

## **Podcast 5 - Tendons and tendinopathy with Jill Cook**

This is the Physio Edge podcast Episode 5 with David Pope.

Hi, and welcome back to the fifth episode of the Physio Edge podcast! This week we're getting stuck into tendons and tendinopathy. I am going to be chatting to researcher and physio Jill Cook. Jill is down in Melbourne, Australia, she's done a lot of research and been involved in even more research in tendinopathy and she is now a Principal Research Fellow at Monash University. She's got a whole lot of advice for Physio's into the causes and treatment of tendinopathy and it's a great interview. I think you will enjoy it.

So let's go

**Hi Jill how are you?**

I am good thanks David and you.

**Yeah great, thanks for coming on the show and having a bit of a chat about tendinopathy.**

Yeah my pleasure.

**Yeah we have got some good stuff to talk about today and it is going to be hopefully some interesting insights and it is going to be great to get your expertise on the subject.**

Yeah, I think it is really important to note that often we are talking from a clinical perspective not necessarily with good research evidence behind it but this is certainly what I do clinically and I think that is an important distinction.

**Excellent. Well it is good for physio's to get that clinical insight as well so that will be great. Fantastic- so Jill can you give us a bit of an idea about yourself, you know who are you and what you are up to at the moment.**

I am at Monash University now, so I am a principal Research Fellow here. Um, I came here in January, I was previously at Deakin as a, I had a full time position there, um and prior to that had some university some clinical work, so I guess for the last 5 years now I have been a full time researcher, but I still do the desperate and dateless patients that ring me up and ask me for help.

**Yeah right, so you still got a bit of a clinical caseload?**

Oh yeah, I think it is really important as a researcher that you never lose sight of your population because it is too easy to get arrogant and think that you know everything and understand everything and it is the patients that bring you back to the real world.

**Yeah it keeps it real.**

Yeah, absolutely.

**Yeah so ok, that's good and how did you get to this point where you are working for a University and you are spending a lot of time you know based around tendinopathy, that sort of stuff, how did you get to this point?**

Where I started, I was working with a basketball team in the early to mid 90's and, um, they had a lot of patella tendinopathy and I went back to the literature to look for my options for treatment and could find nothing and serendipitously at exactly at that time I was working with Carem Khan who was completing his PhD and he really pushed me towards looking at research to answer some of the questions and then eventually he became my supervisor, so I think the combination of having that pressing clinical question plus just pure luck to have a research mentor like that at the same time I ended up finishing my PhD and then have just gone on from there. I love research- I was um, worked very hard as a clinician and got tired as a clinician so was looking for something different anyway.

**Great and what sort of research are you involved in at the moment Jill?**

A little bit of everything, always underpinned by tendon research but um, university employment forces you to be broader than that. In tendons we are looking at risk factors for tendinopathy we are looking at the pathology of how it develops and whether we can detect early change in the tendons. We have got an arm that has got some animal studies going so we have got some rats and some horses, um outside of that we are doing some research in cricket, so looking at low back pain, sort of past stress fractures and side strain in cricket players plus some football, strain in football research as well so a little bit of everything.

**Yeah, some good stuff there. Like what sort of interesting things are coming out in relation to tendinopathy at the moment that you have noticed?**

Well, from a risk factor perspective Jamie Gadder who is working here as a post op now has some very good evidence that adiposity is a big factor in tendinopathy and where you store your fat linked to that is insulin resistance diabetes as a risk factor, plus or minus high cholesterol. We have some tissue studies going on in Canada where we have collected tissue from people with tendinopathy and we are looking at how much fat deposition, how many AGE's - so advanced glycation end products there are in tissues of people that have had tendon ruptures. So we are looking mechanistically at what is happening, plus we have got some population studies happening ah, looking at whether those people with diabetes actually do have more tendinopathy or not. So that is a very interesting part of our research at the moment.

**Yeah, so it sounds like there is more than just biomechanical factors involved in tendinopathy there is a few other sort of -**

Oh yeah, gosh yeah.

