Greg Doerr: Hello, I'm Dr. Greg Doerr and it's my pleasure to actually be doing this introductory presentation on "The Use of Instrument-Assisted Soft Tissue Mobilization." I actually have about over 23 years of experience with instrument-assisted soft tissue. I've been fortunate enough to have lectured on these topics on 6 different continents.

So, it is something that I have quite a lot of experience with, and with any luck in this two-hour presentation, will actually give you enough information to understand why instrument-assisted soft tissue mobilization is an important aspect of what we do as manual therapists, as well as how to integrate it into clinical settings.

The class that I developed is really an offset from Graston Technique, which is where I started with my instrument-assisted experience. I taught for Graston Technique for about a decade before starting my own company, but also in the process of evolving Graston Technique into, instead of a static environment, more of a motion-oriented environment, and eventually bringing things under provocation, which was the evolution of what FAKTR became.

And then the functional soft tissue class really evolved from FAKTR into more of a clinical aspect rather than teaching simply the concepts and the technique of doing it. I turned it into a little bit more into a clinically-oriented class. So, the functional soft tissue class incorporates evaluation as well as doing the instrument-assisted soft tissue, as well as using rehab because my feeling is if you're just doing the soft tissue without doing some of the rehabs, it's not that you're not going to get great results, but I'm looking for long-term stability. And rehab is critical in remodeling those soft tissues, as well as creating new motor pathways and stabilizing the injuries that we're treating with soft tissue.

So for the purpose of this lecture, we're really going to focus on the instrument-assisted portion. Again, my largest expertise is going from Graston Technique all the way through FAKTR and functional soft tissue. So, that's a lot of what I'll talk about and how it is that I associate it with that.

Now, to begin with, FAKTR was created by myself and Dr. Tom Hyde. We both were teaching for Graston Technique at the same time and largely taught a lot of classes together. Even if I was teaching a Module 2, he was probably teaching a Module 1. We spent a lot of time together, especially between 2000 and 2002, just literally testing the boundaries of what the Graston Technique taught us. Obviously, in that process, we started coming up with wow, if I put things under provocation, we noticed that things responded quicker and had a longer-lasting effect in a positive way than if we just did it in a passive, non-weight-bearing environment.

Since we started doing that, we've obviously had contributors from countless numbers of chiropractors, PTs, PhDs. There are three that I listed on the screen here; Warren Hammer particularly, in my opinion, is one of the godfathers of all soft tissue internationally. Phil Paige, who's, as you can see, a Ph.D. PT ATC. He was hugely important, as well as Mike Schneider, in discussing and coming up with a relevant theory as to how it is we're affecting things neurologically, not just the old Graston technique thought process which was to break down scar tissue adhesions. There's more of creating that evolution of the neurological aspect of what it is that we're doing. Since then, there is nobody, in my opinion, who is not giving you influence to actually improve and evolve upon what you've done. I've always said in 23 years

of teaching now, it's rare that we really come up with a unique idea. It's more that we've been influenced by others. Or if we do, so to speak, have that unique idea, somebody else is probably doing it. It's just we've never interacted with each other. So, that's always great when you see two people walking the same pathway without really having any contact with each other. But, the uniqueness of what we do is always a little bit sometimes overblown, but our influences are so vast and expanding. It's wonderful to be able to evolve things as we learn new information.

Here's an example of some of what instrument-assisted really started at. We like to think that instrument-assisted soft tissue mobilization is a new thing. Graston Technique, which is really the granddaddy of all of it, it's really a mid-'90s scenario. In my opinion, the '90s were a huge evolution into manual therapy whether it was instrument-assisted, whether it was newer techniques that came out there, and you can see they've just been evolving ridiculously over the last 25 plus years.

Instrument-assisted soft tissue mobilization is not new. It's been around for thousands of years. In particular, Gua Sha, which is one of the ones you see in front of you, was some of the first instrument-assisted work that was ever done and at least in recorded history that we can say. Obviously, Gua Sha's influence on this was much more associated with things like removing stagnant flow. They were looking more from the chi level. Their purpose was to bruise you, and the bruising colors, just like with cupping, gave you an idea of some of the stagnation and what was going on. But that was really, so to speak, the starting point of our instrument-assisted at least in the modern, and by modern, I say a few thousand years era and were a lot of this has evolved from. So, it's not that what we've done is new, it's been around forever. We have just added to it. Here are some other examples of some of our Gua Sha instruments.

Now, when we started looking at the newer or the modern versions of what we would say instrument-assisted soft tissue mobilization came around, there's obviously a whole bunch of different companies whether it was Graston Technique, Astym, or sound assisted soft tissue mobilization. All of these are offshoots of Gua Sha in theory. Again, it just became a little bit more westernized. And as that has changed and evolved over the year, we've also seen things like HawkGrips developed, a similar set of instruments to the Graston technique. Then all of a sudden you started seeing some of the multi-tools developed.

Tom and I, in particular, were probably one of the first companies to develop these multi-tools. We created, literally, four instruments, three of them which you can see in front of you. The purpose of it was to literally, not need three instruments to treat one person. It was trying to put all of the different edges that you needed to take care of people, kind of into one environment so you can have it in your hand, like, one instrument, and be able to take care of everything associated with that body part of that injury.

We obviously developed different instruments, much like many other companies do, because sometimes something feels better in one clinician's hands over another. They have preferences in things along those lines. But that's been the evolution. I guarantee there are so many companies now that have created their own instruments, and it is far from over. It is just going to keep expanding and going. The great thing is that if you have a great product, it will last the test of time. If you tend to have a lesser product, it tends to go like, "Eh, I don't really want that

anymore."

Even the functional soft tissue instruments that you see in front of you are an evolution of the initial FAKTR instruments. I changed a lot of it. It was the beveled edges to make them a little bit more comfortable for the clinicians to use, as well as for the patient. So, as I said before, this all came from Tom and I literally working on each other in hotel rooms and finding out that when, for instance, we both have knee injuries that when we're squatting and provoking our injury, we felt significantly better post-treatment than when we were just doing like sitting on a chair or lying on a table and having the same tissue structures worked at. The difference was we're like, "Well, why?"

And truth be told, Tom and I were clinicians. I don't want to say that I'm a researcher or anything like that. Sadly, I've been around too many PhDs now, they're forever in my head, constantly making me ask that question, "Why? Is it valid? Is it because of this or this?" So I question things to a ridiculous level now that when I had my wonderful ignorance of just being a clinician it was like, "Hey, it worked. Who cares?" But that's what Tom and I started. We started as just clinicians trying to push the envelopes of what we learned in a hotel room, treating each other's knees, and finding that, "Wow! This is really different."

Now, Tom was retired at that point. So, I would be taking all of these concepts and theories back to my office and treating my athletes, treating my geriatrics, treating my normal everyday patients, and literally going, "Hey, it worked on the knee. Does it work on a shoulder? Oh my god, yes, it does. Oh, it works on a hip too. Oh, it works on the lower back. It works on the spine." And it was really just testing every single one of our concepts associated with all the different body parts and the different injuries that we had going on there. I'm the first person to say that, the person who's teaching you and tells you absolutes, you should probably walk away from that because there's no such thing as an absolute. There's no way that your instrument-assisted soft tissue technique is going to work for every condition, every single time, exactly the same way. That's the beauty of being a clinician. It's being able to adapt it to the person in front of you, and actually patient selection as to what techniques, concepts, and so on and so forth, are better for that patient over maybe another patient.

This is all being contributed to by a numerous number of PTs, chiropractors, athletic trainers. I mean, at this point, I don't know if I could actually leave out a profession that has not had an influence on my ability to evolve these concepts and applications. As I said, it did originate with Graston Technique. The important thing is it wasn't just X marks this part, there's a plain pain point and treat it. We really started diving into, as early as 2002. What's the kinetic chain of the injury? If we're just treating the knee and it's not getting better, is it the knee, or is the plant leg on somebody who's also a thrower, and their shoulders are all messed up and it's just working the whole kinetic chain? These are all the interesting things that sometimes you go through.

As I've said, if we had unlimited time in our office, well, then maybe we can treat the entire kinetic chain at one time. Most of us don't, most of us are clinicians that run on a schedule. And in that case, obviously, we want to start with an asymptomatic body part, and then move through that kinetic chain, as we're either happy or unhappy with the results, or trying to really

clear out an entire problem. Obviously, athletics is one of the common ways that we do that because of the use of the kinetic chain in sport-specific activity.

Now, this is where Tom and I have really put together some kind of an almost like, I don't like using the word 'protocols' cause these aren't protocols, it's not this, then this, then this, then this. But almost a format upon which you can apply your soft tissue procedures. Now, I'm saying instrument-assisted, but these are the same concepts that are used from the manual with my hands, and so on and so forth. So, it's not just instrument-assisted, this is really what I use for almost most of my soft tissue rehab treatments that I have in my office. So, it is a hierarchy. Concept one is a physician of provocation, obviously, that's the simplest. It's as simple as, luckily, we're sharing the screen so you can see my video as well as the PowerPoint but I presume a position of the public patient can be something as simple as, "Oh, I feel my neck pain over here." Okay. So that could be something like a physician of provocation motion might be, well, it's not necessarily, "Oh, there's my pain but every single time I move my wrist, I feel like, Oh there's my suboccipital but it's fine at the endpoint but it says I'm going through a movement. Oh, there it is right there as I get to this level." So sometimes the motion of provocation which by the way is neurologically is much more powerful than just holding a position, adding in resistance. Now we'll talk about that a decent amount as we go through the process during this lecture. But adding in load is adding in even more neurology.

Now, the other interesting thing when we add resistance is we can also change the morphology of the tissue. And we'll talk about that in pretty good detail when we hit things like ligaments. And more importantly, tendon injuries. So we going to add in resistance to certain injuries based on what is the problem.

Next is using functional position directivities. Now, this is one of my favorite ones because it's almost my jump to almost every athlete. "Hey, I only get my pain in the cocking mechanism of throwing." Well, that's a functional position. When I get into the hole on a squat, that's what I feel my hip, my knee, my whatever. So we use those functional positions. "Oh, my elbow balance me but only at the bottom of a push-up." So I'll use push-ups, squats, throwing motions. All these different activities that provoke their symptoms, I bring those to the plate immediately, especially in my athletic environment. But it could be geriatric that tells you every single time, "I get in out of the chair, that is when I hurt." Well, I haven't reproduced sitting in my chair while I am treating them. I like to turn things into weight-bearing as much as possible.

The ideology of just lying on a table and getting treated is something that I-- I don't want to make it sound like it never happens anymore because again, that would be absolute and we always know absolutes are untrue. But it is my methodology is always trying to get that patient as weight-bearing as possible even if it is only semi-weight-bearing at a point and then bringing them into more weight-bearing. My post-surgical cases might be a little bit different, especially dealing with the shoulders or something like that where we can't add in load. Let's just say it's a rotator cuff repair where we may not be adding a load for 6 to 8 weeks before we really start bringing in some load intervention that could be 10, 12 weeks before we bring in some eccentric loading.

And then lastly is adding in Proprioception. Proprioception, again, is just creating an unstable environment. So, that could be anything from using body blades and perturbation that could be

using stability pads or bow shoes or eye joys if you have those vibrations, things along those lines. Just creating an unstable environment for the patient while they're doing their activity. That's what the last in the hierarchy, is using in progress.

The algorithm that Tom and I developed, again, back in the early 2000s, which happily I can say that it's rare I go to a class that people don't use the same algorithm now. Again, it's an evolution of where we're thinking in treatments, whether it's soft tissue, whether it's taping, whether it's manipulation, mobilization, whether it's rehab. We want to see these things. It's the greatest way of, as I like to say, creating patient compliance but also showing the patient the value of what it is that you're doing on a day-by-day basis.

