Academy of PHYSICAL MEDICINE

Transcript

Articular Grafting – Ref 256

Steven Bruce
No Good evening. Welcome to the Academy of physical medicine for the second broadcast this week. My guest this evening, he's been on the show twice before he is consultant orthopaedic surgeon, Ian McDermott, his specialist subject is knees. And when I looked him up on the internet, I counted about 30 publications, which is either the sole author or the lead author, almost all of them about knee. So I doubt there's very much he can't tell us about that. He's here to talk about Kandra, grafting and the state of affairs in the UK today. So I suspect that will be of interest not just to you, but to many of your patients. So welcome to the show. Thank you for coming back and joining us for a third time.

Ian McDermott
Thanks very much, Steven, that's kind of YouTube invited me to be here.

Steven Bruce
I hope I didn't do any injustice by not doing a fuller introduction there. I mean, you've been you've been a consultant now for what, 23 years or something, haven't you? And, and you've, you're the youngest trustee of the Royal College of Surgeons as well, at one point, so you're pretty eminent in your field. I think it's fair to say.

Ian McDermott
It seems ironic to use the word young now. I don't I don't know. You don't have to give some crappy, long intro. If I if I want to introduce myself accurately as succinctly then it's my name is Ian. I do knees. That's That's it?

Steven Bruce
Well, I was gonna say actually two of the papers. They're not the only two but two of the papers on that you're responsible for are not about knees. One is about fat embolism syndrome, and the other is about thyroid cancer, isn't it? papillary thyroid cancer. Now I can see the connection with fat embolism syndrome because that does occur as a result of Orthopaedic Surgery. Sometimes I understand well, I'm no expert in that. But the other one cancers. How did you get the right papers on that?

Ian McDermott
Because, well, when you do your surgical training, you have to go through different specialties. So I did not just Orthopaedics I did a lot of general surgery did end did plastics, Urology. So you get you get exposure in lots of different surgical specialties on in your early training before you then sub specialise in just one specialty, which for me was obviously need. Or sorry, for me was Orthopaedics. And then when you start when you're into a

specialty like orthopaedics, then when you finished your general or your general specialty training, that's when you can sub specialise. So that's when a sub specialised purely knees.

Steven Bruce
Right. Okay. So, you said that the state of play in the UK at the moment is a mess. Why is that?

Ian McDermott
So long story, but articular, cartilage grafting and kind of the most cutting edge the best surgical techniques, they've evolved over the last 2030 years, and the regulator's people, people like nice, for example, have loaded way, way behind. And what's been what we've been allowed to make available to patients in the UK has lagged behind. And the problem we're facing now, I mean, I'll talk about it later when we when we talk about articular cartilage grafting, but the problem is that it's barely available in the whole of the UK now. And suddenly the insurance companies just just won't even cover it up some insurance companies will some some won't. It's like their bat their ball, their game, their rules, and it seems entirely arbitrary and kind of without logic or reason as to why some people won't actually allow it apart. From the obvious, which is it's just a cost containment exercise for their own benefit.

Steven Bruce
Yeah, presumably that they must have done the sums on what the alternatives are. And the alternatives are going to cost money as well. And the outcomes might lead to further surgery sooner or later data imagine why am I eating into your presentation?

Ian McDermott
No, that's fine. I think yes. And yes, the if you leave somebody, the longer you leave it, the worse it gets the poor the outcome. But no, in as much as from an insurance companies perspective, if they just leave somebody, well, then great, they don't have to pay for it. And maybe the patient will just give up, maybe the patient will go elsewhere, try and go down the NHS or self fund, or maybe in a couple of years time, they won't have the insurance policy anymore. Now, the problem is that insurance companies are a little bit like the NHS, they work on short term targets. So people, look, the most important insurance is corporate insurance. And this is for the insurance companies from their perspective. And big companies renew their insurance every year, and they go through brokers. So all the insurance companies really care about is their annual targets, and renewals. And then if you look at people who are working within insurance companies, well, guess what, they're all on salaries, and they're all got targets. And so again, they all care about short term targets. Whereas if you take somebody like you, or I, you know, we're potentially going to get to know a patient and know them for many, many years. And, you know, our top priority is the long term best interests of the patient. So we're fighting from two completely different perspectives.

Steven Bruce
It's, it's disappointing, isn't it? I mean, the NICE guidelines are supposed I suppose, in many cases, to look at the quality of life years as a result of whatever intervention it might be, but they don't change very quickly do they don't necessarily reflect current best practice?

Ian McDermott
Let's be really clear and honest about this nice really stands for the National Institute of cost effectiveness, not clinical effectiveness, and there's a huge difference between the two. So

and it's not setting not clinical excellence. So it's all about money. It's all about qualities, qualities, how much money does it cost to give how much quality of life improvement but that's absolutely fine when it comes to a population based approach. Problem is none of my patients there are a population that they're individuals within a population and what's right, what's in the best interest of the population may well not be in the best interest of any of a particular specific patients. So we treat patients were not epidemiologists or public health people sitting in middle offices who kind of have never seen a patient for the last 20 years. We're clinicians, and we treat the individual in front of us. And that's a huge problem when discrepancies like that exist.

Steven Bruce
Yeah, must be hard work explaining to patients why you can't give them what you think is the best treatment. I didn't mean want to ask just before you start on, you know what you've got prepared for assuming, though, as you work, I think almost entirely now in private practice, don't you've given up your NHS work?

Ian McDermott
I gave up the NHS so well over 10 years ago, so I'm Yeah, full time private now. So

Steven Bruce
how much latitude do you have as a consultant to do whatever you think is best for your patients, even if it's not in keeping with the current NICE guidelines,

Ian McDermott
guidelines or guidelines, protocol protocols, other monkeys who haven't the faintest idea what they're doing, and they just didactically follow orders with no thought whatsoever. That's a protocol. A guideline is a suggestion based on evidence and it helps guide people in their decision making process on the understanding that there are always people who are a bit to the left a bit to the right. And the you know, what's right for the individual may be different. So guidelines always include caveats, and they're never they should never be considered didactic. Okay, so how do you organise? So

Steven Bruce
I was gonna say, How do your insurers regard that you have something like a 93 or 95% success rate, but that means there's 7% who don't succeed? If they were to complain about that? Would your insurers say well, you weren't following those guidelines, therefore, you shouldn't have been doing

Ian McDermott
articular cartilage grafting and, you know, we'll chat about it later has got about an eight 80% success rate at five year follow up 93. And, you know, that's part of the consent process. And you've got to be pretty stupid. If you think that there's any such thing in the world as it's safe. Its effective. There is no such thing in the whole of medicine in any aspect of medicine. There's no such thing as an intervention that's 100% safe. There's no such thing as an intervention that's 100% effective. It's just complete fantasy, even amputation, you know, that may not be successful the stunt may get infected, they may have phantom limb pain, you may have stomach problems, you know, it's even an amputation cannot be called, cannot be guaranteed 100% successful. So it's all about patient consent. And consent is about informed consent. So our job is to explain to the patients, the pros, first of all, what they've got, then what their options are, and then the pros and cons of those different options. And then our job is also to guide the patient in the decision making process, if they

require guidance. And then it's only once a decision has been taken and only if that decision involves surgery, that you're then going to do the best job that you can, technically. So there's no such thing as guaranteed outcomes. And explaining that to patients is absolutely critical part of the decision making process. So these guidelines that get this from Nice, a lot of insurance companies or some one insurance company, in particular hide behind nice, which is very, very inappropriate, and quite disingenuous, because nice. It has no statutory remit within the private sector whatsoever. It's an NHS organisation, and it's it assists the NHS in funding decisions. And that's all it is. So it should not be used as a tool to restrict patients access to appropriate treatments within the private sector. But some insurance companies do exactly that.

Steven Bruce
Just taking a slightly contrary stones for a second, we've certainly had consultants on the show in the past, and you might have been one of them. I can't remember it's such a long time since you have been on the show before who have suggested that there are surgeons out there who are inclined to recommend whatever it is they do for a living, not always in necessarily in the best interest of the patient. Do you see a lot of that,

Ian McDermott
too, I see a lot of it. I on a not infrequent basis, I get patients coming to see me. But about 50% of my practice is second opinions. And an a not insignificant percentage of those second opinions. Are patients where I disagree with the diagnosis or recommendations or treatment of whichever consultant they may have seen previously. And you're absolutely right. It's horrific to have to say it in this day and age. But there are undoubtedly a number of surgeons and not insignificant number of surgeons out there who's who I would say their decision making process is suspect at best. And I can't help but wonder whether the decision is in the consultants best interest rather than the patient's best interests. And whether it's for nefarious reasons, rather than just incompetence. bit harsher. Scary. And that's why if you're a clinician, and if you're working in if you refer a patient to a specialist, then you know by God, you really ought to know, that specialist you ought to know. Are they good? Technically? Are they good in their decision making process? Are they a good human being you can't be a good surgeon and Mr. Good Doctor and you can't be a good doctor unless you're a good human being. And just like all human beings are not good. All surgeons are not good. So you have a responsibility to protect your patient from bad doctors, bad surgeons bad medicine. And it's part of the referral process.