**So you mentioned a few of those there. What seems to be coming out of some of the more important ones?**

Um, I guess it depends on age and the patient presents, how they present as to which factors might be more important. Certainly, it appears that women after menopause are more vulnerable so looking at the age of the woman, looking at whether she is post menopausal, whether she has had treatment for breast cancer might be important factors in women. In men, it would be things like central adiposity, you know their loading, their background loading, their background history of tendinopathy, um range of motion can be a factor so it really depends on the tendon, the person, how they present. One of the key things that I think that we are finding out of all this is that a tendon isn't a tendon, isn't a tendon. It is just about the person in front of you and you can't go with a single treatment regime or a single assessment regime you have to actually embrace what is there and actually bend your assessment and your management around the person.

**Yeah excellent, so what - I am just trying to think clinically if someone walks in, like, how are you relating their risk factors to the tendinopathy and is that changing anything that you are doing in the treatment if someone has say diabetes, you know how is that affecting what you are doing?**

If they are diabetic then they tend to be much more load sensitive and change sensitive so you have to be much more careful in how you load them and how you change their loads. Whereas someone who isn't diabetic can be much more tolerant and much less sensitive to load change so you have to be thinking about that, um if somebody is you know a male who has a lot of central adiposity you know you have gotta think not only of the fact that that central adiposity is contributing to the tendinopathy but in fact just the mechanics of having that much load on the tendon so you might choose your loading to ah, be a little less strenuous for somebody who has got you know is 100kg and it is mostly central adiposity, you might be a bit more careful about how you do that. So a range of things would influence what you did.

**And so you are saying if they are a bit heavier then you might reduce their loading, I am just wondering you know you obviously a heavier patient is going to be placing larger loads on their tendon is it more initially that you are going to be trying to back off their load so that you can get them up to scratch later on or do you tend to phase that in?**

Yeah, look again it is such a complex interaction. The evidence we have is that it is not about if your heavier that you place more load on your tendon therefore you get a tendinopathy. What we think is happening is your heavier and you store your fat centrally if you are a man, that's the thing that really influences the tendon. It is not to do with just mechanical loading. If it was a simple as that, you know, light people would never get tendinopathy and heavy people would

always get tendinopathy, it just doesn't happen like that. So, it is a much more complex sort of assessment, but if you were suspicious of some of these factors affecting the tendons, so it wasn't just the loading strategy you would have to expect that they might be more sensitive to the loading and more sensitive to the change in load. So you would be more considered in how you approached it.

**Yeah, fair enough. Ok well that's some good insights there into how to adjust your treatment to the patient.**

You have to all the time, you cannot afford to use recipe programs in tendinopathy.

**Yeah, and it is sometimes something that physio's or people in general get stuck into is that we have got a recipe or a treatment approach for how to start a eccentric training program, and righto you are on this for 12 weeks and away you go, but I suppose you have always got to keep that in mind don't you?**

Well more than that you will fail most of the time if you expect all the different presentations that come in to respond to a single treatment. There is no way in low back pain we would have a single treatment option for all the different presentations of low back pain but yet we seem to think that it is acceptable in tendinopathy, I don't get it.

**Yeah, yeah for sure. Alrighty well that is a good intro, I also wanted to ask you about Craig Purdam, you have obviously done some great stuff with Craig in conjunction and you wrote a great article in 2009 for BJSM staging tendinopathy. How did you first start working with Craig?**

It is more of a personal story rather than an actual professional one. Craig and my husband used to share a house together in Geelong in their very early physio careers so I actually met Craig through him and then, ah we were both interested in tendons and because we had contact a lot we started to talk a lot more and then as I started to research more Craig became involved and I think we compliment each other really well. You know he has a lot of clinical insights, I have the capacity to put them into research outcomes. So between us I think we do quite well.

**Yeah excellent and your article was great so um we are actually going to talk alittle bit about that article that you wrote with Craig, so um, you also went into abit of this as well in the BJSM podcast which was a good one, if anyone hasn't listened to that one it is going to be a good one to listen to either before this or following this as well because it will give you some extra insights. Um so, but can you give us abit of an idea about the stages of tendinopathy from that article that you wrote.**

Yeah, this is, to put it in perspective, it is our hypothesis, it isn't, we have some evidence that it is actually right but there are a large number of research groups out there that don't agree with this at this point in time so it is definitely

hypothesis and in fact in 2010 there were two other papers published that actually published different patho-ideological models so if someone was going to read our paper that I recommend that they actually read the other two papers as well and make up their own clinical mind which model suits them best. Um, but what we are proposing is that tendinopathy is not ah, a collagen tearing event that you don't overload your tendon and tear your collagen. What you do is overload your tendon, the cells become aware of the overload and the cells are the first response, and it is the cell response that then drives the changes in the matrix that include both the proteoglycans and the collagen, and if the cell is continually stimulated because of overload it will eventually have an affect on the extra-cellular matrix and the collagen. So it turns the whole concept of the collagen being first completely around the other way to say that collagen is actually one of the last things that is affected in an overload environment.