The first thing, obviously, I want to do is test. Then we want to treat with whatever interventions we are using in this particular class. We're talking about instrument-assisted soft tissue mobilization. Then we are going to retest. So in other words, when I flex my bicep, I got pain, and I treat. And then I flex my bicep again. The way I always like to go about this with my patients is I say, "When you first did the activity, that was a 10." Then I'm going to treat. I'm going to retest that activity. "What is it now?" We're always looking for a minimum of a 10 to a 5. Obviously, are there situations where you may not get a 50% of reduction in a single visit? Yes. Things like Stenosis. Well, it's rare to get a 50% change in Stenosis in a single treatment, okay?

Post-surgically. Well, hopefully, we can reduce pain but are you really going to take a post-surgical knee replacement and all of a sudden go from 90 degrees to 120 degrees in one treatment? Most likely not. There are obviously examples, but what we are looking for in a general population is dropping it from a 10 to a 5. Remember my starting point for every test is always a 10. And then, depending on your schedule, my general rule of them is I don't retest more than three times in the course of a treatment, otherwise, we are going to start running behind because I do have a relatively busy practice schedule and we do work on basically, 4 to 5 patients an hour. So, I do want to make sure that I'm keeping within my schedule. I don't like patients waiting in my office either.

Lastly, is using training. Now that brings in our exercise and adjunct therapies, and it also establishes so many different things. It's everything from re-establishing motor pathways to morphological changes within tissue that we're trying to be pro-inflammatory with, which we'll discuss in a few slides, as well as for me, taping is a huge adjunct that I use after treatment. Which there will be another class on that if you're so interested in looking at that kind of methodology.

So again, testing as I said, we're going to basically determine that either position of provocation, movement of provocation, resistance, the functional position or activity, or again, the adding of Proprioception. We're going to look at that and say, "Whatever it was, it's a 10." We are going to go through our treatment and we may treat obviously with or without motion, resistance, or Proprioception but it depends on where they fall into that hierarchy. What provokes their symptoms? Or their imbalances or their restriction. It's not always just about pain, it may involve range in motion reduction or a loss of function. "I can't break parallel on a squat," "My knee goes valgus when I do a squat." Things along those lines.

Now, our treatment time really should be somewhere in that 30 seconds to 2 minutes. The worst place in the world you could ever go to try and learn how to do instrument-assisted soft tissue mobilization is Youtube or social media. What I see on those is frightening at times. I see the amount of particular responses and again, I don't fear particular responses. Those that do, don't understand the purpose of what they're doing or the reason particular responses are showing up. However, I don't fear. I know it's part of the normal treatment however, I also know large particular responses. Okay, maybe they happen in your first one to four treatments, but the idea to try and create a particular response for the purpose of creating it? I question whether or not that person may have a good understanding of what they're trying to accomplish with instrument-assisted soft tissue mobilization because most of what we do is neurologic. Which should not necessarily be pro-inflammatory in its aspect. Again, early on it's very common to have that. It shouldn't happen later on.

So, again, after we've done our treatment for that 30 seconds to 2 minutes, we're going to retest. Once again it was a 10 before what is now, re-treat up to 3 times again re-treating and re-testing up to 3 times. And then again, depending on what your problem is or what you're looking at, you may move up and down that kinetic chain. A tennis elbow being a perfect example. If you got a tennis elbow, most likely you have either a wrist or a shoulder issue. It's a question of which it is or Scapula stabilization issue. So it could be any of those. But that's when we might be moving up and down the kinetic chain. You don't want to ignore the tennis elbow, you want to treat it, but you also want to treat what's causing that tennis elbow. And then, obviously, add more complex testing. It could be, "Hey, by the way, it was just when I gripped my water bottle, that hurt." Okay. Well, now maybe we're going to put a weight in. Now maybe we'll have him do more of activity like twisting a cap or throwing a ball or lifting a heavier weight. But add in more complex things, doing a push-up.

Then after that, we are going to go into our training program. Now that's again, restoring our muscles balances training, our movement patterns, and then again, adding in our adjuncts like for me a huge one is kinesiology taping. Although while we're talking about instrument-assisted, I also use a lot of my shockwave therapies using these same types of concepts. I find that it works really effectively with those of you who may do shockwave as well.

Now, indications. This is one thing that I always find interesting. I know we have to do this just from a standpoint of creating a framework of what you should at least know what is in your real house. There are very few things that I don't have indications for myself if there is a soft tissue involvement. It's actually just knowing when not to apply more than anything. So, obviously, your tendinopathies respond extremely well to these types of FAKTR concepts. As well as instrument-assisted soft tissue mobilization or fascial syndrome like an ITB syndrome. My biggest thing, of course, with some of these, is like an ITB Syndrome is like, "I get that's your pain, that's not your problem." So, in those situations, we obviously have to be looking at what mechanics and probably hit imbalances to make sure that we're correcting our ITB problem, and let's just hope it stays on one side and it's not because there's something bad going on the other side, which then makes this work twice as hard.

Trigger fingers, things going those lines. Other indications, I absolutely love doing nerve entrapment stuff. I have been fortunate enough I finally met Shacklock recently. I find his book to be absolutely one of the best around there. But even Butler's research studies that I've read

where it all started in all honesty with nerve flossing. But carpal tunnel syndrome, thoracic outlet, all these other nerve entrapment syndromes whether they'd be true neuropraxic compressions, which obviously carpal tunnel and cubital tunnel are most common ones. Or they make maybe fatal adhesions, in other words, the nerve just isn't gliding well within their sheaths like a TOS. Again, a TOS can be a true nerve compression but a lot of the time, it's just being hung up in some tissue. Which is why sometimes we see TOS surgeries not really working too well. As well as if you're only doing some stretching. Sometimes you really have to release some adhesions within tissue in order to establish POP immobilization between nerve, blood vessels, muscles, fascial sheaths.

Ligament injuries. Of course, the more superficial the ligament injury is the better off you're going to be. MCLs, AC ligament sprains, my God, these respond so exceptionally well. Ankle sprains are a lot more complicated just because the mechanics that are going on there. But at the same time, if you're doing a really good rehab program associated with your instrument-assisted work, both from an anti-inflammatory aspect of reducing swelling from the acute ankle sprain, as well as assisting in remodeling the injured ligament which may be pro-inflammatory depending on the pace that you're in. We'll talk about that as well in a few slides.

And then, to me, scar tissue and adhesions, which is what instrument-assisted work at least in the modern methodology starting with Graston Technique. That's why it was developed. It was to actually mobilize scars from two guys who had previous surgeries and were athletic. So, that's the part where these all came from, was actually post-surgical work. And honestly, I find it to be absolutely invaluable if you are in the office doing post-surgery care.

The interesting one is Edema. Now, massage therapies, physiotherapists have also been utilizing milking versions with their hands for decades and decades and decades. Instruments are phenomenal for that post-surgical and acute swelling. While I know it's utilized a lot in Lymphedema as well, I got to be blunt, that's not my wheelhouse. I'm a sports guy, so for the most part I use it for more post-surgical and acute Edema. I tend to refer to my physio-therapist for Lymphedema myself and if they happen to use instruments, fine and dandy but they do it every single minute of their day. Whereas somebody like myself, I might see Lymphedema 5 cases in a month or something along those lines and it's usually secondary to they're in for me to see something else. If Lymphedema is really a primary issue, I tend to refer that out to somebody who's a little bit more vested in that information. Because it is a lot more than just pushing out swelling in an acute ankle sprain.

So, our contraindications, this is one of the things that I get a little crazy about because, this is again, we have to put up a framework of saying "Hey, be aware. Don't just treat the soft tissue just because you think you're great at soft tissue. Be aware of these things." But a lot of these things that we're throwing up here, I live right outside of New York City in New Jersey and the reality is, cancer is something obviously we see quite a lot. Just because somebody comes in with cancer, it doesn't mean you're not getting instrument-assisted soft tissue mobilization. You just got to think, "Okay, is it a lump? That's a tumor that's visible?" We don't use our instruments over that.

But if they have roughly we'll say something like a Renal Cancer, it doesn't mean you can't treat the shoulder. I obviously see a lot of mastectomy work and breast cancer treatments,

Lumpectomies, radiations, things along those lines. So, these are the things that are very common to me in my office. There are things however that, a burn scar, well, I was told burn scars it doesn't really work well with, but I had to try anyway. And the reality is, it truly is a different type of collagen scarring that occurs. I have not found burn scars to react really well to instrument-assisted soft tissue mobilization. An unhealed fracture. Look, if you are co-managing the situation, then you're fine but obviously, your unhealed fracture should be seen by the MD, the orthopedist. They're the ones who should be handling an unhealed fracture.

Kidney disfunction. This is one that understanding if soft tissue releases a lot of solutes into the bloodstream. If you're on dialysis, you got to be careful as to how much you do because the kidney is going to get taxed drastically, the liver even for that from that standpoint. Pregnancy. Look, I live in the United States, there are more lawyers than manual therapists. Whether it be Cairo's, physios, massage therapist, so on and so forth. Pregnancy, if you look at a pregnant patient you're liable until they're 18. That kid's 18. It's something that you always have to be worried about but happens to be, even though I'm a sports guy, pregnancy happens to be my second favorite population to take care of in my office. I love them. They respond exceptionally well to almost all the work that we do. And it's great to have somebody who's so happy actually seeing you because we're the only people that are getting them out of pain. Unfortunately, in the medical, I can't inject them, I can't give them drugs, so what am I going to do? Usually, they firm out. These are a group of patients that I actually love getting.

Anti-coagulant medications. Remember we already talked that particular response is common, especially in those early visits, first one to four in particular. You need to know whether somebody's on anti-coagulant medication. Not necessarily that it's going to say, "I can't do this on you" but your amount of time that you spend, your duration should be low and your intensity should be low at least for your visit to see how other tissues react. I have had patients with high doses of anti-coagulants that had absolutely no particular response. And I've had patients on half a baby aspirin that literally I took one stroke with an instrument the next thing you know there is a line of a particular response. You have to be aware of it. It has to be something you discuss with your patients so that you're aware of it with each other. Again, to kind of curve your aggression initially with your treatment. Obviously, for any of your inflammatory arthritis, if they're in an inflamed state, you must reduce the amount of work. However, I may switch to an anti-inflammatory application that, again, we will discuss in the next few slides.

Uncontrolled hypertension. Bluntly, I've had more than enough cases of uncontrolled hypertension that have shown up in my office. I am praying when you take your blood pressure, your vital screenings and you actually see this and you ask the patient, "Okay, you didn't list hypertensive in your intake form. You have a blood pressure of 240/180. Who is monitoring this for you?" "Oh, I didn't even know I have high blood pressure." Well, please don't treat them. Call up their MD and either say, "Do you want to go to the ER or do you want me to send them to your office?" Obviously, the MD 99999 out of whatever number of times, it's going to be "Send them to the ER" And again, with that level that I just told you something like a 240 and I actually had somebody come on like 240/180. They went right to the ER.

Other problems are contraindications. Reflex and pathetic dystrophy or better understood as Chronic Regional Pain Syndromes. Look, I don't want to make it sound like you can't treat

these patients, in fact, I do. However, resolution of their problems shouldn't be the expectation 100% of that time. If you can and it does happen, be thrilled but literally, if you take somebody who's been living their life as a 6 out of 10 every single day, their lives are an 8 out of 10 and you're reducing that to a 6 or a 4 out of 10. I think you're doing your job. You're helping them stay off medications, you're allowing them to live their life better, so, that's fine.