Steven Bruce
We ask the person chiropractors have the same sort of thing in our statutory guidelines. And certainly the stakes are somewhat higher in your profession than they are in ours. But nonetheless, we constantly wringing our hands over whether we're getting a patient back too often or aren't recommending too many courses of treatment for their own best interest. And because we're conscious of how much they have to pay for, because very few of them are being paid by insurance companies paid for by insurance companies. Anyway. So I'm waffling on when you've got a whole lot of stuff that you wanted to tell us about. So shall we start on with that?

Ian McDermott
Yeah, let me just share my screen. And could you just let me know Steven, can you see that?

Steven Bruce

Yeah, we've got your full screen up at the moment.

Ian McDermott
Brilliant. And can you see my laser pointer on the screen?

Steven Bruce
Just for the gallery's benefit. I've lost Ian's audio.

Ian McDermott
Okay. I can still hear you, Stephen. Be useful to know whether I can hear you. Yeah, I can hear you.

Steven Bruce
I don't know if the audience can because I can't hear you now.

Ian McDermott
Okay, can somebody from somebody

Steven Bruce
somebody's told me they can hear us both. That's fine.

Ian McDermott
They can hear us by Berean. But but you can't hear me, Stephen. Because I think you probably need to hear me if you're going to be able to ask questions and interject etc, etc. So while Stephen is hopefully hopefully about to stop stealing when you can hear me or you can hear me. Brilliant. Right? So let's get going then because there's a lot to get through. So this thing is articular cartilage but you cannot talk about articular cartilage in our isolation, because articular cartilage is a structure in a knee with other important structures. So, there are other things that you have to talk about in relation to articular cartilage, and we'll cover those as well. So what is articular? cartilage? Well, everybody knows it's that smooth, white, shiny, glistening layer of tissue that covers the joint surfaces. What's remarkable about articular cartilage is that it has the lowest coefficient of friction of any substance known to man, which is incredible. It just shows how amazing amazing either God or nature are depending on one's beliefs and perspectives. So, it is a credit an incredible structure. Until it is, it goes wrong, because it has no blood supply. And therefore, the cells in the articular cartilage, which are mainly in the basal layers are relatively sparse and fairly metabolically inactive. So articular cartilage has very poor limited healing potential. There is a minimal amount of healing that can sometimes happen if you have for example, a clean cut in the cartilage. But generally speaking, articular cartilage does not repair does not regenerate does not grow back on its own. So what about the symptoms and signs? Well, this is actually quite difficult, because the symptoms and signs of articular cartilage damage are really quite non specific. Now I'm not talking about articular cartilage wear and tear where you've got widespread cartilage loss and new developing arthritis, I'm talking about what if you've got a focal patch of damaged, unstable or missing articular cartilage in a joint well, your complaint of medial or lateral joint line pain approximately, and the patient may point to the side of their knee, I may have some clicking the mouse and catching the mouse and giving me the mouse and locking and the knee may well swell. Well, every single one of those symptoms also applies to meniscal tears. So it really is quite non specific. That's why when it comes to defining diagnosing articular, cartilage damage, and defining the severity and extent of any potential damage, we absolutely rely on imaging. Now, if somebody comes in with an arthritic knee, and their x ray looks like this, then you do not need an MRI scan. It's blatantly

obviously arthritic, around we're talking about joint replacement surgery. These are not the kind of patients we're talking about. For the rest of this talk, I'm talking about younger patients with focal areas of damage. So for that, you need an MRI scan, an MRI is an absolutely invaluable, critically important mandatory tool for diagnosing exactly what's going on in a knee. Again, that's excluding older patients with severe arthritis fully blown arthritis, which is obvious on an x ray. So here's an MRI scan of a knee. And this is a high res 3d scanner. If the picture is a little bit blurry or low res, that's purely because it's just my picture on my screen coming through your pick your screen, but we can get some very, very high quality high resolution pictures now, specifically on three Tesla three T scanners. And if you can see this, this is a medial femoral condyle. And there is a chunk of articular cartilage missing. So here's the bone. The articular cartilage is this thin, pale grey layer of tissue on the joint surface. The black line is the subchondral bone plate. And we come around to here there is a patch a chunk of articular cartilage missing. And you can see on this next view, it's a little bit wider on this view. So imaging critically important

Steven Bruce
before you go on mute my my sound everything so that I can speak. When you look at that image there. Which which MRI are you looking at? Are we looking at a stir sequence there to show inflammation? Or is that simply t two I'm thinking

Ian McDermott
yeah, this is a TT picture. It's my favourite picture. They say T one's good for anatomy. T two is good for pathology. This, almost everything I look at is nearly always on a t t scan. Right. So this is you know, a fat suppressed spin echo blah, blah, blah. You know, it's it's the it's the one where everything more black and white, not the one where everything's different paler shells, Shades of Grey. And please don't ask me to explain the physics of exactly how MRI works because it's still after all these years a bit of oranges mystery to me.

Steven Bruce
I think that will be very reassuring to a lot of people watching me. I've got

Ian McDermott
my own simplistic little explanations in my head. So if somebody forces me to explain the MRI scan, I can kind of explain it a bit. But I think I'm making half of it up because I don't really understand the physics is complicated. So yeah, arthroscopy. arthroscopy is not just therapeutic it's also diagnostic, and it's not infrequent to find articular cartilage damage either coincidentally, in which case, it may have just been genuinely coincidental, and it may be asymptomatic or to look in somebody's knee and think there might be a little bit of cartilage damage, and to find out that it's a hell of a lot worse than you thought it was. So, arthroscopy is invaluable, not just therapeutic and also diagnostic. So, this is a picture of an arthroscopy. You can see I'm probing the medial meniscus in the medial compartment. And that meniscus is intact. And the articular cartilage is that smooth, white glistening layer, so on the joint surfaces. So this is somebody with grade three cartilage damage, that didn't show up particularly well on an MRI scan on the MRI, the cartilage looked pale, but it looked like it was still present. But when you do an arthroscopy, and when you probe that cartilage, your probe just disappears into these deep fissures and you can see this unstable flaps. So that's grade three with fissures down to the bone articular cartilage damage on the back of a patella. Now, a good analogy is if you go to a dentist and they think, or have you got a cavity, where they're not just going to look in your mouth. From from a distance, what they do is they get a little mirror, and they get their goggles, their magnifying glasses, and they use their magnifying glasses and their little mirror to look inside your mouth. But even that's not

enough. So that's the equivalent to an arthroscopy, but that's not enough. They also get a little dental pick and they just poke. And if your dental pick disappears into a cavity, well, you know, there's a cavity. So arthroscopy is a little bit like that, you're looking much more closely. Remember, an MRI scan is not a picture, it's a representation of the water content in different locations and different pixel locations. It's not a photograph. Whereas arthroscopy is a photograph is a real life and very, very important that you can actually probe things. So you get that tactile information as well. So if you've got unstable rough articular cartilage damage in a joint, and if the patient is symptomatic, and if you find that at the time of an arthroscopy, what you can do is called abrasion, contour plasti. Now, this is an arthroscopic shaver looks massive, it's not because it's only 3.5 millimetres diameter, oscillating Jaws at the end, hollow tube, Trump's tissue sucks out the knee, it's incredibly dangerous when it comes to articular cartilage. So what I'm doing here is literally just tickling the surface of that cartilage very, very cautiously and gently gently taking away the unstable flat.

Steven Bruce
If when you do this, you have a much better image of what's going on than we're seeing.

Ian McDermott
i It depends on I can't see how bad your picture is. I'm

Steven Bruce
sorry. It's flickering. From static short to static short, I take it yours is very much real time and you can see exactly what your probes doing.