**Ok, yep and how does that relate to the symptoms you are seeing in a patient when they walk in.**

Yeah, ok, It's um, we would suggest and this is something that has come out since we have published the paper and this is linked with Patrick Danielson's work from Umea University, you know the centre that Hakan Alfredson is from. Patrick Danielson showed that the cells that were activated so, when a cell detects load it becomes, it goes from it's more sort of passive state to an active state and that the active cells are actually capable of producing nociceptive substances and the receptors for them. So this is really interesting because we are proposing that the first stage of tendinopathy is actually activated cells. So if somebody comes in acutely painful we are now thinking that they have sufficient cell activation to be producing enough nocieptive substances for the brain to detect it. So it is a sort of multi stage process if you want to think of it that way. Um, and a lot of our early treatments in painful tendinopathy's are about calming down the cells rather than trying to change the structure of the tendon.

**Ok, so that is in the first stage which you referred to as the reactive stage, is that right.**

Yep, in the simple and pure model that is reactive. Remember that you can get reactive tendinopathy in somebody that has a degenerative tendinopathy because the degenerative tendinopathy will only be in parts of the tendon. So the normal part of the tendon can get reactive and that is a common clinical presentation. Somebody who has had a grumbly tendinopathy and I think I said this on the BJSM podcast, grumbly tendinopathy does something silly- overloads their tendons, comes in acutely painful. The symptoms in that case are not coming from the degenerative tendinopathy they are coming from a reaction in the normal part of the tendon. So you can actually combine these states.

**Yeah, ok and we might recap some of those stages just for people, so that people can follow along if they haven't already listened to that podcast. So in that reactive phase that is often that initial, quite painful stage is that right and how does that progress?**

Progress in that if you continue to load the tendon and the cells continue to detect that the tendon is overloaded it will produce proteins, particularly proteoglycans that will swell the tendon because their hydrophilic, so they attract water into the tendon. The more of these proteoglycans and water that are in the tendon and the more you disrupt your collagen matrix, so your disrepair stage that follows your reactive stage starts to see early matrix breakdown so where you have got cells that are activated and you have got enough proteoglycans and water to be disrupting the collagen matrix if you continue to let that progress you will get more and more matrix destruction so get more and more collagen disorganization that starts to become degenerative. As soon as you have a loss of matrix integrity you leave space for vessels to grow into. So vascularity, increasing in vessels in the tendon are marker of a very disorganized matrix.

**So this is starting, is the blood vessel growing into the tendon, is that happening during this acute stage or is that happening once we are starting to get into that disrepair stage.**

Yeah, as best we know, I actually use this clinically now and I may be completely wrong in that if I see vessels I know that the matrix is quite substantially disorganized, so the more vessels the more disorganization in your matrix. Now in the early stages, we are suggesting that the matrix is still relatively intact and not disorganized so, if I see a lot of vessels then I know that this is a later disrepair or degenerative tendinopathy.

**And that is when it is visible on a scan or MR or ultrasound is that what you are saying?**

Yeah, no you don't see vessels on MR you only see them on Doppler or power ultrasound, so yes, there visible on either of those two imaging modalities. Doppler or power ultrasound, so not on MR.

**Ok so that first stage is that reactive phase where we are starting to get some overall inflammation around the tendon—**

Not inflammation-

**Good, thanks for the correction ok.**

It's a bad place to be if you are trying to treat this as an inflammatory response because there is no inflammation. This is an activated cell response not an inflammatory response. It is an important distinction.

**It is, and even when we are using anti-inflammatories we are thinking about the use of them not being from actually their anti-inflammatory role but other chemical inhibition.**

Yeah that's right, anti-inflammatories and not all of them, so you have to be very specific, it is not just the generic anti-inflammatory will have the same response,

but some anti-inflammatories will stop or calm the cells down and also limit the amount of proteoglycans they can express. So they inhibit the expression of proteoglycans, so the more calm the tendon cells are the less proteoglycans they produce, the less matrix destruction we get. So very much in this reactive phase, it is about using the appropriate anti-inflammatory to settle down that response.