Lymphedema we've already talked about. Polyneuropathies, again, are usually caused by other things like diabetes or thyroid issues, or something else along those lines. Right now it's a vascular scenario. You're not going to be able to treat those successfully just by doing some instrument-assisted work. Even if you desensitized it, if it's burning pain, it's going to return. This is not something that we are going to have a resolution with. Diabetes, obviously again, that's an endocrine disorder. What are you going to do with soft tissue mobilization? Just be aware that diabetics, they're going to heal a lot slower. Open wounds, unhealed suture sites, things along those lines, well, guess what? Yes, we'd like those to close. So, it doesn't mean you can't do soft tissue work on them but don't go over the suture site. You got to let that close first and then you can move on and start treating the scar.

Obviously, things like **Osteomyelitis** where you have a true bone infection. We're not doing instrument work over that. Varicosities. Now, I'm not afraid of Varicosities myself. Again, I've been doing this for over 2 decades. My pressure when I see a varicosity is feather-light but it doesn't mean in the other region like a calf, for example, I can't treat it a little bit more aggressively. You just got to be careful over the varicosities. If you have somebody who you suspect with Thrombophlebitis or has a massive family history and they got that deep [inaudible] in their calf when they're going for walks and things along those lines, get an ultrasound before you start treating that calf aggressively. Because the last thing you want to do is create embolism.

Now, one of the most important things to me with instrument-assisted soft tissue mobilization isn't just the aspect of getting some healing and treatment. But it's also really important in clinical decision-making. And I got to say, I don't like talking in absolute. But this is about as close to absolute as I can see within medicine. So it uses both assessment and treatment. You obviously start to perform your examinations, and your histories and things along those lines, and it's going to be instrument-assisted. It's going to be integrated into your treatment. It doesn't have really protocols. It shouldn't be a "Do this and this and this." That's not being a clinician, that's basically following a baking recipe.

There shouldn't be boundaries. I always say your greatest limitation with the patient is your own creativity. Now, that being said, if the patient improves and then drastically drops right back down to square one, I like to call it "The yo-yo effect" I'm good, I'm bad, I'm good, I'm bad, I'm good, I'm bad. And that keeps happening. If it happens consistently within 2 to 4 times, I'm a little bit more towards 4. I like to give things at least 2 weeks to see if that's going to take into some kind of high gear. But by 2 visits, if I'm seeing that yoyo effect, I'm not happy. By 4 visits, I can tell you right now, I'm already doing my progress about which I do anyway every [inaudible]. But that's when I might be making my determination of "Okay, now it's imaging; x-ray, MRIs, CT, whatever it might be, now it's ultrasound. Now it's referring out to the ortho, to the MD, I want to get bloodwork.

I have had situations where what seem to be a muscle spasm and then I do mean a threshold spasm. Somebody would walk a certain distance and their back would go into spasm. And we treat it and she was able to get back to that activity again. All of a sudden she hit a certain threshold, and bam! spasms all over again. It turned out once we did bloodwork that her serum calcium was through the roof. She had parathyroid cancer. So, when you see these yo-yos back and forth, back and forth, back and forth, let your spider-sense tingle, man. Your gut is telling you something. It's probably not a good situation. It may be something as simple as, "You missed the diagnosis, re-assess it." But it also might be something more serious like, "Uh-oh, I need to refer this out. This is not a situation I should be taking care of."

By the way, it could just indicate the type of soft tissue that works that you're doing? FAKTR is what we're talking about right now, instrument-assisted wise, it just may not be appropriate for that patient. There is no one technic that is appropriate for every human being on the planet. It's not going to happen that way and if you think so, just wait for the person to walk in that it doesn't work on. We don't do the same treatment to every single patient every single time.

So, getting into our treatment responses with instrument-assisted work, we have to be aware. I am so adamant about this, please nobody get upset about this, but you cannot fear your patient's pain. It is shocking to me how many manual clinicians are terrified of a patient coming in pain. That's why they're seeing you "Oh, all we're going to do today is ice and stim." What? Are you kidding me? Is that the best you can come up with because somebody's in acute pain, is ice and stim? We got to think well outside of that box now. You cannot be afraid of your patient's pain, that is why they're seeing you. If you're afraid of it, why is the patient seeing you?

So, pain and discomfort are relatively common with soft tissue treatments. My favorite thing, again, with a patient that comes in and says, "Doc, new patient. Is this going to hurt when you work on it?" I said, 'Do me a favor. It's a tennis elbow, right? I want you to squeeze right on that tendon with a little bit of pressure. When you do that, does that hurt?" "Yeah, that does hurt, Doc." 'It's gonna hurt when I touch it too." All right? I use humor a little bit to deflect things in my office, keep people a little bit more jovial, a little bit happier but it also sets things into play like "Yeah, that might have been a stupid question."

You can't be afraid of touching something that might be painful. Now, we can do some things to desensitize the region before we work on it. No problems with that whatsoever, but you can't just say, "Oh, we got to calm that down. We can't even touch that region until it calms down a bit." No, your job is to get in there and workshop these things. Bruising, again, very common it's not something that should be a problem for you in the first one to four treatments to see it. It's normal. However, you got to remember particular response is basically our blood vessels, superficially our capillary beds that have stuck between tissue layers that aren't mobilizing well. When things are not moving, that capillary wall becomes very fragile. As you're doing your soft tissue treatment, both through compression and shear and things start gliding again, those capillary walls are actually attached via cytoskeleton to those fascial layers. As it starts gliding and moving, capillary walls are going to be torn apart from that cytoskeleton because they become fragile, you're going to get a [inaudible] response. It is extremely common. It tends to only show up over damaged tissue or tissue that is not mobilizing well. However, you should get that tissue mobilizing pretty well within your first one to four treatments, and therefore, the amount of particular response should decrease drastically.

It doesn't mean you'll never see some red dotting. People do things in life. They might sit at a computer 8 hours a day, 10 hours a day. And some of those postural muscles affect the STMs. All these things could develop those adhesions again or that lack of mobility. And you can still get some particular response, but it should be drastically lower. It should be reduction, reduction, reduction as you're going through treatments. Bruising is not something that should be, if you're on your 8th treatment with somebody you're still bruising the stuffing out of people, I'm concerned. I'm looking at this going like, "What else is going on? Are you just constantly re-aggravating this tissue or is there something going on with you physiologically that we have to be concerned about?"

Lastly, as a potential response, this is not the most common thing in the world that happens. It's called a spontaneous burser release. What these are basically hardened scar tissue that's attached to viable soft tissue. And what can happen is it can tear apart and literally give a loud audible pop. Again, I've been doing this type of work for over 2 decades. Every single time one of these happens I still go like, "Uh-oh." When you hear this kind of a loud audible pop like an ACL just ruptured, it's a little unnerving at first but I see invariably one of two responses. That person goes, "Oh my god. What was that? Holy cow! My shoulder feels great! What'd you just do?" I didn't do anything, it's just scar tissue ripped away and now you don't have any more restriction, the pain is gone. It's a really interesting thing. You'll see somebody go like, "Oh my god. I just feel great now." And then, there's also the negative one. That scar tissue tears apart, you get massive inflammation, and the patient goes, "Oh my god that hurts so bad." Here's the difference, it's inflammation that's created from that tearing of that scar tissue, however, unlike the injury where it could take weeks for that to get better within a week, 3 to 5 days usually, that inflammation starts calming down and the person starts going like, "Oh, wow! That's really starting to feel a lot better now."

So, it's the treatment response. It's that duration afterward, you'll start noticing the person feels a lot better much quicker it was just an initial response that scar tissue tearing away. If you happen to get any of these, I'm really sore afterward. Now, I'm going to give you something that in a few slides when we talk about tendons, I'd like to call it my 7 out of 10 rule regarding post-treatment soreness. But look, whether it's pain, soreness afterward, whether it's a particular response or bruising, spontaneous fascial releases that have the inflammatory response, number one, you must discuss these types of things with a patient. If you've talked about them with the patient and they look at you and they understand it, you're going to be in much better shape.

The other thing is you may need to do some very light work. Maybe you're doing the anti-inflammatory type of work for treatment after that, maybe you're doing an anti-inflammatory application with instruments, maybe you're doing more of your icing, maybe you're doing a rehab technique that is designed more to pump inflammation out rather than doing eccentric loading, maybe you're using other adjuncts like Normatec in order to help pump out some swelling in the area, or laser or things along those lines. Now, we have 3 major applications when we talk about soft tissue treatments. And I think this, in particular, is a really important thing to go through because I don't think a lot of people discuss this very well. The way that I look at it, and this is directly from one of my friends from Canada, Toronto. Kevin Jardine came up with this regarding SpiderTech taping, and this is again going back quite a lot of years now, but he talked about things being either neurosensory, structural, or microcirculatory.

Basically, a structural treatment was much more for in taping was from the standpoint of creating postural changes or things along those lines. I looked at it a little bit from the soft tissue perspective, I said, "This is genius." But this is everything we do whether it's rehab, whether it's manipulation, whether it's modalities, whether it's soft tissue work, whether it's taping. Are we trying to be pro-inflammatory, structural, changing the morphology of something? Or we're trying to do a neurologic response which is what most of what we do is we're trying to stimulate afferent nerve receptors that allow us to reset things within the central nervous system through reflex loop mechanisms, which we're going to go through again in a little while, or are we trying to decrease inflammation? And I took those and I said, "Kevin, genius, I'm adapting this to soft tissue."

Our structural treatments are pro-inflammatory treatments. They're designed to create fibroblastic proliferation. We want to create collagen synthesis when we go that aggressively. They are obviously heavy deeper strokes. They are faster strokes only if you can maintain your instrument on the tissue. There's no point in going faster if you're slipping off it. All you're going to do is create inflammation everywhere else but where you need to. However, as I said, it may be a slower stroke to stay on the tissue. Just remember, these are designed to create inflammation so a lot of the times when you do your pro-inflammatory treatments, the first thing they will say is, "Wow!" I go and I muscle test something again for a tennis elbow and they're going like, "Wow, that doesn't hurt anymore." I was like, "Wow. What did you do?" I said, "Well, obviously, I healed the tendon injury that you've had for the last 12 weeks in the last 30 seconds," and they look at me going, "You're really good." I said, "I numbed your area."

You got to remember, part of what you're doing when you do soft tissue work is you're creating contact anesthesia. So, a lot of that soft tissue work initially, you just numbed it. If you haven't told the patient "Hey, by the way, in the next hour to two hours, you're going to start getting sore because the purpose of what you did was to create a focal inflammation." Why? we'll talk about that in a little while. "But just remember, we are, at times, trying to be pro-inflammatory. However, there are only four times we're really trying to be pro-inflammatory." Our four situations are tendinopathy or tendinosis, in other words, what we're trying to do is I like to describe a tendon injury in these situations as a rope that's fraying from the inside out. My patients get that. So, as I'm doing my tendon treatment, I'm trying to rebuild collagen production inside the tendon. So we're going to focus on using, interestingly enough, our factor treatment concept three, which is resistance but focusing on eccentric loading. Why are we going to focus on eccentric loading? Eccentric loading increases collagen production. It's really that simple.

So, the question could also be, "Well, why don't I just do some soft tissue work and then have them do eccentric loading when they go home?" You can. Here's the interesting thing. We're talking about the neurology of what we're doing. Adding in these therapies together, number one, increasing the amount of neurology that you're stimulating, secondly, is the ideology of how quickly does collagen production starts after you're doing your soft tissue treatment. I'm going to actually show you some actual slides that demonstrate the speed upon which collagen production happens with soft tissue treatment. Secondly, ligament injuries. With the ligament injuries, we have to remember it's non-contractile, however, we do know that fibroblasts and collagen align, in other words, they will line up along the line of strain so what we want to try and do is create the line of strain, the tension on that ligament, while we're doing our soft tissue

treatment because the fibroblasts that we're proliferating and bringing more to the area and the collagen that's being produced is going to be produced along those lines of strain. So, with an ankle sprain, I literally will put it into plantarflexion and inversion, obviously, an inversion ankle sprain. I will put that into plantarflexion and inversion and treat in that position. Now, if they can't wait there, I'll have them sit down put their foot on a Bosu, and just bring their foot right into that position. If they can wait better, I'll have them stand on the Bosu and create that position.