Ian McDermott
It's it's real time and it's 4k HD. So and it's on a great big screen, great big screen in theatre. So yeah, we see it pretty accurately. So that's a version of Contra plasti. Now if you think of articular cartilage damage has been like flaking paint on the rusty gate, and there's bits peeling off. So as your knee is constantly moving or catalyst bits and you're breaking bits of well, the abrasion contract plasti is like using electric sander on that flaky paint to smooth it off. The problem being is that if you are not very very careful, you can end up taking away lots of cartilage and causing even more damage. So imagine that you're going willy nilly on that flaky paint with your electric sander. Then all of a sudden, before you know what's happened, you're down to bare bone on your rusty gating. So bare metal. So when you're doing abrasion contrast, you have to be super, super gentle, super patient and super delicate. I tend to avoid it as much as I can. And the reason for that is that the main thing that I rely on is radiofrequency conduct last sorry Khandro plasti. Now, this is a radio frequency probe, and it's called an arthro care super turbo vac 51. Great name. And there are two little electrodes in the tip. And they superheat the sodium ions in the salt water that we're pumping around the knee and it creates a little sodium plasma at the tip. So it's like a little lightsaber or like little welding arc at the tip. Now if you just get that probe and you stick it against the cartridge and turn it on, it will burn straight through and it'll go straight through to bone up very quickly. So what you do is little bursts of energy, hold the probe away from the surface of the cartilage and just bit by bit. It melts or kind of it's actually evaporate. rate to the surface and what you're doing is smoothing things off and stabilising it. So, back to the paint analogy. This is more like using a blowtorch on your flaky paint to melt the surface stick it down, smooth that off and stabilise it. Now, if you do that it tends to reduce pain, it tends to stabilise the cartridge surface, it stops it flaking away so quickly it does not make the cartridge grow back. Very importantly. And if you go too deep if you just keep going because you want to get it smoother and smoother and smoother, well then sooner or later there'll be nothing left. So you have to be very, very cautious and conservative with how you do

radiofrequency contour plasti is a good thing to stabilise and smooth off the cartridge. But you again, you've got to be very, very patient and very delicate with it. And that is for unstable partial thickness, cartilage damage. Here's a really, really bad one. So this is like crazy bad. This is somebody's medial femoral condyle and this cartridge is just falling apart, it's beginning to flake off and D laminate. And that's that's kind of horrendous. Now, very interestingly, if you simply stabilise that damaged cartilage with a radiofrequency probe, then in about 40% of patients, they actually report that their knee ends up feeling good enough not to need anything else in terms of anything bigger. So they ended up not wanting to take things further. So that's the damage cartridge there. And then what we do is with the radiofrequency probe, just smooth things off as best we can very carefully bit by bit. And if you keep on going, you'll get down to bone and there'll be nothing left. And you want to stabilise the cartridge, not remove it. So very carefully, bit by bit, smooth off that damaged cartilage. Not sure if the video is going to catch up with us. And as I said, if you get that cartridge smooth, if you get that cartridge stable, then it's got a pretty good chance of reducing the patient's symptoms, help them keep their going knee going for longer and delaying the time when anything else bigger might need to be done. But it's not a shooter per se. It may reduce symptoms improve function by people extra time, but it's not restoring the knee back to what it was. It's a tidy up. So the next question is what do you do if there is full fitness cartilage loss? Well, the first option, which is fairly easy, straightforward, cheap, minimally invasive is called microfracture. microfracture has been around for decades now. And it was first popularised by Dick Steadman from Vail. So if you have a full thickness defect, but if it is a small focal defect, and by small the definition is less than two square centimetres, and that doesn't mean two by two, that's four. So we're talking about roughly 1.4 times 1.4 centimetre patch is roughly two square centimetres, and that's pretty small. And if there is a decent shoulder of surrounding articular cartilage, then microfracture might be appropriate. But those stipulations are really, really specific and clear. So with microfracture, you scrape away what might be left at the calcified cartridge layer at the base of the defect. And then you punch little holes with a metal pick. So it's literally just a metal spike and you puncture the subchondral bone plate. The subchondral bone plate is acting as a barrier. So an all the blood and bone marrow and stem cells are underneath that within the bone. So what you're doing is by puncturing the subchondral bone quickly, you allow the bone to bleed then you get a blood clot forming in that little crater. That blood clot is rich in stem cells from the bone marrow and the Americans call it a super clot. And as it heals, what happens is it tends to form fibrocartilage and fibrocartilage is halfway between normal cartilage and scar tissue. It's not normal Highline cartilage, but it's better than bare bone. So microfracture is reasonably good for small focal contained defects. This is quite a big defect. This is looking into the front of somebody's knee unless it is a patch of full thickness articular cartilage damage in the trochlear groove at the front of the femur with very unstable flaps of cartilage and with some partial thickness cartilage damage on the back of the kneecap. So we stabilise the edges of the defect using the radiofrequency probe. And then we puncture little holes into the base. And this is a micro fracture pick. And this is a really old video. This is going to a knee that literally years and years ago and when you punch those little holes if you watch really carefully I hope you can see on the video. If the if the quality is good enough, then what happens is, as you're hitting a hole, out of some of the other holes, you might, if you're lucky, see a little yellow blob come out. And that is a blob of bone marrow. So if you look at that previous hole, there, see that yellow blob? That's bone marrow. And as I put the next hole in, you might see a little blob of bone marrow coming out. If we're patient or not.

Steven Bruce
It looks as though it's quite easy to punch holes in that bone plate

Ian McDermott
and hitting it with a hammer. Yeah, it's easy if you've got big hammer. And if it's difficult get a bigger hammer. Yeah, that's the that's the mantra for orthopaedics, isn't it? So now you can't see any little yellow blobs. And the reason it's not bleeding in here. The reason you're not seeing the whole thing filling up with blood is simply because we've got the water pressure. Turns out, we're pumping pressurised saline through that knee, and that has a tamponade effect. So there you go. Little yellow blobs. Do you see them coming out? You might have missed that. Yeah. So that's bone marrow. So that's microfracture. But we've moved on. I mean, that's awesome school. And a few years ago, we went from using a micro fracture, which basically fractures the bone or impact it and it creates a hard cone of bone which actually inhibits bleeding. So we moved on to something called micro FX, which is using a flexible drill bit to drill little holes, and even that's old fashioned now. So the current thing that we use is nano fracture, or nano drilling is another way of putting it. And that's a 9.9 millimetre diameter, flexible drill bit. And what we do is put much, much smaller diameter holes in the subchondral bone clay. And there's very good German research that shows that gives much better result because it damages the subchondral bone plate less. So this was a difficult case. This is somebody with a displaced locked bucket handle tear of their medial meniscus, and that's the meniscus. I'm probing there with a horrible big patch of full thickness, cartilage loss damage on their medial femoral condyle. And that is a big big patch. So first thing we did in this case was to reduce that meniscus back in place, and to stitch that meniscus and do a meniscal repair. Second thing we do is to smooth off and stabilise the edges of that hole in the cartilage. So that's radiofrequency contour plasti to stabilise the edges of the defect. And then next, what I'm doing here is the Nano drilling. And that is to drill lots of little holes on the surface of the bone. And you can see these holes are significantly smaller. And we put kind of a bigger number of them compared to what we used to do for microfracture. And once you finish doing that, that's what you end up with, you want the surface of the defect to look like a Pepperpot there are lots of little holes. And this is actually quite a nice picture because where that meniscus has been reduced and stitch back in place, you can see blood under the meniscus. And that's more the little holes where you put the meniscus stitches in and that's really really good. Because the more blood there is the man that ran the meniscus, the more likely it is the meniscal repair will heal. And this is at the absolute upper limits of what you'd ever consider appropriate for for Nano drilling in terms of the surface area. And it's like really, really at the upper limit.

Steven Bruce
If I can interrupt this for a second Carrie sent me a question a few minutes ago, just asking why such a small discreet patch of cartilage would be damaged in that way. Why would there be a chunk missing rather than more generalised where

Ian McDermott
that's can there's lots of different reasons it may be an object chondrites diskens lesion but that's different bone and cartilage. It may be traumatic, so you get blunt trauma. It may be that you've got meniscal damage, so you've lost your meniscus there forget increased contact pressures. Focal defects like that are quite often traumatic, did not just wear and tear. However, sometimes when you're developing articular cartilage failure, what can happen is the cartilage can crack and then as the crack propagates, you end up with an unstable flap. And then sometimes that flap may break off and leave a focal patch of cartilage damage. And part of the skill in articular cartilage surgery is patient selection in terms of identifying which of those cartilage defects are genuinely fun Go, as opposed to, which are, which then represents a patch of articular cartilage loss that is simply the

beginning of the end for that knee. In other words, there may be a little hole, but it's simply the beginning of all of the articular cartilage beginning to wear away or flake off the laminate fail, etc. And if it's the latter, and you start trying to do articular cartilage grafting in and neither where the whole of the joint surfaces is beginning to kind of fail, well your cartilage grafting will fail. You know cartilage grafting is not for generalised osteoarthritis in anything. So, okay,

Steven Bruce
yeah, that's fine. Sorry, I'm keeping quiet because I'm getting slight problems with my audio and I'm having to mute one system whenever I speak otherwise, I get endless echo is coming up. So I'm fascinated and I will feed in questions from time to time but otherwise I'm gonna keep quiet.