**And which ones do you find are the best?**

The best we can tell from the literature and we have followed this up a little bit clinically, um, is Ibuprofen is probably the best, Naproxin will be not as good, but it is not a bad option, Celecox or Cox-2 is somewhat similar, but Ibuprofen seems to be the best from all the literature we can find.

**And is there any recommended dosage that you are looking at?**

Just standard doses that are on the pack. An anti-inflammatory dose will have the same effect on the tendon.

**Ok, so when would you look at cutting that out, once we are starting to get past that reactive phase is there a time that you recommend for patients to stay on these.**

Yeah, it tends to be once you activate cells in a tendon they are very sensitized and they are, can stay sensitized for a good period of time. So at least a week, and possibly longer periods than that, up to 2 or 3 weeks you certainly have to be careful. Certainly as a physio Ibuprofen can obviously irritate gastric lining so you would want to make sure that you weren't recommending it for long periods of time unless you had some sort of medical backup and you had somebody monitoring them, but we find that you do need it for, weeks rather than days.

**Alrighty, and that is just in that reactive phase of the tendinopathy?**

Yeah, it is not an intervention that is going to work in a disrepair or a degenerative phase, because especially in the degenerative phase because the matrix has been disrupted you know and in the degenerative phase sometimes the cells aren't activated, they are actually quite passive. So you really want to be using this in the early activated cell stage and it is really not that good at any other phase and I think people say, 'oh well, I have tried that and it didn't work' often it has been tried inappropriately rather than actually being specific about your prescription. People have actually tried to do it in other phases and it just doesn't work.

**So what are your clues that it is the right time to use anti-inflammatories and when you should stop or not use them?**

Um, ok, indications are abusive overload of some description. So the person will come in and say you have no idea what I did yesterday. I now can't walk because I did something really silly. So you are really looking for that history that you have had a really substantial overload of the tendon, um, acutely painful and

really minimal loading of the tendon makes it painful. Um, if you can see the tendon depending on which one it is, um they get this homogeneous swelling so they don't get lumpy and bumpy, they are actually, the whole tendon looks like it is involved, um they would be 3 critical sort of clinical signs that would suggest to me that it is a reactive tendinopathy.

**And how long in your experience, does that tend to last?**

Depends on how abusive the overload was and how sensitive the tendon is, so some people who for example; if you get a direct blow on a tendon, so you fall over and you land on a stone right on your patella tendon that can be months and months even though there is no tensile overload, the actual direct blow has irritated the tendon and the cells have activated. That can be months and months. If it is somebody that has an underlying degenerative tendinopathy and they do a very little bit of overload and it gets a bit sensitive, it can settle down in days and I think you know often when I am working sort of with physio's, I will say has anyone had a reactive tendinopathy where they have done something stupid, the tendon has been sore for a few days and then it has settled back down and people can often relate to that and think about, yeah I remember when I hurt my achilles and it did that. That would be a very low grade reactive tendinopathy, but you can get very, very reactive ones that can take weeks to months to settle.

**So this is like you know, your 16-17 year old rugby player who has come in with a flared up achilles from just you know, all of a sudden bumping up their training to 5 days a week from 0 or 2 or something like that and they come in, they are hobbling in. That sort of thing, is that often what you sort of see**

Yeah, that is likely to be reactive. I am always caviate on young boys particularly because they do poorly with tendon management. For some reason, their tendons at that developmental stage are very sensitive, but yeah, that is exactly the sort of presentation. Something really silly, really really sore tendon suggests reactive, um a reactive stage.

**Ok, so then, when would you not recommend, obviously that second stage when we are getting into that disrepair that is when anti-inflammatories are not going to be as much help or no help, so what's your clues and indicators that no, this person shouldn't be on anti-inflammatories.**

Once the pain has really settled down and once the tendon shows it is not sensitized. So, sometimes pain will settle very quickly in these people, but very small return of load will activate them again so they completely settle within a week but they, you know, do a very small overload and they get very angry again, you know they get reactive again. That is still sensitized, that still needs something. So a tendon where the pain settles and can tolerate some change in load or some loading without getting very reactive again suggests that they are not going to benefit from sort of the Ibuprofen type approach.