Third. Post-surgical or traumatic scars. Again, remember that's what instrument-assisted in a modern way hat was developed for. Now, you can focus on any and all the concepts here. It really depends on where they are post-surgically. And just remember when you're doing a post-surgical case and you're working specifically on that scar, I tend to use what I call a filet stroke. This is a stroke that I actually developed at Graston Technique. Our purpose with this is literally taking tissue and filleting, I'm going to try and show this one as best I can, filleting through it. Almost as if you were doing this type of motion. Almost like an atom in the lab where we're peeling off layer after layer you treat and pull off, dissect and pull off. So, that layer, it's going to go within two layers but it's not going to be thick, it's got to be the narrowest part of the instrument in order to accomplish that. Those fillet strokes are great because it revascularize the scar. It prevents scar tissue from forming in a negative way within that scar and cross-linking. It revascularizes it so it reduces the coloration of that scar much quicker. In other words, it'll turn it back to a skin color faster. The raised scars, it'll also drop them down.

So all of that is extremely powerful things. They have wonderful methodologies of improving the ability for somebody to mobilize much quicker, in other words, they may be able to have less pain. One of the greatest examples I can remember is seeing somebody who was terrified of me working on their scar, but by day four after their surgery, they were in so much post-surgical pain they said, "Just do whatever you can. Whatever. I don't care. Just do something." And I did more of my anti-inflammatory work, which we'll talk about in a little, over that scar and they were off-purchase that's literally the next day. But in the chronic nature, we're going pro-inflammatory. We want to mobilize that scar, revascularize it, get it moving again because scars can create a lot of negative neurologic effects in the body, whether it could be pure neurologic paresthesias or hyperesthesias but it also can create dysfunction. In other words, you might have a scar somewhere and the next thing you know, you get dysfunctional in another part of the body.

The coolest one that I can remember in modern history. I had somebody who had laparoscopic surgery on the right side of their body and post-surgery, they actually got tingling numbness and weakness in the opposite hand. It came out right after the surgery. I'd done all my questioning, arm position, things along those lines, were there any cuffs or things along those lines on that arm. No, everything was fine. The real interesting thing was as I was testing for grip strength and kept mobilizing the scar at the same time like pushing and testing the grip strength and the opposite side at the same time, I hit one direction, all of a sudden the grip strength came back. I don't know. Neurology is weird and it's interesting but you can't ignore these scars. So, any type of position that puts provocation into that scar tissue, that's what you want to use whatever the concept may be.

Then we also have our deep fascial lesions. Now, these are those knots that we've talked about forever. Recently, again, another evolution in soft tissue procedures is fascial manipulation. We have those Luigi Seco who developed this now. Carla and Antonio tend to do a lot of the research as well as the evolution of fascial manipulation. I tend to like using concepts for functional positions associated with those deep knots, those stucco points basically, deep fascial layers that have adhered together. What they're talking about is the use of these hyaluronic acid chains that become longer and longer. They actually turn over on themselves and kink, and it almost creates chewing gum between these deep fascial layers and it creates these knots. These densifications within our soft tissue, the way that you have to disrupt that is by deep pressure and increasing the temperature in that to denature those hyaluronic acid chains. Compress and mobilize them and get these things to actually release. I find it happens quicker using my instruments and adding in more of a complex position; a squat, something along those lines. Something that really mobilizes that tissue for me while I'm working on it. I find that actually speeds up the process of getting rid of some of these densifications within our soft tissue, these knots.

Now, the biggest thing with pro-inflammatory styles of treatments that you have to remember is I like to use my 7 out of 10 rule because patients do not want to tolerate too much pain. I said don't be afraid of it. I didn't say be the grand inquisitor. You're not trying to torture somebody. While the pro-inflammatory treatment is designed to create inflammation, you must follow that 7 out of 10 rule. Meaning, I say this, if I hit something that's a 7 out of 10, you need to let me know. It's not that I'm going to hurt you, I just don't want you to be too sore the next day. The whole purpose of that, again, is to make that patient understand "Hey, look, you're 7 out of 10. You let me know when you hit it." It also tells them "I'm not going to hurt you because we actually hit pain." All right? But it also lets the patient know it's normal to be sore the following day from this type of treatment. But it gives the patient control again. It allows you to do your job but it gives them patient control.

Remember, when you're doing these pro-inflammatory time frames if you go 30 seconds that's a lot. You really should be doing this in about 10 or 15-second bursts and then getting off the tissue reassessing 10, 15-second bursts. Pro-inflammatory treatments rarely should take more than 1 to 2 minutes to accomplish. That doesn't mean the entire treatment's done but the pro-inflammatory part of that shouldn't be much more than a minute, minute and a half, two minutes at most now. When we look at pro-inflammatory treatments, especially associated with ligamentous injuries, we have a cross-fiber massage that's been done forever on these things. We do cross friction from Cyriax. Well, one of the studies that were done by Terry Loghmani associated with a wrap study was literally doing a transsection of the MCL. Seven days postoperatively, in other words, they let the wound heal. They started using an instrument 3 times a week for 1 minute on that MCL. What they basically discovered was a lot of interesting scenarios associated with the ligament being stronger, stiffer than untreated, and was also able to absorb more energy before failure. And we have the specifics on those in the next couple of slides.

The method was, again, 1 week after the surgery to allow for that wound to heal. They used what was then a GT6, which was the smallest instrument in the Graston Technique arsenal, and the pressure was done using a force plate to understand that that was consistent. They did 1 minute of treatment 3 times a week for 3 weeks. They did do a long-term study as well that

increased that 1-minute treatment for 1 times a week for 10 weeks for a total of 30 treatments, not a lot associated with that, but we'll go through it in a second. So, here are some scanning electron microscope slides that show what a normal knee looks like, and here's the disrupted MCL. Now, the interesting thing of course is what happens to that MCL once you actually treat it. Now, this is a histological slide where you can see the effect of an untreated tissue, and then to the right side of the screen, you see the treated one. You can see the alignment's much better, the scar looks much better, and this is what's happened over that 4-week. This is, again, 1 week of healing of the wound where you did 3 times a week for 1 minute.

Now, the effects on the ligament, the mechanical properties that changed were they found that it was about 43.1% stronger, 39.7% stiffer, and it was 57.1% more energy had to be absorbed in order for it to fail again. So these were actually really, really important from that aspect. Now, the interesting thing is when you look at the 12-week study with 30 treatments, you notice how they evened out the untreated versus the treated. Now, granted, there was still more energy needed before failure, in other words, the likelihood of injuring that tissue again was still better in the 12-week study than it was in the other ones. But the stiffness and the strength of the ligament ended up evening out. What's the importance of this? If you're able to get on these injuries early, you can actually create what takes the body 12 weeks to do on its own, you can accomplish it in 4 weeks. How many people don't want to have 2/3 of the time reduction in recovery of an injury?

So, here are some examples, again, using a scanning electron microscope. Going a caged control all the way to the left, an untreated ligament. You can see the morphology of it. It's all disrupted. It's scattered and then you can look at the treated one, where it's much more organized as well as you can obviously see some disruption there. But in comparison to the untreated side, it's a drastic difference. Here's looking at that at it even higher. You can see the treated side. Again, a lot more organized and less chaotic whereas the untreated looks like you're walking through a spiderweb of crosslinking and adhesions. So, again, our short-term effects using instrument-assisted soft tissue on ligamentous healing were stronger, stiffer, and able to absorb more energy before failure, and the qualitative improvements of the collagen alignment were obviously significantly better.

When you look at the longer-term, okay, they started evening out. It was stiffer, still deficient, may still need more energy in order to fail. However, Terry Loghmani, in her in her discussion did say specifically that, a longer treatment might be needed because they only did one minute. So, they're looking at this as maybe they needed to do more. Not to mention, you don't get a wrap to rehab so that's another challenge as well. Another interesting thing that we always talk about with instrument-assisted soft tissue work is we work on it and all of a sudden you have this red on the skin, and we see where we're bringing blood to the area. Not 100% accurate. We're bringing blood to the skin, that is accurate. But the interesting thing with instrument-assisted work was that increased blood flow actually didn't happen until 24 hours after that treatment session, and it would continue for up to a week following. So that healing response blood coming to the air, bringing oxygen, bringing cells of healing, it actually perpetuates at 24 hours after treatment and continues perpetuating 1 week after the final treatment. That's pretty amazing.

So, our vascular effects from instrument-assisted work is not only we have that neurologic effect immediately, but we have a vascular effect that can happen to a week after our final treatment. Which, again, is massive in its healing process. We're getting not only our neurological. We're not just getting fibroblastic proliferation collagen production, we're also gettinr. Now, one of the important things to understand when we're talking about "Are we trying to be anti-inflammatory neurologic or pro-inflammatory" is understanding the amount of pressure. If we're being pro-inflammatory, we need to use heavier pressure because heavier pressure actually creates greater amounts of fibroblasts in the region. This is a study that was done by Gaenslen that shows lighe created very few fibroblasts; moderate pressure some more came to the area; heavy pressure you can see all that topography. A lot more fibroblasts started showing up in this tissue to create a healing response.

However, heavy pressure needs to be done within patient tolerance. You also have to consider, "Okay, I want to be pro-inflammatory. I know have to be heavy." Well, what happens if it was an ankle sprain that was 6 months old? I need to do some heavier pressure. What if it's the ankle sprain that came in 6 minutes after spraining it? Do I have to be pressure? No, my job with my instruments then is to help remodel the tissue better, use that position of provocation putting it in alignment. Because the disruption has already created inflammation. Your job now is to be the traffic cop and help guide it so your pressure is going to be lighter in that acute injury because the inflammation is already there versus the chronic injury where you have to disrupt and create inflammation.

Here's a simple example. I'm going to show a video quick here of somebody going into an inversion position while we're just working simply over the ATFL and the CFL, and those ligaments of the lateral ankle. It's a real simple thing to do. Again, it doesn't have to be heavy pressure in an acute setting. In a more of a chronic setting, you're going to use a little bit more pressure but the amount of pressure is going to be based on what your patient can tolerate and also you must consider the cross-sectional area of the tissue. Obviously, something like an achilles tendon will take much more force than, say, a tennis elbow. You don't have to use as much force or a tendon in a finger. So, always keep in mind the amount of cross-sectional area of that tissue while you're working on it.

Now, this is an area of you'll see me working on this using somebody on a Bosu. I gave them a cane in order to help stabilize themselves while they're weight-bearing, but all we're going to do is put that person into our plantarflexed in an inverted position as we're doing right there. And now, you're going to hold that position w; if we're treating so this creates the position of provocation, but it's also adding in some of that proprioception. You can see me doing a very short treatment stroke. This is a little bit deeper because we're trying to be pro-inflammatory. Now, what I've done here is I just added in some motion to that creating eversion, inversion back and forth. The purpose here is to create a little bit more of a neurologic stimulation as I'm working on those specific ligaments and to create a little bit more of an alignment within that tissue.