Ian McDermott
Okay. So then, everything we've talked about so far, we've talked about radiofrequency controversy or site abrasion, contrary plastic radiofrequency conduct plasti for partial thickness damage. We talked about microfracture, old school modern version nano drilling for small focal defects. The next question is what do you do if you've got a large full thickness defect? Well, you've got options. You can do autologous Chondrocyte Implantation or, and that's where you take cells come to them in a lab, six weeks late, six weeks later, re implant them. And if those cells are cultured into a membrane, that's called macing. There's a Mick and I use something called Kandra tissue and explain that in a minute. Or there's focal resurfacing with actual metal implants. Or you can kind of go to the the kind of final resort stuff, which is partial relief and total knee replacement. So what is ACI or Macey, this has been around for decades, originally developed in Sweden. And what you do is a two stage procedure where you scrape the first operation is to scrape some cartridge off the edge of the joint. And then you send that cartridge off to the lab. And it used to be done by a company called Genzyme. They used to be the biggest. And they they take about six weeks to culture, the cartilage cells, and they multiply them into about 50 million cartilage cells, and they send them back to you. So six weeks later, you can implant those cartilage cells. First generation ACI, you use a little patch of periosteum. But that was subjected to quite a lot of overgrowth. So second generation ACI was when people started using little collagen patches instead. And then third generation ACI is when the cells are actually impregnated into a collagen membrane. So you basically get you send yourself six weeks later, you get a living membrane, we're living cells in, in a in a culture serum. And they're sent back to you and you implant it. Now. That process is staggeringly technically demanding, and just the cell culture alone costs 10,000 pounds or so used to cost 10,000 pounds. And it requires two operations instead of one operation. And in 25% of cases, you the patient ends up needing a reoperation for either a partial failure of the graft or overgrowth. So there are lots and lots of issues with that. However,

Steven Bruce
can I assume it's done arthroscopically, though, you

Ian McDermott
know, the problem is, if you do this, some people used to do this arthroscopically. And what the research showed is that the water that you're washing around the knee, so you can see what you're doing washes away the cells. So this has to be done through at least a mini arthrotomy. So it has to be done open doesn't necessarily require a great big knee replacement incision. But it does require open surgery. So big, open surgery to not one on 10,000 pounds just to culture, the cells that does not include the cost of the first or the cost

of the second operation that's purely to culture, the cells. And the overall success rate is in the region of about 80% at five year follow up. So it's reasonably good, but it's far from perfect. Now, this is where the mess started to happen. So nice. And it's great wisdom refused to use the word except endorsed as good word. They refused to endorse or recognise ACI as a procedure within the NHS. So it wasn't considered cost effective. Because it's so expensive. Doesn't mean it doesn't work. It's just too about. It's about money, cost effectiveness. So they wouldn't endorse it. Therefore, if it wasn't nice approved, you couldn't do it in the NHS outside of clinical trials. And the insurance company said, Well, if the NHS bans it, well, then we're going to ban it, which is completely nonsensical because it's a financial decision based on cost. It's not a clinical decision based on effectiveness. So what happened is because nicely, basically effectively banned it, it disappeared in the NHS, it disappeared in the private sector. And the companies, therefore, basically withdrew. So all of a sudden, we were left with no options for a cartilage grafting. Then, in the wake of that, what then happened is, I'll come back to that picture, I'll come back to it. What then happened is people got innovative. And there was one certainly published about the fact that he put in a collagen scaffold, which was supposed to be part of the ACL ACI process, but no cells were available. So we just put it in the scaffold alone with no cells. In the end, the patient actually regrow cartilage. And which was a little bit of a surprise string thing to do the first the first time anybody ever did that, that it was done. So that then begs the question, then we'll just how many cells do you need? Or do you even need cells at all do you need to do the cell culture and off the back of that something called a Mick was developed. An AMI stands for autologous membrane induced Khandro Genesis. So this is a single stage procedure. Unlike Macy, or ACI, it's a single stage procedure, and it uses a bio absorbable synthetic scaffold, and the one there's different ones available, the one that I use is Kandra tissue. And Kandra tissue is a woven Ponte glycolic acid mesh impregnated with high alloy uronic acid, and it comes like a piece of fuzzy felt. So this is an example of open contract tissue grafting as a single state procedure. And in this is a girl's knee, who had loads and loads of damage loads of problems. And she ended up with this great big, tear shaped full thickness defect of full fitness defect with bare bone exposed on her medial femoral condyle. So I've stabilised the edges of the defect. I've done micro f f x drilling, remember that's now old fashioned nowadays, it'd be much, much smaller holes with a nano drill. But this is a historical slide. We then get that graft, we cut it to size, and we put that graft into the defect. And very, very quickly that graft soaks up the blood that's coming through. That's it. The graft has literally just been put on. That's the ground literally a number of seconds later, it soaks up the blood from the holes in the bone. Within that blood is rich. In bone marrow, it is well it is bone marrow, and there are stem cells within that bone marrow. And then this particular case, what I've done is pinned that graft in place with four little bio absorbable contour dots. Then what we do is we cover it over with a biological glue called reverse that PRF that's not PRP. It's PR F which means platelet rich fibrin. And what we do there is we take 120 mils of blood from the patient, spin it down and that gives us five or six mils of fibrin autologous fibrin, which is like the sticky sticky part of a blood clot, so it's like a glue. And it's got an eight times concentration of platelets in it and the platelets release growth factors. So that's the defect and the graft covered over with diverse that PR FA as a glue B as a sealant to keep the cells in and see it's bioactive because the platelets release growth factors which promotes healing.

Steven Bruce
So just for a second, and I'm gonna go back to those research papers that I mentioned earlier on. Is this why there are those respiratory complications of orthopaedic surgery because you're inducing clotting in the process here presumably with vibrant?

Ian McDermott
No, this is this is small, and I know that you tend to only get things like fat embolism syndrome. Very, very, very, very occasionally, with joint replacement surgery. That's pretty much unheard of families and syndromes, mainly from fractures of long bones, we get large amounts of of fat from the bone marrow from damaged blood vessels, he goes into the venous circulation. So fat embolism syndrome is something associated with major trauma, not with not with by comparison, relatively minor. I mean, this is major soft tissue surgery is complicated, it's fiddly. But this is not in the realms of something that is like ever likely to cause pain but isn't syndrome.

Steven Bruce
Right. Thank you.

Ian McDermott
So that's the same patient with her MRI scan nine months later and Here you can see the bio absorbable pins are still only partially absorbed. And what we've got now is a new layer of articular cartilage that has grown on the joint surface that grows higher line like cartilage. Now you got to be really careful when you hear comments like that normal cartilage is called Highline cartilage. So when you say hide in like, you're saying normal, like normal like means abnormal is like saying, my darling, you are almost perfect is exactly the same as saying you are imperfect. Okay, so when people say is highly like cartilage, it means it's abnormal. It's not normal cartridge, but it's better than nothing is better than their bone. And again, that has got an approximately 80% success rate at a five year follow up so broadly similar to ACI. Then we moved on to trying to do this arthroscopically. So there's a full thickness defect on a medial femoral condyle. Here's the micro FX drill. So again, this is a slightly old video, micro effects drill is drilling holes in the joint to surface to penetrate that subchondral bone plate. There, then we size it, then we cut our graph to size, you place the graph graft in place, and then you pin it just to hold it in place. And then you fix in place with bioabsorbable Condor darts. That's the first one. Here's the second one. And then once you've fixed it in place, straightaway, you see the graft is beginning to soak up some of the blood from the holes on the bone surface. The reason it's not gone completely red is because we've got the water turned on the water's washing away cells. And that's a bad thing, not a good thing. And then I spray the whole lot over with the device that P RF and P Rf is amazing, you can actually inject it arthroscopically even if there's water there, polymerize is within within fractions of a second. You just have to turn the water pressure down. And so what I'm doing is spraying this PRF if we can get those little bubbles out of the way, spraying my graft with PRF and then want to do is slowly straighten, and then bend the knee and what I'm doing there is I'm spreading that PRF over the graft surface. So that's the first spray. And then I'll do it again, because there's a little bit missing, there's a little gap at the top. So I'm going to spray that with PRF covered over the excess stuff just gets washed out, washed out the knee, and then again, bend the knee, straighten the knee very slowly, very carefully. And now that's beginning to look like a more stable surface. Again, if you're not used to knees that probably looks gross or grim or messy. But actually, if you're into knees, that's a thing of beauty. Because that PRFs surface layer in now acts as a sealant to prevent your SINOVEL fluid or whatever water you're pumping through the knee at the time the arthroscopy from washing away all those cells. Now, here's another one. This is a patellar increase incredibly difficult if not impossible, to do cartilage grafting on the back of the patella through keyhole surgery, you're going to have to open up the knee and either the patella so that somebody patellar opened up either did which means the same as dislocating and there's a full thickness defect are marked the edges of the defect. With pen, you scrape away what's left in the scar tissue. So down to fresh bone, you do your drilling of the base,

you put your graft on as a template, so you can see where the edges are because the edges are red. You cut it aside, you pop it into your defect. I've put I've pinned it in place with two contour dots there. And then I use my vivid snap P r f as glue. And that's it with the graft in place covered over with my PRF. This is

Steven Bruce
a patellar it's clearly not designed to be E verted. How much damage you're doing to the surrounding soft tissue. So the tendons

Ian McDermott
lots. Yeah, it's a nasty thing to do, you know, like it's the same approach as a knee replacement where you cut through the midline of the skin through the skin in the midline. We're talking about a 15 to 20 centimetre cut for that procedure. So, probably 15 centimetres for that

Steven Bruce
one. I have one here I prepared earlier.