**Ok, great. Now we will talk about the third stage and we will actually come back to some treatment for each of these stages but we have sort of talked about the anti-inflammatories, that sort of thing for the reactive stage, but if we move onto the third phase, the degenerative stage of tendinopathy, can you talk to me a little bit about that?**

Yeah, these people often don't present to you. Often people that have a grumbly old tendon that um, you know, their Achilles is a bit sore when they get out of bed in the morning or a bit sore after running but it doesn't actually give them that much grief, it settles down the next day and they continue to just do whatever they do. So that is a phase by itself that actually won't bring them to see you. They do something really silly, they come in, they have got a reactive tendinopathy you will see them. Often you need to treat the reactive tendinopathy and then look at the underlying degenerative change and address that. So there is a lot of people out there with either asymptomatic or grumbly degenerative tendinopathies that you don't often see. So it's yeah, a question of how they present to you as to what you might do.

**Ok, and what are you seeing on your Doppler ultrasound of that sort of thing with these guys?**

These guys will have big hypoechoic areas, so there will be on ultrasound you will have disruption of the collagen, so instead of having nice collagen fascials there will be blackness within the ultrasound and if you put the Doppler on or power Doppler on you will see vascularity within it. So both those things indicate that the matrix is very disorganized and um, suggests that you need to be doing strategies to help try and get some sort of process happening and some sort of collagen alignment or strengthening within that tendon.

**So that's where you are starting your other training programs for the tendons? So, is it in that.....**

Sorry, go on,

**Sorry, I was just going to say which stage do you tend to start you know a strengthening or an eccentric program?**

Um, we start strengthening at every stage. You have just got, we know the loading environment that is good for all stages of tendinopathy. Um, I am certainly not a slave to eccentrics. I don't use eccentric programs, I use strengthening programs and power programs. I don't care whether there eccentric only, in fact, I tend to stay away from eccentric only programs because it just doesn't help you and it just complicates the issue. So you can do a generalized strengthening, generalized power program with these people that will include eccentrics, but you don't have to be a slave to them.

**Ok, so if for instance you had someone with a mid substance achilles tendinopathy then how are you approaching their sort of strengthening program.**

Depends on their age, depends on their co-morbidities, depends on how they present. Depends on a tonne of things that we talked about right at the start, but if we go back to the common presentation, the middle aged man, mid Achilles, lumpy and bumpy, so probably a disrepaired degenerative tendinopathy, um, usually poor strength, poor power, arh, those people need a strength base to come off so we often do, depending again on their age, if they are younger we will do a weights based program if they are older we will just do a body weights based program so we will start them on just heel lifts up and down on their toes, a certain number, under the number we know will irritate the tendon and then just progress from there. So it can be as simple as that. So you are including that concentric phase of the exercise as well.

Yeah, absolutely, nobody is ever shown, they have shown that concentric by itself isn't very good, but they have never shown that eccentric is superior to concentric and eccentric that study hasn't been done. Clinically, it is so much easier to teach somebody to go up and down on their toes than it is just to teach them to come down on their toes and the other thing is if you read Garry Allison and Craig Purdam's paper in BJSM, just doing eccentric exercises actually doesn't attend to some of the strength issues in the muscles, so by doing concentric and eccentric we can load the tendon and also strengthen the muscle at the same time.

**Ok, excellent, now so you are looking at for say, that same example, say you have got your 40 year old runner who comes in, you know sort of your typical marathon runner, finer build and he has got a mid substance tear so you are looking at your concentric and eccentric, you know your toe raises, well your heel raises I suppose you would call them, um, and are you then looking to address, you know, his other biomechanical factors with your strength programming or what sort of stuff may you do in that sort of a case?**

Yeah, again it is about assessing the person that presents. So if it is a mid Achilles tendinopathy, he is light so he is not carrying any extra fat, you don't have to worry as much about your systemic risk factors, um but you would certainly need to look at things like the key factor in Achilles is ankle dorsi flexion range of motion, so make sure he is not stiff in his ankle. There is absolutely no evidence that foot posture has any effect on Achilles certainly not pronation. There is some evidence that if you have a supernated rigid foot and limited dorsi flexion you are more prone to Achilles. So I rarely worry about foot posture at all, but I am concerned about ankle range of motion in dorsi flexion. Aside from that, that and calf strength, that's it, that's your pot. You don't actually need to do a tonne more than that.