When we talk about tendons, the difference here is now we have contractile tissue. So, here's an interesting thing when we looked at cyclic loading, you can see that that slides to the left, that's cyclic loading. Again, these are chondrocytes so this is not really within a tendon, but these are chondrocytes. You can see cyclic loading all of a sudden created an alignment and

not to mention densification of those chondrocytes together after cyclic loading. This is over a 24-hour period. The other major thing to understand not that's just looking at the loading aspect is the alignment is let's not forget the effect of eccentric loading with tendons. The amount of tendon production, so what you're seeing in this bar graph here, I know it might be hard to readjust from looking at your screen is, Langberg had basically looked at eccentric loading of an Achilles tendon and looked at the amount of collagen production before training and after 12 weeks of training.

So you can see in a healthy tissue: negatives or that eccentric loading. It doesn't really do a lot. It does something but it doesn't do a ton. But look at what happens in an injured tendon. Look at the amount of collagen production that is produced by an injured tendon with eccentric clothing versus one that's not training. So, eccentric loading is critical to the absolute production of our type 1 col,lagen. The training schedules for this should be twice a week. Within the literature, what they've done is a 12-week process doing 3 sets of 15 heel raises eccentrically, in other words, they use one foot to bring the heel up, and then they slowly drop themselves back down. You can see that in the next picture.

If it doesn't create any soreness, you're supposed to actually increase body weight, in other words, use a backpack or something like that containing up to about 20 of your body weight. It's normal to get soreness with this type of activity for the first 3 to 4 weeks. The reality is if they're not getting any soreness, you're supposed to increase the amount of weight that they're doing this with. Here's an example of doing knee straight which would be gastroc and knee bent doing soleus for an Achilles tendon. Here again, is that eccentric contraction where on that right side you can see they're using the toe on the healthy side to drive the heel back up so they don't have to put all the weight through it. I got to be blunt, I tend to just let them do a toe raise using both legs. The only time I'm really really concerned about literally limiting the amount of concentric loading may be a post-surgical case or somebody who's in severe pain, but for the most part, I literally have them go up concentrically a little bit quicker and really slow on the eccentric so we're focusing on it.

Then here's an example of doing it with lateral epicondylosis. This is for tennis elbow, where they're gonna come up and then slowly bring themselves down. Then there's a physical therapist in my area, Tim Tyler, who actually created these protocols for TheraBand using flex bars. This slide shows the pictures on how to set up for an eccentric load associated with tennis elbow. He did the same thing for medial epicondylopathy. Now, this is our interesting thing. I remember taking tests and everybody tIts purpose when you're going through this kind of a process, you have to remember that the whole aspect of fibroblastic proliferation and collagen synthesis when I was taking boards," they said, "Oh, that happens about 72 hours. That's the fibrosis cycle within healing," and I was like, "Okay. So, 3 days after and I don't even remember when I was first learning Graston Technique, I was like "So, we're telling everybody they should exercise but wait a second if fibrosis doesn't start until 3 days afterward, should we actually have them exercise 3 days after?" Then we got a new literature and this has been great with the fascial congresses and things along those lines that have come into exist and how much great new information we get.

This slide that we have in front of us is from Grinnell. This is showing that literally within an hour of a disruption, we actually get fibroblastic proliferation and collagen synthesis. This

study was done within an hour. We also have people like Lan Javin and Sherman who have actually demonstrated using acupuncture needles rather than an instrument-assisted that that actual time frame drops to a minute. So, within a minute of doing your soft tissue work, I like to give it the nice little r amange within a minute to an hour, you're actually getting fibroblastic proliferation and collagen synthesis. Hence, you want to add the two together as quickly as possible not just for the neurologic perspective of what's going on, but also for the actual soft tissue remodeling. It happens much much sooner than what we learned in school. Happening within a minute to an hour of that procedure.

We want to create our eccentric loading at the same time we're doing our soft tissue treatment to maximize the amount of collagen production as well as fibroblastic proliferation that we are creating. That doesn't mean they might not have to do homework, home exercises, or I might send them to my rehab room afterward to do another set of something. But that's all part of that process of getting the fastest healing response you possibly can.

Here's an example of doing some eccentric loading associated with things like a rotator cuff. In this situation, we're going to look at supraspinatus, we'll look at posterior cuff, and the biceps So in this particular case, we're having our patient literally do an eccentric load for the supraspinatus. So, now, he's taking that arm out to the side. I brought it up to a little bit over 45 degrees but you can see the slow reduction back in. So, he brings it back up. Notice every little resistance on it. He pulls away to create the load and now he's slowing. Now, what I'm specifically doing with that instrument at this point is doing the my tendon's junction, but we also have to remember about the way that the supraspinatus, in particular, is going to come across the front of the shoulder and almost goes out like a fan over the whole front of the shoulder.

Here is a posterior cuff, where we're doing more of that myotendinous region. Then in this case what we're doing is we're just changing the position which isn't going to isolate out our posterior cuff as well but it does give us a little bit more neurologic aspect, and it does expose the myotendinous component of the posterior cuff the infrand so on minor a little bit better so you can see him changing his orientation. Now, what we're going to shift it to is the biceps. So in this one, we're going to create our eccentric load by bringing the band behindou come out into a flexed position, again, this is looking more at the long head short head of the biceps. In particular, in this one we're going into the transverse humeral groove where the long head of the bicep is ; there’s dives into the shoulder joint. I use my one finger to actually get into the tunnel to make sure I'm anatomically where I should be, and then I use the instrument over that to make sure that I stay in the right area.

What I'm doing here is doing the same exact thing except I just switched to a manual method like using cross friction. So, while instrument-assisted is critical and I think responds best to tendon injuries, we can use our hands as well. Now, here's one we're showing just using the achilles tendon. With this one, we're gonna have our patients go up onto their toes. As you can see, they took some of the weight off now they're gonna shift their weight to he bad side and then slowly drop themselves off, and at this point, I'm doing the lateral asect of the achilles almost like that anterior aspeAthleticsg me work through the medial aspect. I use a finger to get my depth. And then I'm going to change my pressure lighter to be over the Achilles tendon. You don't want to apply a lot of pressure over the achilles tendon because that's when you

actually create a tendon sheath inflammation. So we want to get a little bit softer when we're directly on the achilles and a little bit more aggressive when we're going to that fascial to the anterior aspect of it. t forget to hit those Sharpey fibers as they dive into the periosteum at the calcaneus. These are, again, what I tend to do is maybe 10 or 15 reps and then I retest the patient.

Now, neurosensory, I've actually done this from more of a neurologic standpoint. We als. Obviously want to release neurologically, which means normalizing the tone of the gastroc in the soleus complex. So, going from there, those are our pro-inflammatory. Again, just to summarize one more time, the only four times we're trying to be pro-inflammatory: ligamentous injuries, tenderness injuries, those post-surgical or traumatic scars, and those deep fascial knots that, we talked about we develop in our tissue. A neurosensory treatment. This is basically, I like to say control-alt-delete on the computer. We're trying to reboot the system. The purpose here is to reset the tone of our tissue. It is a ,much much, which ,is neurologically,where I go crazy when I see YouTube videos. I see them scraping the stuffing out of a forearm and the forearm gets a particular response. I'm going like, "Ohh! Somebody might have gone a little too hard." Not that the parThe other interesting thing when we add resistance is that ike a particular response, I'm going, "Wow, somebody went a little too aggressive."

The weight of the instrument should literally be h,ow much you're doing when you're doing a nwill add in resistance to certain injuries based on tissue. Obviously, with instrument-assisted work, we tend to wanThissome sort of emollient. For instance, the ones that I use fnearly everyes is a combination of synthetic beeswax and coconut oil, but you need some form of a lubricant. Something preferably that does not scrape off. I know some people use ultrasound gel because it's really inexpensive, and also it's water-based so if you're taping over it, it makes it really easy. But the reality is, ultrasound gel does scrape off really easily so you constantly have to reapply, and at some point, it also might get a little bit uncomfortable for your patient. So just be aware of that. Again, I use the factory emollient that we created. But most of the companies out there havr own form of emollient in some way shape or form. Some people like using Biotone, again, it's a little bit cheaper than some of the other stuff. It does scrape off a little bit more and absorbs into the skin a little bit more. So whatever it is that you're using, try and make sure it's something that doesn',t absorb into the skin that easily. That you only need a little of in order to coat an area because all it's trying to do is decrease the friction of your instrument over the tissue.

With a neurosensory treatment, it's a lighter treatment stroke, weight of slightlynt over the tissue area. This is the large majority of work that we do is neurosensory. We're just trying to stimulate afferently some of those receptors in the skin in the superficial fascia to reset thef tissue. I like to describe it as balancing seesaws; something's overactive and something's underactive. What we're doing with our instrument soft tissue is we're just trying to bring it back into play. The biggest thing to remember is, it is not designed to create inflammation. This does not mean you will not create a particular response. It does mean, however, that it should not be your goal. Part—just responses will happen over almost any dysfunctional area. It just is the amount of particular response and the amount of aggression that you're using. You want to keep this light and easy, and if a particular response happens, again, one, two, three, by the fourth visit, it should be gone.

So, remember your neurosensory treatments control-alt-delete. What we're trying to do is reboot that neurologic system to reset the tone of that tissue. Underactive; we wake it up, overactive; we calm it down. I know in a lot of techniques and a lot of companies we talk about releasing or facilitating or inhibiting. We don't do that. We literally create an afferent stimulation. We're creating a stimulation optors, those nerve receptors, then either reflexively segmentally, or through higher functions up the spinal cord possibly all the way to the brain, we are basically creating those loop mechanisms or stimulate, those loop mechanisms so the central nervous system does what it needs to do to that tissue. We don't say "I want you to relax." The central nervous system tells it to relax, we just create some of that afferent stimulation to help it along.

Here's a good little video showing a tendon sheath and the fascia that surrounds it. You could Area right there, superficial fascia, that surrounds the tendon. And in the next few seconds, you'll actually see that tendon sheath. See the tendon actually gliding right between the fascial sheath and the tendon. So, of course, what can happen is if you develop some adhesions between there, it's going to prevent the tendon from moving properly. This can create more fibrosis and scarring, obvious pain. But just remember that fascia is everywhere. It touches and covers every single cell in our body,. Now, this is Siegfried Mense who... I honestly I don't know at this point if he has retired. The last time I saw him he told me he was, and then I looked him up and he was still working. I got a feeling if you got a brain like his, it'll never shut down. He is probably the foremost authority on myofascial pain in the world, and he was one of those guys that discovered fascia is not an inert structure. It has a dense network of nerve fibers and it has a close association with those nerve fibers with vascular tissue.

Again, his studies, for the most part, were animal studies. But later on, he also tried to look at cross-sectional area of thoracolumbar fascia in those animal studies and also compare them with human thoracolumbar fascia. The Forbe pretty similar. That'll be our last slide with him. But what he discovered was innervation by the layers of thoracolumbar fascia that 90% of all of those nerve fibers were located in that superficial layer and he did the thoracolumbar fascia of the low back. He found that the middle layer was composed of much more dense collagen bundles with very few nerves, and the inner layer, again, likewise was pretty much devoid of nerve endings. So, that superficial layer is the layer that has the most abundance of those afferent nerve receptors, and interestingly enough,h it also has a whole lot of sympathetic efferents that come there as well.

What he also found within these fibers was the types. He found a ton of substance ; itome CGRP, free nerve endings were discovered in abundance in those superficial layers. While these there's also pain, there's also nociceptive in their orientation. The interesting thing was he found in the middle in the inner layers very little of this. So almost all of those nerve endings showed up in the superficial area. Why is that so important for a manual therapist? Oh, we can get on the superficial layers really easily. It's almost directly underneath the skin in a lot of situations so that makes our lives a whole lot easiwho do don't understand the purpose of what they're doing or whygain, over 90% was in the superficial layer. Here's the interesting thing over 40% of those nerve fib;ers were sympathetic efferents. Why is that important? How many of you have actually said to your patient when you get stressed that's why things get worse? Well, this is actually why. Remember, it's sympathetic efference so this is the sympathetic nervous system as controlled by the central nervous system. The center's not going the opposite

way. This is our brain and our spinal cord all saying, "Hey, by the way, fight or flight fight or flight to the tissue."