Ian McDermott
And then you cut longitudinally through the distal quads, and then you cut around the circumference of the patella. So you're cutting through the medial retinaculum and then you can't login easily to the medial side of the patellar tendon. And then you dislike the dislocate the whole thing by diverting it towards the lateral side. So yeah, it's brutal. It's not as and there's nothing In small tetanus, the graft may be small and delicate, but my god the surgery is invasive. So, again, this is not the kind of thing you would want done in your knee unless you really needed it.

Steven Bruce
You know, thank you. If I can just take you right to that high line like cartilage again, peppers asked if you've got any idea what degree of pain relief does that give by contrast to proper Highline cartilage?

Ian McDermott
Right? The whole aim and cartilage grafting is to give somebody a pain free knee with good function. Often you don't achieve 100% pain free. If we if we achieve significant pain reduction, that's a win. If you get pain and complete and total pain relief, well, that's brilliant. That's great. Okay, that's a bonus. In terms of function. The aim is to allow people to do their daily activities and do exercise does I think it themselves fit and healthy, it does not mean that you should go back to sport or heavy impact pivoting type exercise. And that's a really, really important point and this is where I firmly disagree with a not insignificant number of other surgeons on this point. So some surgeons have on their websites that or at meetings, they say, Oh yeah, 72% of my cartilage grafting patients can get back to sport or 72% Eliminate skull transplant patients getting back to sport Well, in a well done not because best analogy I can give you on that is it's like saying, oh great look 72% of my lung transplant patients can get back to smoking, or 72% of my liver transplant patients can back get back to drinking Well, you know, the adult thinks is salvage this is not curative. This is This is that same patient this this is his patellar relook arthroscopy for other reasons at nine months post op, and that's the new tissue that's grown on the back of the patella. And looking from the top of the knee looking down, it's pretty good. But you can still see that area where the cartilage is a little bit different colour, it's a little bit rough, it's a little bit uneven, it is not perfect. So if you're performing salvage surgery to reduce somebody's symptoms to keep

them healthy and to and to keep them going for longer, then if you pound that graft by going back to heavy impact exercise, all you're going to do is significantly increase the likelihood of it failing prematurely. So you can't have it both ways. It's like saying, right, I've got bald tires, so I'm going to go too quickly. I'm going to have new tires put in my car. Then you say to their Mr. Quick Fit. can I escape on your forecourt on my way out? I missed a Quick Fit was a well, you can of course you can if you want to have four new tires pretty damn soon. If you want your tires to last drive sensibly, don't pound them. Now Kandra tissue versus ACI. So there are pros and there are cons, ACI to ops contract issue one up risco but 25% in ACI patients. I don't think it's right to put no in contract issue, I'd say less frequently. The actual graft when you're doing ACI or Macy surgery is fiddly as hell and it's really delicate. The Condor tissue graft is far easier to handle in terms of the surgical technicalities is more robust. If you have an ACI graft, and you drop it on the floor, you're stuffed. If you have a conduit tissue grafts and you drop it on the floor, well whoops, you've just you've just thrown away a couple of grand, but you just get another one off the shelf. Tissue formed for both of them is highly like, and in both of them results are approximately 80% of five year follow up. ACI costs about 10,000 pounds to culture, the sales contract tissue, it costs about two to 3000, depending on which hospital it is. So roughly two and a half 1000 pounds for the actual graft. But don't forget, that's just the cost of the graft. You're also talking about to the cost of to operations and the pain and the hassle, the risk, you know, for the patient with two opps versus a cheaper single up if you do it as a single stage procedure with contract tissue. And then, you know the crunches well can you get ACI on ACI so may see in the UK? The answer is no, you can't whereas competition is available. So what would I have competition. Now I'm gonna flick back. Sorry, this is a little bit annoying, but let me flick back. Because there is no

Steven Bruce
you're finding the right slow. Can I just interject with a question from Cali? Cali was asking about whether there is a benefit in a patellar replacement rather than a graft, which is more successful.

Ian McDermott
Is the question is which is more successful?

Steven Bruce
Yes.

Ian McDermott
Is hosting some courses if you've got an older As with widespread cartilage loss, in other words, patellofemoral arthritis, we're going to be talking about a patella femoral partial replacement. If you've got a young person, and they've got a focal patch of cartilage damage or loss, well, you don't want to do a joint replacement, a young person with just a small patch of cartilage loss. So you talk about two completely different things. But telefone will replacement and cartilage grafting, you should never, ever look at an ear thing. Should I do this? Or should I do that? You're talking about two radically different entities. Different different pathology, different different issue in different patients. Okay, thank you. This is the slide I wanted to go back to and this is something that I've got a bit of a problem with. And there is a German company called codon who have introduced into the UK something called sphere ox. It's like ACI it but it's not ACI. And it's not Maisie that culture. It's similar. They culturing cartilage cells. So it is two stage procedure. And they provide the cells as these little spheroids are conjoined. And what they what you're supposed to do is just inject them into the knee, allegedly, they stick to the bone surface, you don't have to stick them in, they

just stick on their own. And then these little blobs, somehow miraculously grow new cartilage tissue. I'm extremely sceptical about it, just like you say, Highland like, is not the same as this is like ACI. It's not ACI. I asked the company repeatedly for clinical evidence, and repeatedly, they failed to provide any. So I wouldn't personally personally, I wouldn't touch this with a barge pole. But everyone's got their, what's

Steven Bruce
this called, again?

Ian McDermott
Spear rocks. It's called spear rocks from a company called codon. And there are lots and lots and lots of different surgical options and different surgical techniques. And they've all got their antagonists and protagonists, they've all got some degree of evidence, some of it is, you know, really quite comprehensive and robust. Some of it is absolutely lacking when I put this one in the lacking category, and I personally wouldn't go near it. I might be proven wrong. But I probably have to wait another five or 10 years to find out one way or the other.

Steven Bruce
So where are they getting the cells from for this

Ian McDermott
problem from the patient's need, just like ACI. So, sorry for jumping around. In terms of logic, I just wanted to do it in that order. Now,

Steven Bruce
if I can interrupt this once more, because I think this will be quite separate for you. Alex has come in with a question. Well, more in hope, I hope than anything else, I think, than anything else. He says I don't suppose this kind of technique will work for multiple epiphyseal dysplasia because his teenage son has just been diagnosed with that.

Ian McDermott
That's something completely different. Sorry. Yep. So Nope. Apologies, Alex. But no, this is something that was completely different pathological entity we're talking about here.

Steven Bruce
Okay, and Rupert said, what sort of average age are you suggesting would be appropriate for grafting in the me?