**Ok, and how long do you tend to see these guys for and um, when do start to, when do you decide to call it quits with their strengthening program?**

When they can lift their body weight repeatedly appropriately to what they want to do. So if they are an endurance runner they need to be able to do tonnes more

than someone who is a golfer. So if your golfing you don't need as much sort of strength, oh, that is probably not true, you don't need as much power if you're a golfer, let me think about this, another person. So someone who is not very active, you don't need to do as much strength endurance someone who is a marathon runner you would need to do a tonne of strength endurance with them. So it would depend on the person as to what level you would take them to because you have got to tailor what you need to do to what outcome you need from them. So again, it comes back to that specificity of assessment, specificity of treatment.

**Ok, and what sort of guidelines would you use for their training program. Do you use pain guidelines. What sort of stuff do you use to tailor their program. .**

Um, yeah, ok, ok. I have always got my eye on what they need. So someone who is a runner needs to be able to repeatedly hop or at least do alternate leg sort of fast movements, if they can do that they can go back into a running type of program where you would systematically increase the amount of load on them. So you might start them with a walk jog program for a short period of time and build them up to a short jog and then increase the length of their jog. Tendons are all about very, very small and systematic changes in load. Tendons really hate big change in load so you can never ever take large changes in the load that you place on them. So it is all about just small steady change in load and every time you are just waiting for the tendon to tell you that it's ok.

**So you have started their strengthening program (say that marathon runner) you have started their strengthening program, you sort of looking to your functional tests like your hop or your alternate leg skippings or you know something like that to give you an idea that, yeah, they coped with it ok. That's the stage that they can start running while continuing their strengthening program, is that, tend to how you introduce that.**

Yeah, it's, it's really hard to be so specific. I demand that they have a very high level of strength and strength endurance first, then when they have that I will put them on to some sort of speed tendon specific loading program. So more power, more skipping type of stuff. When they can do that for the appropriate amount of time for what they want to achieve I will then put them back towards their sport. So, um, strength underpins everything. Strength endurance underpins people who need an endurance component to it. Most people require some sort of power endurance program for an Achilles, but you know, for example someone who was a bushwalker, who wanted to walk with 20 kilos you probably wouldn't do a lot of power work with them, you would do much more strength/endurance with load, because you are not looking for them to run you are looking for them to actually carry a 20 kilo pack. So that would be a whole different approach, um I think this is just highlighting how different, you know, you have to be for each person. No point asking someone who wants to bushwalk with a pack to be effective at skipping. Unless you need to skip out of the way of a you know snake that is going to bite them on the leg or something, but it is a completely different approach to someone who wants to repeatedly energy store in their tendon as a

marathon runner. So you know where you start is always with strength, where you finish is quite dependant on the person in front of you.

**Yep ok. Now coming back to that reactive phase then, you are often looking to settle down the loads that they have, that have brought on this reactive tendinopathy. When would you start their sort of strengthening program then?**

Immediately, we are finding that, and again this is a clinical observation that isometric but quite heavy loads are actually very good for settling pain so even when they are acutely sore we will start them on an isometric holding type exercise regime and they often feel better afterwards. So we, we virtually would never not load, we just are very careful about the loads we choose.

**Mmhm using pain as a guide in that stage?**

Yeah, tending not to use pain during exercises. It is a pretty ineffective guide. Um, but I am always monitoring pain 24 hours later. So, do some exercise if you are worse the next day, the load the day before has been too much. Simple as that. If it is not any worse and its tolerating that load then you might change it abit. So it is often a very good indication.

**Excellent, so you are using that 24 hour, you know, latency period to give you an idea as to whether you are on the right track or not.**

Yeah, exactly, exactly. A tendon will clearly tell you if it is unhappy with a load but it does it quite belatedly. So you can't sort of change up loads on a day to day basis you actually have to wait for the tendon to report back to you as to whether it is happy or not.

**Excellent. You mentioned as well that you would never rest a tendon. I wanted to also talk to you about splinting. Do you ever find a case where splinting could be helpful?**

I am trying to remember the last time I ever splinted a tendon and I can't for a minute recall when I did it. Ok. Yeah no, it doesn't help a tendon and in fact it is quite destructive for a tendon if you take load off it. Tendon needs load. It is about finding the appropriate load for the tendon at the stage it is at, and as I say even acutely sore tendon can do isometric loads and actually benefits from them. People report being, feeling much, much better after doing them.