The interesting thing is it helps those central nervous system media events that sympathetic response is creating vasoconstriction, and it's changing the viscosity of the thoracic, lumbar fascia. So, it's almost creating a constriction event. When that constriction event happens if you have injured tissue, what is that going to do? If you crush or pressure something that's injured, it's going to hurt more. The great thing is because of what we do, we stimulate the autonomic system, that parasympathetic response, using our manual therapies through stimulating those afferent fibers that counteract the effects of sympathetic fibers. So, we can actually through our manual methods effectively shut down that sympathetic efferent effect.

That's why so many people feel good after manual therapies like, "Oh, my god. I just feel like jello. I wish it would stay that way." Me too, but unfortunately, not always. There is a reason why we get so much more benefit for patients even from a psychological standpoint through our manual methods. The interesting thing as I said before is "Are humans rats?" Well, on a cross-sectional analysis of the human thoracolumbar fascia, the findings of those nerve endings in the rat TFL were found to be equal proportions in the human thoracolumbar fascia. So, guess what? Rats are humans. Not really, but obviously, the distribution of our nerve and vascularity within those regions is very similar. While we're saying, "Yes, I get it. It's an animal study," guess what? The more we look at it, the more we correct the same kind of proportions of those nerve tissues within human tissue as well.

Now, another hypothesis that we want to look at is from a neurologic standpoint. Some of that is going back to what we just talked about; What's actually in that superficial fascia, those nerve endings that are there. Well, one of the things in particular was, and this came initially, especially Johansen's material came straight from Mike Schneider, whpractor Ph.D. at the Universexceptionallyttsburgh. He really helped as well as the scope page in the neurologic aspect of what we're doing with instrument-assisted soft tissue mobilization. And in particular, Johansen's looking at the gamma-alpha loop mechanism. He proposed that it's actually the gamma motor neuron system that influences the system, and it's through these extensive interconnections in the spinal cord that we accomplish this.

The interesting thing is those sensory afferents is that it is talking about within the skin, the ligaments, the muscles, the tendons, and mechanoreceptors, the superficial fascia, all of those extensive interconnections actually reflex onto or connect with the gamma motor neuron system, not really the alpha motor neuron system. So, our effect of stimulating those A-beta fibers is actually more on the gamma system. Now, why is that important? Through that constant relaying of information gamma, we get this feedback, this interfacial fiber feedback onto the muscle spindles, and it's therefore changing the reaction time of those tissues. When we stimulate the skin, the fascial ligaments over a joint start to introduce normal motion, which starts to stimulate a lot of this afferent. Well, guess what? When we're developing factors we're like, "Wow people are getting better," but we didn't know why. Well, this is one of the theories, which why. It's because we're stimulating all that neurology. And while creating that barrage of proprioceptive input, that afferent input, that's what's resetting the normal tone of the tissue. It's a control-alt-delete. This is the reboot of the system. It's almost like that same thing like you smack your thumb, you wave your hand around, and I don't feel, pain but as soon as I stop,

well the trauma's still there and your thumb starts going "Bop-bop-bop-bong" while you stimulated all those A-beta fibers hence why I don't feel pain, but as soon as I stop stimulating the A-beta fibers, bam bam bam, the pain is there.

The end result of what we're doing with our instrument-assisted mobilization especially using things like factory concepts where the person is moving, is resisting, is under load, is in positions, is that we're probably creating greater stimulation of that A-beta system, that gamma-alpha loop mechanism that's allowing us to reset the tone of tissues in a much better way. Now, when we looked at Robert Schleip's work, again, a lot of this stuff was from our first myofascial congress back in I think it was the early 2000s. And Warren Hammer really introduced a lot of this material into soft tissue classes. Basically what Robert Schleip said was that there's a neurovascular cascade of events that occurs from soft tissue mobilization. Everything from what we've talked about with the stimulation of these A-beta fiber stimulations, that gamma motor neuron system by decreasing sympathetic tone, improving vasodilation, and through even endocrine loot mechanisms, and vascular mechanisms by creating vasodilation increasing interstitial fluid. That profusion of blood plasma into this extracellular matrix improves that viscosity

So, looking at these almost one by one, if we have a palpable soft tissue problem or honestly even provoke soft tissue problem through an activity, we do our soft tissue mobilization. That's going to stimulate those mechanoreceptors, in particular, what we're looking at is those interstitial and Ruffini nerve endings. We get a change or stimulation to that autonomic nervous system, which improves our local fluid dynamics as we talked about including improving plasma perfusion which improves the viscosity of the tissue, and we see the tissue change in its appearance. That interstitial myofascial receptor, we talked about this earlier as well, stimulating them in the skin and in those joints, tendons, ligaments, and superficial fascia. It's assumed that when we stimulate those interstitial receptors, we're actually creating an endocrine response. A hypothalamus tuning is at its fault. It's a neuromuscular effect. It's an emotional state, this is also taking in the psychology of an injury, as well as obviously, cortical and endocrine function.

This is why when people get up off a massage table they're like, "Oh my god, I feel like butter. I'm melting." That's that hypothalamic loop of actually creating a global deep and healthy change within the tissue. Again, we have a palpable tight tissue, we go through that soft tissue manipulation, we stimulate those mechanoreceptors, that also influence that automatic autonomic nervous system again, that creates the hypothalamic tuning which creates an endocrine response, changing a global, not just a local tissue, but an entire body change in the palpable response of our tissue.

Another aspect, and this is Chantal and Delaney, talked about fascia as an adaptive organ. Meaning, the ability of your fascia to truly contract. It was always thought of as a nerve, but what has been discovered is that this thoracolumbar fascia actually has visceral smooth muscle cells in it and within those smooth muscle cells, that allows for contraction. Now, obviously, if you're under sympathetic guess what happens? You get that contraction of tissue and that creates a constriction on injury tissue or pressure on injury tissue, which creates more pain. Now, as we stimulate these nerve receptors in our skin, in our joints, or tendons, and so on and so forth, obviously, we're getting those smooth muscle cells through an autonomic response to

relax. Therefore, reducing the amount of constriction on those issues. So, again, we have a palpable restriction within the tissue, for densification, we do our soft tissue manipulation; that stimulates those mechanoreceptors, we get that parasympathetic response; that creates a relaxation of the interfacial smooth muscle cells creating relaxation of that tissue.

So, in summary, it's all of these. We have everything from stimulation of mechanoreceptors that will affect both the central nervous system through loop mechanisms, that will affect the autonomic system sympathetically both centrally and peripherally, creating endocrine vascular as well as that smooth muscle cell response. So, of course, I always love to say, "Well, which one are we truly trying to affect?" Guess what? The body does that. All we do is create afferent stimulation. It will decide which pathways if not all of them are stimulated at one time in order to create that palpable change in tissue.

Looking at mechanical load and frequency of soft tissue, what are guidelines for this. Well, you know what? Guidelines still will always come down to the aspect of what is clinically relevant for that patient. However, when we look at things if we're doing low load low frequency obviously that's lighter pressure. Active trigger points, acute injuries, painful scars, things along those lines, it's non-inflammatory. It's very low, non-inflammatory, desensitization kind of stuff, so that's our anti-inflammatory application. When we're looking at things that are pro-inflammatory, heavier pressure; a higher load onto those things. Those are things like tendinosis chronic muscular restriction. Just remember that pro-inflammatory should always be very low duration so that it can actually not over inflame a tissue. It may be high pressure, hopefully, fast enough across the tissue to create a better pro-inflammatory response. However, at the same time, you have to be able to stay on the tissue.

Here are examples of when we look at some of our concepts. For instance, concept number two: motion of provocation. When we're looking at some of our soft tissue stuff, we can see what's happening with these slides. So in this example, we're using the cervical spine and in this situation, we have a patient who is just going through flexion and extension, some rotation, and we're doing very light pressure. This is going to be concept two, which is using motion, but this is a neurosensory application. Light pressure all we're trying to do is reset the tone of that tissue, making sure we create the greatest amount of tissue response without creating heavy inflammation in the tissue.

So, as you can see, as we're doing this we do get hyperemia on that skin. How do I know when it's time to actually pause and take a test again, is when I see that region that I'm working on has become hyperemic. That is when I want to try and stop for a second, reassess my situation, and then go back and retest and maybe retreat again. How do I know that the hyperemia is the time to retest? As we've just talked about, the same A-beta fibers, those same nerve receptors that are creating vasodilation are the same nerve receptors that we stimulate to create those responses, as Robert Schleip, that big slide that we showed showing all the different pathways. So, I want to retest as soon as I get that basal dilation on that global tissue, I want to go and reassess the situation and make sure that I've actually created a positive neurological response as well.

Now, as you can see, what I'm doing here we're doing multiple body parts moving at the same time, creating even more of a neurologic, as well as creating more kinetic chain stimulation.

We can also get this down to more focal areas whether it be a suboccipital muscle or whether we're trying to get as deep as we possibly can to maybe a facet region. Now, I don't like saying that if I have somebody like my neck very thin, good chance I'm going to get down to upset pretty easily. However, let's just say I was taking care of an American football player, offensive lineman. Well, that neck could be this big. I am probably not getting onto a facet with that person. So, we have to understand the amount of depth we're getting still has a neurologic response, but we still want to go through the process of treating those different things and making sure that in that aspect we've created as much possible response as we can without creating too much inflammation. These are, again, neurologic in their aspect.

Once we've reset the tissue, again, I always like to say "If it was a 10 before, what have we dropped to?" If we've dropped from a 10 to a 5 to a 4 to a 3 to a 2, I'm pretty good on that day understanding that I'm a clinician and most likely that patient is on a treatment regimen, in other words, maybe I'm seeing them twice a week for the next two weeks. Well, I don't have to go from a 10 to a zero on day one because the reality is the more times I keep treating or retesting and retreating, the more likely they are to have a negative treatment response the next day rather than having a just positive outcome that stabilizes over a couple of treatments. So, don't build roman a day, you don't have to but always look for a minimum of that 50% change as you're going through your treatment.

The next one I'm showing here. Again, using factor concept two which is scapular dyskinesia. So, in this case, I'm looking at really shoulder impingements. One of the most common reasons we're going to have shoulder impingement is scapular dyskinesia. The biggest thing is how many muscles help control this movement of the scapula. There's a ton. You got your scapula stabilizers, you've got your rhomboid, you've got your mid trap, upper trap, lower trap, levator, serratus, lat, all these tissues that are attaching it, teres major. We can keep going on and on as to what's attaching subscapularis, all of these things that are touching to the scapula. So, my goal here is to neurologically balance out all the seesaws. Again, doing something like this I'm treating the entire upper quadrant, that upper shoulder region, the whole scalp region into the spinal region down into the lat region, back, anterior cervical region, the deltoid region. All of these things are actually playing a role in scapular attachments.

The biggest thing is, just remember this is much, much, much lighter. This is the weight of the instrument on that tissue, and all we are trying to do is create that hyperemia on the skin to reassess. One of the most fascinating things that I have associated with shoulder injuries, which is one of my absolute loves in treating, is that I can have a guaranteed rotator cuff tear. Never touch the rotator cuff from the standpoint of trying to truly get on that rotator cuff but just literally do this very light neurosensory treatment weight of the instrument over that region and that patient will reduce that rotator cuff pain by 50% or more without ever really doing a specific treatment to that rotator cuff just by normalizing the tone of scapular mobility. All the muscles that treat subscapular mobility. Now, you see here I took a smaller instrument out to get a little bit more into something like the subclavius region, anterior cervical fascia, as well as maybe even treating some of those ac ligaments during the course of movement. This is how I would very frequently treat a grade 1 sprain of the AC ligament and then do a little bit more pro-inflammatory specific to those ligaments but neurosensory through the entire upper quadrant.