Ian McDermott
I would say I'll answer that in a slightly different way, which is what that's what's the upper limit? Some people say the upper limit is 50. Some people are a little bit bolder, more adventurous, say the upper limits 55. Thing is, the older you are the poor your heating potential, the lower the probability of a good outcome combined with the fact that the older you are the closer you get to that age where an artificial joint replacement is more appropriate. And again, the older you are, the more widespread the damage tends to be. So really, average age. I think a better way to say it is upper age limit, upper age limit, probably about 50, which is a little bit ageist, but it's not ages. It's just it's just science. It's just nature. Yeah, you get young 50 year olds, you get old 50 year olds. So you know, there's always a little bit of leeway in that. So, next thing to talk about and you cannot not talk about this is the meniscus. And time and time again, I've seen people who come to me for a second opinion, you've had previous surgery, and somebody's done micro fracture in their knee. And there's

no meniscus there. And that's just really silly. There's no point in doing micro fracture on the article account for articular cartilage defect if there's no meniscus there to protect the articular cartilage. So we all know what the meniscus cartilage is are two small C shaped elastic wedges of cartilage that has low G errors. People refer to them as shock absorbers but in reality, they're predominately load sharers in the knee. And they tear quite easily to lots of ways to tear meniscus. So meniscal tears are one of the most common things that a knee surgeon will ever say. Now, if you develop a spontaneous degenerate Have meniscal tear in an older patient. And about two thirds of those settle down with conservative management just with time doesn't mean the reminisce because it's healed or regenerated or grown back, because they don't, it just means the nerve fibres have shrivelled back and it's no longer hurting. And if it's not catching and it's not mechanically unstable, but you're not going to get mechanical symptoms. So in about two thirds of patients, then if you're cautious patient, you give them time and time TLC and a bit of rehab, their knee will settle down enough, maybe not 100%, but enough for them not to need surgery. This is in older patients with a degenerative meniscal tear. If you have a younger patient with a traumatic meniscal tear, most of those will need surgery and it's man is much more important to operate on them sooner rather than later. Because the sooner you catch them, the more likely they are to be repairable. This is a ragged complex tear in the poster a horn of a medial meniscus. And when you look about the whole thing is in a bit of a mess and those bits of tissue are gonna catch they're gonna flick around, that's going to be very symptomatic. If it's symptomatic, if those symptoms feel bad enough to justify the pain, the hassle, the risk of surgery, then you're going to go ahead with an arthroscopy. There's no way a ragged tear like that is repairable. So you're going to trim it you trim away as much tissues in need to get the remaining tissue smooth and stable whilst trying to leave behind as much as you can. And that's a partial mastectomy. Partial minutes get to me has a very, very high success rate for eliminating miniscule symptoms from a meniscal tear

Steven Bruce
or life expectancy if I can put it that way. I have a partial meniscectomy. How long will it last?

Ian McDermott
You mean, how long will the need last?

Steven Bruce
I'm sorry, what I mean is how long will it be effective for because presumably with that loss of load bearing, the load sharing that you've now experienced is going to be more where on the articular surface.

Ian McDermott
Again, you gotta be really careful with precise use of terminology, the partial partial minutes gets me will work forever, you've taken away the torn tissue. And it's not like the more you take away, the more likely what's left is to tear, the more you take away, the less there is to tear and the less load the remaining tissue is taking. So apart from an escaped me is 100% effective at getting rid of the torn tissue. And if it's the torn tissue that's causing the symptoms, well then it's got a very high probability of getting rid of the symptoms of the meniscal tear, it does not restore the volume or function back to the meniscus. So it's 100% ineffective at restoring miniscule function. So if you've got a meniscal tear that's asymptomatic, we'll leave it alone, because you're better off keeping as much meniscal tissue as you can. If it's symptomatic, and symptomatic enough that you can't tolerate your symptoms, and you feel that you need to get something done, well then have a trim. And if you have a trim, it'll get rid of your symptoms won't restore the function. And therefore the

consequences are actually in the longer term, not the short term. And pingers, if by magic. So this is some pictures from one of the studies we did at Imperial College. top picture is an intact lateral meniscus. And that's the pressure profile. The bottom picture is what the lateral compartment looks like when you've taken out the lateral meniscus. So what you do is you have a much smaller contact surface area and therefore much higher peak contact pressures in that smaller area. And that's what causes the articular cartilage to fail and eventually wear away and you end up with arthritis, if you want. So that is why if you can possibly repair a meniscus you should. So that comes back to the younger patients if the younger patient where the traumatic tear, especially if it's a vertical peripheral circumferential tear, you really, really want to repair that if you possibly can. If you look at the literature, the literature suggests that maybe about 15% One 5% of meniscal tears are repairable. And the success rates vary massively depend between the different published papers from anything from 50% to 90%. I audited my practice a few years old now, and I repair about about 1/3 of the test that I see. But that's because I see a lot of younger patients with a lot of sports injuries. And my patient satisfaction was between 96% or two and 81%. So 80 to 90%. Satisfaction. So even if you repair it, it does not mean that that tissue will necessarily heal. And if you end up having to if it ends up not healing or retiring, then sometimes you have to go back in and just trim it anyway. And that's a massive negative because then the patient is undergoing two operations instead of one with a lot of pain and hassle in between. So it's very, very important that you pick and choose your meniscal repairs again, I can't say enough times. patient selection is everything And if you lose a meniscus, well then you're more likely to get arthritis. If you want to quantify that risk, if you take out the whole meniscus, so a total mastectomy, then the relative risk of developing arthritis is 14 at 21 year follow up. So you're 14 times more likely to develop arthritis, an easy way in terms of the numbers is you say 15 times in within 20 years, just roughly. And if the patient's still doesn't seem to be taking that seriously, well, then tell them the risk is 1,500%. So another way of saying it, and then all of a sudden, yeah, you take it seriously. So that's why you don't want to tear a meniscus. If you've torn a meniscus and you're young and there's a chance of it being repairable, then you want a meniscal repair. The longer you leave a meniscus tear, the less likely it is to be repairable. However, ragged, degenerate meniscal tears in older patients that are rarely if ever repairable. And therefore all you're going to do if anything is trim them, and that's purely to get rid of the symptoms, it does not restore the function. If the symptoms are not bad enough to justify the pain, the hassle and risk of surgery, you're better off leaving the meniscus as it is. Now,

Steven Bruce
one of the things I find in all of these shows is that my wife Claire can bring everything back to something related to horses. And she's asked regarding that picture of a miniscule repair is that blue string baler twine because she's been looking for some way of using baler twine?

Ian McDermott
No, sorry, it's a non absorbable suture. Basically, it's, it's similar to polyethylene. So those stitches

Steven Bruce
are very disappointed. Yeah, sorry.

Ian McDermott
So then, let's take the logic one step further. What happens if you've lost your meniscus? And as a result of losing your meniscus, you're beginning to develop premature progressive wear and tear of your articular cartilage and it's symptomatic? Well, the answer is putting a

new meniscus. It's not new. That's Klaus Miller kowski. He published the first paper of case series of human municipal transplants back in 1989. And he actually published it in 1987 in the German speaking literature, but 1989 of English speaking literature. That's a meniscal allograft. From a donor. There's nothing nothing better from it for replacing a missing meniscus, then a meniscus. It's immuno privileged tissue. So it doesn't elicit elicit any Ben, come on. My mouth is getting tired. It doesn't elicit an immune response so it doesn't get rejected. All you got to do is is match left knee right knee medial or lateral incisor that's it prepared ready to go in? That's a medial compartment with no meniscus, and the articular cartilage surface is beginning to fail. And that's the meniscus our graph put in. Does it work? Well, yeah. Here's the last piece of the equation from that previous study. The top the left hand pictures are 2d, the right hand picture is the same data but 3d. So the top two pictures are an intact lateral meniscus. The middle pictures are what the pressure profile looks like when you remove the meniscus. And then the bottom two pictures are what the profile looks like when you put in a meniscal allograft. So a meniscal allograft restores the contact pressures back towards normal but not to normal. So again, a meniscal allograft is better than no meniscus, it's not as good as your own original meniscus. And also, it doesn't make any out articular cartilage damage that you might have already developed. It doesn't reverse that. So the aim of meniscal transplantation is to reduce somebody's pain, maintain their function, keep their knee going for longer to try and delay but not necessarily avoid the time when they need a knee replacement

Steven Bruce
was a criteria of a patient selection here and I speak with a certain amount of self interest having a total meniscectomy in 1982. And then progressive arthritis probably 20 years after that. I was never offered that option. And it might not have been appropriate but I never even heard the option raised

Ian McDermott
right. There's only a small number of us who do meniscal transplantation in the UK and a very, very small number of us that do it in big numbers. And I did my first miniscule transplant in can't remember 15 plus years ago, something like that quite a long time ago now. And it's one of the most fiddly, technically demanding soft tissue knee procedures that you can do. It's not the kind of thing that you just get to do one once in a blue moon, because there's a steep learning curve, it's difficult, so not many surgeons do it. And then number two, the patient selection criteria are very, very strict. Again, there's an age limit And, broadly speaking, the cut off, most people kind of agree the cut off again is about 50. And it's not for an arthritic knee is for somebody who's lost them in their system. They're beginning their knees beginning to go downhill. And it's not even to stop that downward downward progression is to slow it down is to buy them extra time. So again, it is salvage their surgery, not restorative. And there's lots of other criteria. It's, you know, you could have a whole evening talking about meniscal transplantation, and then put success rates. Again, if anybody ever asks you in an exam situation or any clinical setting, what is the success rate for x, and if the word if the phrase involves that also includes the word cartilage, whether that's meniscal cartilage, or articular cartilage? And if the why is five year success rate? The answer is 80. All right, if you want to be a little bit more optimistic, it could be as high as 8580 to 85% success rate with every single procedure at five year follow up for articular cartilage and meniscus replacement.