**Ok, into a slightly different arena, if say you have got a patient who comes in who has had a like that crumbly tendinopathy for maybe 6 months, that sort of stuff, and they might have abit of a tear on MR if you referred them on for that and they are just not able to tolerate a loading program. Is that a case for a boot or something like that, or do you still, like where would you start that sort of thing?**

Nope, you can only ever tear abnormal tissue. So the first thing is how sensitive is imaging to diagnosing a tear and the answer is it is not that good at it, because it often can't detect whether it is a tendinopathy or whether it is a tear and it will often be dependant on the history on the clinical notes as to whether the radiologists will call it one way or the other. But the bottom line is that you can never tear normal tissue you can only ever tear an area of tendinopathy so a tear is often just a tendinopathy and should be treated just like that so we would never react or respond to a report saying a tear unless it was a complete rupture. Um, partial tear can be treated as a tendinopathy.

**Ok, so starting with the same program, your power program?**

Yep, no you would assess the person and you would decide where they are, what their strengths was, how irritable their tendon was, how sensitive it was, how sensitized the cells were and you would put all that together and come up with your base program. You would apply it, see how the tendon responded and adjust your programs as appropriate.

**Ok, good o.**

It is abit hard for a simple response. Because I am not deliberately being obtuse. It truly is the clinical approach that you have to take and you know it should be obvious, I hope it is obvious that you can't just apply the same strategies to each tendon.

**Yeah definitely. Ok, I am just thinking about other sort of clinical scenarios and how you would adjust your or how you might approach a training program for say abducta tendinopathy, let's use that for say an example.**

Yeah abducta tendinopathy-- I would prefer to use another example purely and simply because that is such a complex diagnosis- abducta tendinopathy. A simple abducta tendinopathy will fit everything that we have talked about but often it comes with a whole range of other pathologies and other structures that might be involved. I am happy to talk about hamstring tendinopathy would that be easier.

**That sounds like a great one.**

Yep, ok. Principals are exactly the same. Um, hamstring tendinopathies are incredibly easy to treat in most athletes or most people purely and simply because it is not an anti gravity muscle so it doesn't tolerate, sorry does not take enormous loads. Um, the people who get in trouble with it are the people who use it with body on leg flexion, so the hockey players, sprinters, hurdlers those sorts of people. They are the people that tend to get hamstring tendinopathy. The principals are the same with the addendum that you have to stay away from hip flexion in the early stages because that compresses the tendon and that compression results in cell sensitization and so you activate or you maintain a reactive state. You do a lot of deep hip flexion exercises in the early stage. But the principals that underpin it are exactly the same.

**So where would, what sort of exercises may you use in a hamstring tendinopathy case.**

In the early stages then nothing beats hamstring curls- flat. So not the ones where you are bent over where you have hip flexion as part of it but putting loads directly, tensile loads directly on the hamstring tendon is wonderful and for a lot of hamstring tendinopathies just simply getting a good hamstring curl program will get rid of most of their pain and in fact, often you don't need to progress from there because it just gets the loads right and you then counsel the person about you know the fact that they don't want to be doing a lot of deep hip flexion especially body on leg flexion work. Clearly if they are a hockey player, you have to progress from leg curls because you would need to be doing some sort of power program as well and sports specific program so again it would depend on the person in front of you what the sport was they did how much they loaded it as to where you would go. But you would always start with your basic strength.

**Ok, so starting with like a hamstring curl and if you had someone like that hockey player or maybe a rugby union player that is getting the scrum and having to push forward that is probably another good case for where they are going to need abit of strength in that hip flexed position. So how would you progress there strengthening from the hamstring curls.**

You would need then to be looking at some weight bearing strength and some weight bearing strength endurance. So things like walk lunges, good mornings, you know restricted dead lifts, those sorts of things can be really quite useful to get to really improve your strength and to improve your strength endurance then you might start to add some sort of power to it, so you would start to do some faster work, you could either do that in a sports specific environment or you might actually do that in the gym. Again it would depend on what the person needed as to whether you would go one way or the other. But you would need to be looking at putting that tendon under faster loads.