It doesn't really matter what area you're working this also works just as well as doing something on a squat like we'll do in this next slide. We can see the same exact procedure done for let's just say a patellar tracking disorder. One of the more interesting things that I've seen associated with things like knee injuries whether it be meniscal; meniscal, again, being a very common one, is that normalizing the tone of those tissues creates a drastic drastic response in normalizing the tone of the muscles that are controlling knee movements. And in that aspect when we control those muscles that are causing those knee movements, we normalize their tone of them. Now, all of a sudden, that squat position no longer is painful for the patient even with things like internal arrangements. So, you saw me working on the quad there. Now I'm working on the adductor region while that patient holds the squat position and while he's holding it, we could have him just going up and down. He's holding that position. He's actually strong enough to hold a squat position for a long period of time, but we also want to get onto these posterior structures so now we're doing the hamstring, as well as the gastric region. And all of these are going to come into play into normalizing the tone of those tissues that are controlling loads on the knee itself.

So even in a squat position, you can see I can get onto the blue. I'm doing this over clothing, purely from the standpoint of video demonstration. Understand I try to instrument on skin on almost all procedures. However, if a patient is wearing spandex, it's not unusual to be able to treat through spandex I will force them to go instrument on the skin if I'm not happy with the results I'm getting. These are all wonderful examples of how we can normalize in a very short time period. In fact, this entire procedure of like the upper quadrant that we just did for scapular dyskinesia or affecting all of those different compartments in the thigh and the lower leg, we can do this. It takes about 5 minutes of time to get hyperemia on all these issues quickly. It's amazing how fast we do it. Now, we have the patient going through squat motions so it's creating more of a neurologic stimulation helping to control-alt-delete and reboot that system. And then once we've done this, we can go and start creating some of those more specific areas that may be pro-inflammatory, like maybe we're doing the coronary ligament or working on an MCL, or the patellar tendon, or the retinaculum associated with the patella, or in this situation, you see me I'm working a hamstring insertion. In particular, it's a good eccentric load on the hamstring insertion if I went to more of a pro-inflammatory treatment because as he drops into the squat, we're eccentrically loading the hamstring tendon at the buttock right at that ischial tuberosity.

Now, we have one other application to discuss associated with instrument-assisted soft tissue mobilization, and that application is anti-inflammatory. This, to me, is one of the more unique situations that we have and personally, I think it's one of the ones that we don't talk about a lot. In fact, I know one of the challenges I have within the orthopedic world, is a lot of the time they'll sit there and say "Okay, I don't want you to see Dr. Doerr for the next 2 weeks because we want to get the inflammation to calm down first before he goes and starts working on it." and I'm going like "Still don't get what I do." They frequently associate the soft tissue work that we do for tendon injuries or ligament injuries we're trying to be more aggressive, but they don't understand necessarily the neurologic resetting or the anti-inflammatory aspects of what we do, especially in post-surgical cases. My goal is to literally have that person in my office almost like the same day if possible, but definitely within 24 to 48 hours.

So with anti-inflammatory treatments, our purpose here is to improve superficial blood profusion because that's basically where we know we're doing it. We also know from our studies that we can actually increase blood profusion within the tissue but it doesn't happen for 24 hours after and remember it does perpetuate for a full week following that last treatment. But this is more on the superficial layer that that's the creating that vasodilation that we talked about neurologically and improving plasma perfusion into that region, helping to pull out chemical irritants. Again, improve the in viscosity of the extracellular matrix as we talked about by improved blood plasma perfusion, reduce edema by opening up capillary bones. We help to move these tissues or this fluid out of there. It's amazing on things like bursitis. This is one of the more unique things that I will discuss. It's really very unique with bursitis as well as with things like hyperesthesia as we talked about whether it's post-surgical pain and/or some of that hyperesthesia that some people really develop within scars. These are extremely light treatment strokes.

Since you're able to see me. If we're doing a neurosensory and that's basically the weight of the instrument as we're treating, understanding that as we do our instrument-assisted work, which I'll show a little bit more in a second how our angles and our pressure. That's the last thing we'll do. When we're doing an anti-inflammatory treatment, I almost let the instrument wiggle in my hand, so I barely have a grip on it. And from there, it's literally feather-light. It's not even the weight of the instrument as I'm treating. I'm going to look here. The amount of perfusion you're going to get is so minimal. I'm looking to get that point of very very light hyperemia. A light pink, not even a deep red. Once I've achieved that in the global area of what I am working for, that anti-inflammatory region, I'm done. I'll stop right there. Anti-inflammatory treatments can be done on a daily basis. They don't have to be done 2 times a week or once a week or things along those lines.

I've had cases where on electron number of cryptos, which is one of my best cases. I apologize I actually didn't put the pictures into the slide presentation for that. But I had a person who had an egg on their elbow. Was actually a Junior National hockey player and he had taken the elbow to the ice being hit from behind a couple of times. The challenge that he had is this egg was sitting on his elbow for about 2 to 3 months and it was starting to become to a point where he's limiting his ability to play, especially when he took hits and his elbow might have hit the ground again it was really becoming very painful. So, I did the same type of very low-level application. Very very light over that region. A couple of milking strokes but the milking strokes in itself as you understand, you don't milk swelling out of a bursa. I mean, you could drain it but you're not going to milk it out.

So I did one or two of those types of stroke but most of it was this feather-light type of treatment. The interesting thing is I saw that patient 4 days in a row; Monday, Tuesday, Wednesday, Thursday. The interesting thing is on day one, I take an x-ray obviously because the patient in their history is also described as a locking so I'm thinking to myself like a loose body was the first thing that came into my head or possibly some kind of internal arrangement. But on the x-ray, it was completely clear. There was nothing there. By day 2, so much swelling had reduced out of the egg that I felt a palpable ball in there. There was a loose body. The difference was it was fibrous. It wasn't bony and it hadn't calcified so it wasn't showing up on the x-ray. By the 4th day, the egg was gone and all you saw was that little ball that I could move around. Now, he wasn't looking, he hadn't locked for months and months so it's not like

I referred him to the surgeon to get that removed. I basically told him "Look, if it starts locking more consistently obviously you want to get the orthopedist involved and this might have to be an arthroscopic surgery to remove the loose body." But I wouldn't do surgery on somebody that wasn't necessarily locking. It wasn't creating any kind of a problem. So I allowed him to continue on with what he did. Once the swelling was gone, his pain was gone, I know that doesn't sound great for business management, but one weekend this guy was a hundred percent invariably what I noticed with bursitis is that I can treat them usually by the 4th treatment, bursitis has calmed down.

Now, sometimes I may do that in the real world. I might only see that person twice a week for a two-week period but by the time that two-week period is over, the bursa's gone. However, I will admit that if that swelling that personal inflammation has not changed within those four treatments, that's when I bring in my orthopedist to do the injection. I don't see a reason to keep that person in pain with bursitis if I can get a cortisone injection in there and reduce the pain. The reality is 9 out of 10 times I never even need to do this. It's actually even higher than that. Almost every bursitis I see calms down within that two-week period using just an anti-inflammatory treatment over it. Again, feather-light. If you go too aggressively you actually inflame the bursa more and also stimulate some nociception. So, it's feather-light treatment. It should be a non-painful treatment. It has some wonderful benefits on bursal inflammation. However, that's talking about our feather-light stuff. Again, hyperaesthesia, painful scars bursitis, bruising.

Another quick case, which I wish I could have put in this presentation as well. Unfortunately, I'll describe what happened with that one. I had an elderly gentleman who came into my office with a... I mean, literally, when he took his shirt off, it looked like he was wearing a black shirt. I don't mean purple, I mean black. It was truly black. This guy had fallen on ice and landed square on his back. He was in his probably mid to late 70s at that point. It was four weeks ago and it was still black. He had had x-rays, there was nothing that showed up on the x-rays from a fracture standpoint. His pain was just like this deep ache across the back area over the bruised area. So, on him, I did my anti-inflammatory feather-light treatments over the bruise. I treated him once a week for 4 weeks and every week you saw the black and the black all of a sudden turned purple, yellow, green. Then the purple, yellow, green turned to the yellow-green then the yellow-green turned to spotted here and there and skin color again. And it was once a week for four weeks.

I had all of this documented wonderfully on photography and unfortunately, the SD drive on my phone died. It fried and I couldn't recover the pictures. That was what I was planning on writing that one up as a case study but unfortunately, I lost the images from it. All I had left was my notes which don't really give it justice then. But again, whether it's hyperaesthesias from a surgery or a severe bruising that's creating so much inflammation superficially, it's creating that thoracolumbar response in the case of the person that I just referred to or bursitis. Those extremely light, those feather-light treatment strokes are ideally what you want to do to reduce the inflammation. However, there are times, again being a sports guy myself, where you're going to see the acute injuries. The ankle sprains, sometimes post-surgical that you can milk out. Ankles are one of the more common ones where we can milk out the swelling. Again, it's an anti-inflammatory treatment stroke because we're pushing the swelling that's already

there out, but not necessarily from the standpoint of those neurologic mechanisms that we're talking about or had talked about earlier.

The next slide I'm going to show you is actually a video specifically on the reduction of an ankle sprain. This one is acute. This one came in literally within hours of straining an ankle as a baseball player who just rounded the base and took a bad step and went right down on his ankle. So here is an example of an acute. What I would like you all to do is if you can, look at that swelling that's in the foot. I want you to get a good visualization of that before I even start the video so that you can actually see it. And this is only done. This video is only one treatment stroke. So, take a good look as we go through this video as to what's happening. A lot of people will ask me as you're going through this, how painful is this for the patient? The interesting thing is really most of it like where I am right now, you can see that fluid weight starting to develop right in front of my instrument, it almost looks like a snowplow going through snow and pushing it away, it's a huge response. It's usually not very painful at that point but as you get up into that extensor retinaculum in the front of the ankle as well as the ankle ligaments that have been damaged, that's where you're going to start noticing that as you're putting that pressure and trapping that fluid because you do have to press in deep enough to trap that fluid and push it out, we can actually create a massive reduction in the amount of swelling. The lovely thing I absolutely love about these ankle sprains, in particular, is they get carried to you and they walk away from you.

When we do the taping seminar, that's also available through FIX, you'll also see once we do the ankle strapping is a dramatic change in the ability for somebody to actually weight bear on an injured ligament. But now, take a really good close look. I'm going to go back and forth one more time on this so that you can see it again. Look at how much swelling was pushed out of that foot in just one treatment stroke. Now, how do you know when you're done with this? It's very simple you know you're done when you can no longer push that swelling any further, in other words, I'm pushing up, pushing up, pushing up and it doesn't seem to go anywhere. In other words, the lymph channels have taken in as much as they can. They won't accept any more at this point unless you're going to milk the calf out. A lot of what we do in my office is I will do my acute edema reduction. I'll get rid of as much swelling in the foot and the ankle as I possibly can, then I put them in my Normatec, which will now push that fluid from their calf into their thigh and back into their lymph channels more proximally so we have less chance of that gravity dependency letting it come back into the ankle. However, it usually only takes a few of these treatments before you start noticing that the ankle swelling is gone. Just for visualization purposes, we're going to go here. See how much swelling is there? I'm going to play this one more time just so that you can see the amount of swelling that is actually reduced and that fluid wave that develops in front of the instrument. This is one of the more miraculous things we can do with instrument-assisted work that, in all honesty, I personally think does a lot better than hands because her hands are soft and they actually flatten out against the tissue and it allows for fluid to escape. Whereas, the instrument will trap it, capture it, and literally like a squeegee push it along.