Steven Bruce
So in the case of all the practitioners watching this evening, I mean, they will come across I'm sure plenty of patients who will have had at some stage, a complete mini segment

escapes me. And presumably, given that nobody even mentioned this to me, we ought to be aware of those surgeons who are offering it so that at least the choices put before them.

Ian McDermott
Just to burst the bubble and to be kind of slightly negative about it. The answer that I unfortunately have to give to the majority of the patients who asked me, Can I have a meniscal transplant is no, I'm sorry, your knees too far gone. And you're not appropriate? Unfortunately, that's that's a reflection of the fact that exactly as you've just said, not enough people know about it, and therefore these patients are not referred early enough when they're still a candidate. And by the time that they hear about it, their knees knackered, and it's too late. You've missed the boat. Yeah, so that is a problem. But the good news is that the only a small percentage of people who have a miniscule trim actually end up being suitable candidates or needing a meniscal transplant. There are other options. There's miniscule scaffolds, but they're all a bit rubbish. So this is a conundrum meniscal implant, and they're not very good. You know, they say that about 75% of the missing tissue grows back it doesn't. The tissue that grows back is just scar tissue is not proper miniscule tissue, and they've got very, very high failure rate. So I stopped using ministerial scaffold years ago. They're just not good enough. There is if there's if you want to replace missing missing meniscal tissue, there's nothing better than actual real meniscal tissue, in other words, in meniscal allograft, a donor meniscus. So what happens if you put it all together? Now, you know, Why the emphasis on the meniscus? Well, if you've got articular cartilage loss, and you've got no meniscus, there's no point in replacing the cartilage on the joint surface. And yes, you also replaced the meniscus because the meniscus protects the articular cartilage surface. Likewise, if you've got their bone rubbing against a meniscal allograft, is much more likely to fail. So you either don't do a biological reconstruction in that situation, or you reconstruct everything, in other words replaced both. If you do that, when that's what the Americans referred to as a biological knee replacement, and I think that phrase was first coined by Kevin stone, who's a knee surgeon in San Francisco. So this is a real life. This is real, really the kind of stuff that takes years off your life as a surgeon, okay. Big defect on a medial femoral condyle. Once you stabilise that and debride it down to a clean base and a stable edge. That's your defect. That's the microfracture that's been done. That's a meniscal allograft ready to go in. That's meniscus Landgraf going in in place. And then templating putting the graft in putting it in place. There's the graph before we've covered it in reverse that and there's the graft once it's been covered in reverse. So if you replace a meniscus and do articular cartilage grafting at the same time, that's a biological knee replacement, or to be less American and less cheesy, I'd say a biological knee reconstruction. Now that is really, really big surgery really fiddly, really difficult. Take me about three and a half, four hours to do that. Patients on crutches with a knee brace for six weeks, they're gonna have about six months of rehab and it's probably going to take them at least nine months before they plateau in their recovery. And if you think that the success rate for articular cartilage grafting is about 80% success rate for meniscal transplantation is about 80 to 85%. Well, that's point eight times point eight five a little bit of an artificial way of thinking about it. But if you do something big like that, that success rates probably in the region of about 60 to 70% of Vibia follow up which is not brilliant. But this is salvage surgery. This is extreme major complex difficult surgery in a salvage situation for a young person who's got no other options, because you don't want to have to resort to using metal. Now, if the knees unstable, you cannot start putting these grafts in in an unstable knee, you'll just recom. So, if you've torn the ACL, if you've got an ACL deficiently, then you've got to stabilise the ACL, you've got to do an ACL reconstruction. So that's a, that's a completed ACL tear the stabiliser that's an ACL graph. If you've got malalignment you cannot do cartilage grafting or meniscal transplantation in a knee where that compartment is being overloaded due to malalignment.

So that's somebody with a valgus knee lateral damage. And that's a lateral opening wedge distal femoral realignment. osteotomy. To straighten up the knee combined with a lateral meniscal transplant, we're talking massive complex surgery. That's a medial meniscal transplant, with a medial opening reg proximal tibial realignment, osteotomy to offload the medial compartment. That pin in the femur is from previous surgery, that's from where they had an ACL reconstruction in the past. So we're talking really, really big scary stuff. Now, what comes next? Well, hopefully, one day better meniscus scaffolds we haven't gotten yet. But obviously, people are researching cells. One thing that I'm really, really keen to try and develop before I retire and we're gonna get there done with ideally within the next one or two years now is to get something called B MAC, which is bone marrow aspirate concentrate where we take a 60 mil bone marrow sample, we split it down, we get down, we concentrate the bone marrow cells so that we can inject those cells with our crafts to increase the cell count. And that's something that I'm working on with the guys the way ministry hospital. And hopefully, we're going to be able to get that into clinical practice in the not too distant future.

Steven Bruce
And not sound dismissive. But why is it so difficult? So you make it sound as though you just spend some bone marrow and you get all the stuff you need? And that's as easy as that.

Ian McDermott
That's because I just said it very fast. It's like saying, Well, yeah, my car's not working. So take it to the garage and fix it. You know? It's complicated. You know, you've got to go through the clinical governance committee, you got to go through the new new procedures process, and everything you do, there's a lot of building blocks to get it in place. There's also regulate regulatory issues in terms of whether it's registered and supervised by the SEC regulated by the human tissue authority, or the MHRA, whether it needs a special licence, there's, it's, it's a big deal. I just make it sound easy, because I said it fast. And then other things, you know, growth factors, you know, can we concentrate the growth factors with PRF or even potentially adding in things like PRP to try and improve healing, that eventually, in a given time, there will be tissue engineering, you say, My knee hurts my spine? Okay, I'll go to Amazon, and I'll order a new one. And they'll grow me a new one. And a few weeks later, you know, we'll stick it in. Ultimately, eventually, it's going to be nanobots, nano technology, it's going to be you know, gene therapy, you take a tablet and when you're growing you need but we are miles away from that. And I think part of the problem is when you hear a talk like this, or when you read an article in a magazine, it's going on about latest techniques. A lot of patients kind of get carried away, or maybe it's not the patient's fault, because a lot of newspapers dramatise things. Yeah. And they they make it sound Oh, my God, look, we've got a new cure, and it's brilliant. Well, most of these things are massively exaggerated. Okay, so we're a lot of the reality is always lagging way behind the marketing. And then final word of warning is beware of the dodgy stem cell salesmen. There are individuals in central London and elsewhere who are offering people stem cell injections into their knee. What they're actually doing is periumbilical liposuction, they're taking fat cells, putting it in a syringe with ball bearings, shaking it. And if you know these people, then what I can say is that gesture is quite opposite. The ball bearings, smash up the fat, and then all you end up with they leave it to settle and you end up with with a layer of smashed up fat cells at the top that they take that out, inject it into your knee and say it's going to grow you a unique knee, they say it's going to cure 80% of knee pain. What an absolute rubbish completely unscientific, no clinical justification, no clinical evidence for that whatsoever. These people are con artists, and by the way, it's about 8000 pounds per injection.

Steven Bruce

It's good I'm really delighted that you you told us that because I had a question ages ago From Jillian about stem cell therapy, and are receiving it up until you finish this, but I think this must be what she's referring to. I haven't seen the adverts myself. But clearly there must be patients asking about this all the

Ian McDermott
time, all the time, and I've had loads of patients come to me and said, Oh, yeah, I had stem cells injected into my knee. And I said, did it work? And they go, No, I go funny that and how much did it cost? Oh, yeah, 8000 pounds? Well, you know, it's criminal that these people are being taken advantage of. So I can sum up. Alright, these stem cell injections with one side and it's this. We have an absolute moral and professional obligation to protect our patients from quacks. Right? Yeah, I'm angry, I'm furious. I think these people are scum. I think it's, it's the dodgy doctors that ruin the medical profession. You know, and there's nobody hates a dodgy Doctor better than an honest doctor.

Steven Bruce
So no. And I think that's probably the case in our professions as well. Because even you know, as I say, the risks are lower in in what we do. But nonetheless, there are people out there trying to fleece our patients. And it's disappointing to hear that doctors getting away with this because I mean, it is in very much invasive and invasive procedure. And I'm surprised more than one finding themselves in front of the GMC.

Ian McDermott
Couldn't agree with you more. Don't start me off about the GMC police.

Steven Bruce
So on a different note, then Sarah sent in a question out of curiosity rather than anything else. She wants to know whether you enjoy what you do, because it sounds like it. But just there you were sounding quite close.