**Yeah, makes sense. Ok well that's probably the main things that I thought would be good to chat about today Jill. You have had some great insights for people and I think you know breaking away from the traditional pattern of just handing out eccentric exercises, you know getting some thoughts on why, why you are actually giving the people exercises and how to address the other factors as well you know using concentric as well as power stuff, you know there is some great stuff there.**

Yeah, look you can't go wrong with always starting with a strength program and a good strength endurance program that underpins everything that you do in tendinopathy. If you get that bit right you will be in a much better place and then it is about how much you need to move into the power stuff depending on the person and their sport and what their demands are. So again you would just factor in all of things we have talked about, all of the systemic risk factors as to where you might go. But always start with a strength program and then you have

got, you have bought yourself a little bit of time to think about what else you might achieve from there.

**Ok, lastly. You are looking at carrying on their exercise program for you know, everyone loses motivation at some point in time especially once they are pain free. When do you know it is time to stop their power strength, say your marathon runner, when do you go right to, (besides if they just stop coming), when do you decide you know, you have had enough of this strengthening program you can move on. What is your guide for that?**

Yeah. It is really interesting. We find we do much better if our athletes maintain a strength program 2 to 3 times a week. So I always counsel my patients that even when they are back playing their sport and are completely pain free it never hurts to pop into the gym to do 5-10 minutes of really good strength work 2 times a week as a minimum. And that really is beneficial- again it seems to maintain the integrity of the muscle and the tendon and that seems to give you some protection for a re-occurrence so I never let it go. Now clearly, people do let it go, but as soon as you lose strength you are leaving yourself exposed to overload. As soon as you are exposed to overload you leave yourself vulnerable to getting a reactive tendon again and getting pain and presenting back to you again. So depends how many times they want to put their hand in the fire and how it takes them to learn that if they don't keep up some sort of loading and some sort of strength that they will get a return of symptoms. You know, I spend a lot of time with my patients doing education, like this is what it is, this is what you need to do, this is why you need to do it, this is how long you need to do it for. If you don't this is what will happen. I can spend easily an hour with each person in their first visit just going through it. So once they understand it, they tend to buy into the program much more. Whereas if you just say I think you need to do this, then I don't think that is a very empowering environment whereas, I often say to my patients—I am going to tell you what to do. You have to do it, you have to take control of this tendon, because you have got it for life. You can keep it symptom free if you look after it so it is about putting the responsibility back onto them.

**Definitely—and lastly- pre-season if you are seeing some guys or a team pre-season what sort of advice do you give people as far as progressing their training do you have sort of guidelines as far as how much to increase their training each week-- that sort of thing?**

Yeah, it is such a nightmare for tendons that people tend to have a period of time off, they tend to eat a bit over Christmas, put on a bit of weight and then come back into a very high loading environment. Tendons will just react to that every single time so the critical thing is about incremental change in loads. So not doing, more than 2 or 3 sessions a week, certainly in the first few weeks and being smart about how long you are loading for, so maybe start with an hour and then increase it from there, but also being smart within your session and making sure that it is not an hour of jumping or an hour of running that you are actually mixing up your loads in that hour. So the people that get into trouble that come back from a period of time off go into a high loading environment that is

repetitive and too much for the tendon. So again, it depends, if you have an underlying tendinopathy it is going to be very sensitive to increases in load, if you have got intact tendons you can probably increase your load more rapidly, but I think it has to be systematic and you have to think very very carefully about what you are doing and how much you change your loads.

**Excellent- alright Jill well thank you very much for that we appreciate your insights.**

My pleasure, I hope I haven't confused too many people.

**No I think you have given us a lot to think about. Can you give us a bit of an idea about where people can find out more about you and conferences and courses that you have got coming up.**

Yeah, no I can't. I tend to go wherever I am asked. So I have got in Australia, I have actually got a course this weekend but that is probably too soon for most people. I always do the Level 3 Sports Course for the APA. Aside from that it tends to vary year by year so unfortunately I am not going to be very helpful for you. I don't run my own courses.

**Ok, is there a set- do you have a blog or anything like that that people can find out about what is happening with Jill Cook.**

No. I am as anonymous as I can possibly be with social media. So I tend to not have Facebook, not have LinkedIn not have anything like that so yeah I hide in my office.

**Keep it on the down low. Excellent- well alright thanks for that Jill we much appreciate it and look forward to talking to you another time.**

Thanks David.

Thanks Jill, there was some great info there on the risk factors for tendinopathy, what's going on at the cellular level, and she smashed a few myths about rehab as well! Some great info.

I've got links to everything mentioned, in the shownotes that's over at [physioedge.com.au](http://physioedge.com.au) where you can put your comments and questions as well.

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