So there's that swelling happening again. You see that fluid wave develop in front of the instrument, and how much less fluid is in the foot as we're moving along. And then as we get to the end of this one, I'll show you the pre and post-effect of an ankle. Seeing some swelling, and then literally after one treatment what the ankle looks like. So this one is over. Now, take

a good look at that foot again seeing in one treatment stroke how much we're able to reduce. Now, after treatment, it'll look like this. You can see on that left side picture, there's some swelling. You barely see the blood vessels other than after the ankle, the vessels become very prominent. Then look at that picture on the right. You can see all the vascular is very prominent, the malleolus is prominent, that's after one treatment. Your aspect of the ability to control inflammation is absolutely fantastic using our instrument-assisted. Now, again, how often do we have to do this? It's very simple. Once the swelling is gone once you can't push anymore, you're done doing your anti-inflammatory treatment this way. In fact, I would be then now focusing more on that pro-inflammatory understanding the amount of pressure you need to do is very light because the inflammation has already happened in that ligament. You're being the traffic cop helping to control the fibroblastic proliferation in collagen production. I'm shifting more now to neurosensory over the calf, over the anterior compartment, over the lateral compartment for the fibularis muscles, as well as doing that very focal treatment over the ligaments on the ATFL and CFL. Again, if the posterior talofib ligament was involved, that's bad. That's usually fractured dislocations that have happened. So, most of the ligament ligamentous structures we're treating here will be the ATFL and the CFL.

Now, the last thing I want to do with the few minutes we have remaining here is through this video, you being able to look at me is I want to show you: number one, the orientation of the instruments as well as that production; how to do it. So, if we take an instrument the, number one thing is obviously you have a treatment edge on your instrument. Now, some of them are double beveled, some of them are single beveled. I double-beveled all of my instruments. There is no single bevel on them anymore, largely because I found that most of what we're doing is neurologic. How deep do we really need to get to simulate what we're getting? It's really a lot more of a superficial response and it's a lot more patient for the clinicians to hold as well as the patient to go through the treatment. So the first thing that we want to actually demonstrate is you can see that that is flat on my skin. We want the instrument angled up roughly about 30 to 60 degrees. If we say 45 as an average, that's fine. The important thing as well as while we're doing this is to notice the instrument doesn't leave the skin. You don't do this. That's irritating. We get a greater neural response by forwarding back.

Now, granted let's say I'm treating up towards the elbow. 80% of my treatment stroke or pressure is going forward it's almost like a glide back, pressure glide back, pressure glide back. So, the weight of the instrument is really on the forward glide and on the glide back, it's not even the weight of the instrument but not getting out of contact with the skin. The faster you go, obviously, we can stimulate more nerve receptors. Notice that my treatment stroke is roughly between about 4 and 6 inches. And if I find something in particular that I really want to focus on, I like to choke up on the instrument and treat it a lot more specifically. That's generally how you want to necessarily apply your treatment strokes, again, between 30 and 60 degrees for the most part when you're holding the instrument. The biggest thing for me is I don't want to see this. I don't want to see you grabbing an instrument almost like it's a knife. Most of the time, we're either holding an instrument with fingertips. Every now and then what I like to do is if my hands are a little bit more tired, you see how I can grab an instrument between my first finger and my middle finger and I can do the same type of treatment stroke without having to grab the instrument. It allows me to actually almost like a lighter contact but the instrument is in greater contact with my skin. I get a lot more feedback from that aspect. When I go to single hand, I like to choke up on the instrument as much as I possibly can. I don't

want to do a single-hand hold holding the instrument here like this because guess what? I gotta hold that instrument a lot harder just to control it.

If I choke up on it I can be right over that area and treat it very specifically. I have the ability to do small little quarter-inch, half-inch treatment strokes while I'm doing this, and I can change my pressure much much easier than if I'm gripping all the way down here. And that's probably when I teach classes, one of the first things initially that I have to do with the clinicians that are in my class, is they tend to grip the instrument; number one, too hard; number two, they allow too much of the instrument out of their hand while they're treating. Even if I was in a one-hand hold, what I'll do is I take my finger, which is where my pressure is coming from, and put it right up to the area of the treatment edge that I'm using. So now, I don't have to use nearly as much force. Rather if I was all the way back here I gotta press harder with my finger just to make sure I get the same amount of force going through that tissue. Since you're gripping harder you get less feedback. You don't feel as much when you're doing it.

Now, past that, that's talking about our handholds and as well as the angle for most of our treatment. Now, let's talk about the application and show that in a little bit. So if we're doing that neurosensory, weigh in the instrument as we've talked about before. A lot of that, again, is forward. The great thing with double-beveled instruments is all I have to do is flip it around and now I'm treating more down towards the wrist, and gliding back. I'm going to do this again until I get my hyperemia. That's our neurosensory style of an application. However, if we're going more towards a pro-inflammatory, a pro-inflammatory treatment is usually going to be a small edge of the instrument. Rarely you're going to do a pro-inflammatory treatment with the broad edge unless it may be a deep fascial knot or something along those lines where you need something that gives you a little bit more leverage in order to accomplish that. But let's just call this a tennis elbow for what we're working on. It's easier for you to visualize that on me. I'm going to pinch or choke up on this instrument, really get my fingers almost like a pencil grip, and now I can get right over that region. Now, in particular, again, if this was tendinopathy, I'd want them doing an eccentric load all at the same time so I'm going to back up for a little bit and I'm going to use just a water bottle as a weight, and then maybe I have them start here. And now, they're slowly dropping that into an eccentric load as I'm treating right on the tendon. Again, slow down.

I like to say to them if you're doing a two count up, I want a six count down. Again, your pressure should be enough to get your instrument on the tissue and it has to be fast enough to generate almost that inflammation but it can't be too fast I keep sliding off the tissue. Right there I was showing you like I'm holding it and doing this all the same time. If I'm a clinician and I have my patient there, one hand is taking the depth of penetration, so in other words, I'm going to go find that tendon. I'm going to find my depth and pull the skin out of the way and then the other hand has got the instrument and is going and doing the treatment. Why do I prefer always using my hand that's not holding the instrument for that palpatory? Number one, it tells me where I am. Number two, it helps me block things that maybe I don't want the instruments to slip in like a bony prominence or something along those lines. Three, I don't have to push through tissue in order to get to my depth. My finger is pushing through the tissue to get to the depth I need to and now I have to use less pressure with my instrument to accomplish the same goal.

So, whatever you do, please always remember to constantly use your hands to find depth, palpation, block things. It also helps you stabilize and make the patient feel a lot more comfortable as you're working on them. So, that goes to our pro-inflammatory treatments. Again, they are shorter strokes deeper, heavier, usually not that comfortable. They last for about 10 or 15 seconds, get off, reassess the problem again. It dropped from a 10 to a 5, but I only did 30 seconds or 10 seconds let's go back again, and we'll test again. We'll do it up to 3 times. Remember, it's so critical with the pro-inflammatory applications that you tell your patient "Most likely you will get some soreness within an hour to 2 hours from here. It will probably perpetuate, meaning, it may increase through the next 12 to 24 hours. However, if you're still sore from the treatment 24 hours later, I'm going to have to decrease my intensity because it's too much inflammation that we're treating. It's okay we're not damaged, I just don't want you to get that sore." Now, granted as you go through subsequent treatments, you'll get less and less sore as you're going through. So, that's how we're taking care of, again, our pro-inflammatory applications are four conditions: ligaments, tendons, scars; traumatic or post-surgical, and those deep knots. Those are the pro-inflammatory structures that we want to be able to work on.

Lastly is our anti-inflammatory application and how we're gonna do that. We're going to stay again at our 30 to 60. The pro-inflammatory we might get up into a 90-degree, but again, we're looking for deeper stuff. When we're doing the anti-inflammatory, once again, we're at that 30 to 60-degree angle. However, our stroke before where we were holding an instrument having it pretty much fully in our hands, nothing out of contact with the prone or anti-inflammatory, I like that instrument to just wiggle on my hand. I don't want to have full forceful control over it. I want it to barely just glide along. It's almost like dusting something that's very very delicate where you don't want to take a chance of your duster knocking it over so you're doing it super, super light, super careful. You want to make sure it stays in contact with the skin, as we've already talked about, 30 to 60-degree. And now you're looking for-- It might take a little longer. Normally, hyperemia will happen within 30 seconds over a specific area and again it might take you 5 minutes to an entire region. But when we're doing anti-inflammatory, it could take you 3 to 5 minutes to get hyperemia. And again, it shouldn't be read, it should be a light pin over that small little region that you're working on.

Let's say it's bursitis on a shoulder, maybe you're doing the entire delt region. You're looking for a pink to develop over that area, and just remember in things like bursitis or those bruising, it's not going to be instantaneous relief. You may get contact anesthesia, yes, but bursitis itself will take a few treatments to get through. The milking ones that we've shown where we truly like squeezing the toothpaste out of a tube can be instantaneous. You get rid of the pressure of the swelling on those injured tissues and all of a sudden they don't have as much pain.

That also has a fantastic benefit from that perspective. All of these things to think about once again while you're doing your instrument-assisted, summarizing it into something very simplistic. We have 5 major concepts that we want to utilize when using our instrument-assisted. Is there a position that creates their dysfunction? Is it a motion that creates their dysfunction? Is there a resistance that does it? Or are we using that resistance to create remodelings like in ligaments and tendons? Is there a functional position that creates it? Or what happens when we create an unstable surface adding in proprioception? So, again, position,

motion, resistance, functional positions, and proprioception. Those are the 5 concepts that we want to utilize with our instrument-assisted.

However, understand it is not an "I'm doing position then motion" No. What is the pitch, oh, it only hurts me when I move this. It only hurts me when I do a squat. Well, you're going to plug that patient into wherever in that hierarchy they are and do your treatments associated with that. So we have our 5 concepts, we have 3 applications. Are we trying to be pro-inflammatory? Again, only 4 situations; ligaments, tendons, scars, those knots. Are we being anti-inflammatory? bursitis, bruising, hyperaesthesias, some post-surgical type of things. Or do we have an acute swelling? Or are we doing a neurologic reset which, again, is the bulk of our treatment? The bulk of what we do or neurologic resets. Just by balancing out those seesaws, we change the mechanics of our body parts so that everything is functioning like a beautifully orchestrated ballet. And now our body moves much better with significantly fewer problems.

So, within that neurologic, it's a control-alt-delete. Again, by stimulating those A-beta fibers as we've talked about already, we're able to reboot our system through a number of different pathways that we've already discussed; vascular, neurologic, endocrine, all of those come into play here to allow for a palpable change in our soft tissue and for better soft tissue healing. So if there's one thing in particular that you always want to make sure is in your brain is, what are my 5 concepts? Am I trying to be pro-inflammatory anti-inflammatory? Am I just trying to neurologically reset things? That's going to tell you the amount of pressure you're going to use, it's going to tell you what type of exercises or rehab you may be bringing into this all at the same time, and it will give you the greatest outcome to your instrument-assisted soft tissue procedures.

My name is Dr. Gregory Doerr. I hope that this was stimulating enough to you to either go and find a class yourself to try and learn a little bit more no matter where it is to look at the possible use of instrument-assisted as a tool that you can develop within your practice, not to mention, it does save your hands quite a bit. As well as the great benefits that we get from both pro-inflammatory, anti-inflammatory, and our neurologic levels. If you have any other further questions, my email was on that first post. You're free to email me if you like. And with any luck, this will become an integral part of your practice like it has for mine. Thank you very much for your time.

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