Ian McDermott
Ah Do I enjoy what I do? Well, that's a very difficult question to answer. I should say. Yeah, I love it. I do love it. But the reason it's complicated is it's it's who and what I am is like asking a hedgehog, do you like being spiky? You know, it's like asking a giraffe. Do you like having a long neck, it's like a giraffe. It's all I do is what I've done for years and years and years. I'm passionate about it. Because the reason I'm so into it is because I want to do the best job I possibly can for every single patient every single time. So if you're not constantly pushing yourself, well, if you're not the best that you can be when you're doing your patients a massive disservice. So yeah, it's I've got one of the best jobs in the world, I think I'm incredibly lucky, I've got a fantastic job, and I wouldn't do anything else. So I love my job. It's difficult, it's stressful, it's challenging. And every single operation is stressful, because you're constantly trying to do the best you can, whilst at the same time, you're constantly being confounded by nature and luck. If something bad can happen, well, then eventually it will, it's just a matter of odds. And the same applies to surgery. If something can go wrong, if a complication can happen, when you do enough operations, it will go wrong. And then when you do get a complication that's devastating for the patient and devastating for the surgeon as well. Because, you know, we're here to try and fix things and make things better. So it's hugely, hugely challenging. That, you know, aren't answered by I wouldn't want to do anything else in life. So

Steven Bruce

pleased to hear that actually. Because, yeah, I mean, you've obviously got an awful lot to offer. And it would be horrible to think that it was a miserable day at work when you were doing three or four of these operations on the truck.

Ian McDermott
Every week, people say, I say to people, I do knees and they said, What just knees and I don't know how hard it is. And so my answer back is no, no, no, just knees. I do. I do left knees and right knees. And every single knee is different. And every knee is in a patient and every single patient is different. You know, it's just like saying, Okay, you're an osteopath. So Aren't you bored of backs. Now, the more you get into the subject, the more you get into it. It's a positive feedback loop. And that's why I think

Steven Bruce
patients should be just delighted that you only do knees if if I can use the word only there because actually probably makes you pretty damn good at news. Somebody else Kari asked earlier on whether the bulk of your patient population is sports people.

Ian McDermott
5050. So, roughly 50% is younger people with sports injuries. The other 50% is older people who are either developing or have arthritis.

Steven Bruce
Okay, so I've got a few questions here. And we aren't coming to the end of the show, but I'll try and run through the Coxy Cox, he is but he or she says Why did the Royal College of Surgeons award the Hunterian award for stem cell work in 2017, after what you've just said?

Ian McDermott
Because stem cell research is incredibly important and proper stem cell research is amazing. And it's going To be a part of, you know, everyday medicine in the future, what I'm talking about what I've just talked about are the dodgy stem cell salesmen who are basically the conman who were just interjecting fat cells into these stem cell technology ways where you isolate and then culture stem cells in a lab. It's incredibly complicated, incredibly involved, time consuming, and costly. I'm not talking about proper stem cells. That's not what these Doc's are doing.

Steven Bruce
How would the average patient or Dare I ask our practitioners know the difference?

Ian McDermott
By how, by reading, and asking questions, and also relying on advice from people who you can trust, which is why we set up the UK biological needs society, which is this slide a few years ago to promote good practice, and to try and highlight and Wheedle out bad practice.

Steven Bruce
Okay, a useful resource, and I'm sure there'll be lots of people are following up on that. A few other questions. I've just been told that you were trying to talk a minute ago, and to ask if you could cover something else, and Clint is saying what that was trying to cover. Sorry, I can't hear you at the moment because I've had to mute you so that I can talk.

Ian McDermott

Okay, wish my I bet you anything, my wife would kill for that button. She'd love it. Right? If this is just the last two slides, and then I'm done, right, and we're just within time, so if you can't go biological go metal. If you've got a small focal defect and an older patient, then we have got small custom made focal resurfacing implants. That's what's called an MPC live from a company called epi serve. And it's much nicer to have a small bit of metal in your knee on the left than a big loaded massive load of metal and you need on the right. If you can get that's a total if you can get away with a partial replacement, they're smaller, they tend to be better functional outcome with better patient satisfaction rates, but a slightly higher revision rate. That's a patella femoral custom made patella from or partial. And then if you want the best possible outcome with the lowest risk of an unhappy patient, then go custom made. So I've been doing custom made knees since 2012. And they've got the highest patient satisfaction rate of any prosthesis. And then if you want a surgeon who can only either do the basics, or like a knee arthroscopy and washout, which is pointless, or a knee replacement, well, we call them a binary knee surgeon and you do not want to refer to a binary knee surgeon. If you've got somebody who can offer the full range of options, meniscus repair replacement, cartilage grafting, folk resurfacing, realignment, osteotomy, partial and total knee replacements. We call that a portfolio knee surgeon. So get to know your local surgeons get to know whether they're any good and where they are on that spectrum from a binary knee surgeon to a portfolio knee surgeon and be careful who you refer to done.

Steven Bruce
Thank you very much. I suspect if you stop sharing your screen, it might fix my audio problems. I'm not entirely sure. But we'll see. No didn't, hasn't stopped my audio problems at all. Anyway, let me ask a couple of a couple of a few questions that are on my list here. Particularly if used to my Oreos asked how long after a graft is done. Can we start doing rehab with our patients?

Ian McDermott
Depend depends what graft? How big what surface. Every single patient's rehab is tailored to what they've had done. So generally speaking, as a broad broad guide, I would put a patient on crutches minimal toe touch partial weight bearing with a knee brace for six weeks, and at the end of that six week period, then slowly and cautiously ramp things up with their rehab, protective for say six weeks and then gradually get going.

Steven Bruce
Okay, thank you. Karis asked what's the recovery like for the posterior patellar graft in terms of soft tissue and function?

Ian McDermott
didn't understand the question? Can you say that again?

Steven Bruce
The question is what's the recovery like for the posterior patella graph that you showed us in terms of soft tissue and function? I think you talked about soft tissue earlier on, but in terms of knee function, how is that affected?

Ian McDermott
Okay, what for that patellar graft. That patient would have been kept in a knee brace locked in full extension for the first two weeks and minimal toe touch partial weight bearing and minimal toe touch partial weight bearing is is better. It puts less load through the neither non

weight bearing because you don't have to lift your leg up the whole time. And it's safer and easier. So locked in foot extension for the first two weeks and then from after the first two weeks up until Six weeks still minimal touch partial weight bearing, but gradually adjusting the locking mechanism and getting the patient to gradually bend their knee more and more but with unloaded range of motion exercises, and then at the six week post op mark, then start the grip the patient gradually increasing their weight bearing, gradually building backup towards weight bit or full weight bearing and gradually weaning themselves off the crutches as comfort, comfort and competence allow, at the same time getting the rest of their range of motion back. So that's going to take easily six weeks before then you get to the three month postdoc mark. And most people by then might then feel ready to do a little bit of gentle exercise by with the seat up higher the resistance download, avoiding standing up on the pedals. But the overall rehab is going to take six to nine months. It's a big deal. It's a really, really big deal.

Steven Bruce
And it seems to me speaking again, from my own personal experience, as well as from looking at patients, and after a lot of these things, it's very, very difficult to regain anything like full flexion in the knee. What would you expect for that operation? What would you expect from a graft or from let's say, a knee replacement.

Ian McDermott
Cut that was a lot of lots of different questions rolled into one sentence there, that patient with the patellar, I'd expect them to get pretty much full flexion because the rest of the was fine. The main reason that people start to develop a lack of flexion or a fixed flexion deformity or restricted flexion is simply because the whole knee is beginning to become arthritic. So as you start getting osteophytes the capsule thickens. The muscles stiffen up everything. So once you start losing your range of motion, that's a clear clear indicator that you are beginning to go down that path of degeneration heading towards arthritis.

Steven Bruce
Right after,

Ian McDermott
yeah, you've kind of your postdoc range of motion after knee replacement depends on how stiff you want to tree and depends on how old you are and how much you commit to the rehab. But if you've got an A good knee replacement, then I'd like to see my patients normally flexing 235 degrees. Occasionally more.

Steven Bruce
In Thank you very much. When we started this, I said we stopped sharp at nine o'clock, so that you can get away and get down the pub or whatever it is you do before a full morning surgery the next day. We're a little bit late today. But I'm just want to thank you so much again for your time. Long ago, I had a message coming in and saying that we had lots and lots of people saying just how amazing your approach is and how much they admire the amount that you're sharing this information. And we've had just under 500 people watching this evening, so a lot of people really grateful.

Ian McDermott
Cool. It's not rocket science. It's there's nothing that I've just said, there's anything other than pretty bloody obvious if you know your stuff. It's really not rocket science. So anyway, I love talking about nice, I'm always happy to share.

Steven Bruce
Thank you. And we're very grateful. And of course, it's not rocket science when you've been a consultant for 25 years. So it's probably comes a lot easier than that is it for this evening.