

ICSC05-1.5 VIEW Rehab of Hip Dr Tim Stark Tier 1 (35.40).mp4

ICSC Lower Extremity Module 5

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Tier 1 Rehab of Hip

Instructor Timothy Stark

Video Lesson: 35:40

We are going to continue this discussion on the rehabilitation module, and this particular video will be specific to starting or initiating your rehabilitation process for the hip joint, certainly within the chiropractic field, and especially the sports chiropractic field. Working with extremities is very important and I think if you spend most of your time really wrapping your head, around shoulder, and hip, you are going to be helping your patients out quite substantially. As we zoom in a little bit on specific measures and interventions for the hip and shoulder, you would have already viewed a functional assessment video for the hip and knee, and the functional assessments are very similar, as you probably noted, to the Star Excursion Test, for example, for measuring just the whole lower kinetic chain.

As we get into rehabilitation, however, we are going to break these apart a little bit more and break them down into sections. We have a rehabilitation process that we use at Northwestern Health Sciences University, USA and it has worked out very well. As you probably have discovered for yourself, when we are looking at protocols for rehabilitation, there is not a lot of protocols out there that can be utilized, in other words, that are held to the scrutiny of research; a lot of them are anecdotal. I will be showing you a protocol that we use here at Northwestern, which is a step-by-step progression.

This is that first step, which is called Tier 1. The outline for the hip is to address these five different steps or tiers, basically for rehabilitation, including removing the negatives. We are going to discuss what those negatives are later in detail. At a higher level, generally, the negatives are basically anything that is going to slow down your rehabilitation process or slow down the rehabilitation and healing process of your patients. What are these negatives? It could be a muscle spasm, joint restriction, neuromotor control, or things like that.

The next step is talking about static stabilization, which will be covered in our next lesson, not in this lesson. In the third lesson, we will talk about dynamic stabilization, and lastly, mobilization conditioning, in other words, strengthening the area. You will notice that it takes us quite a few steps before we get to strengthening the hip joint. I think several physical therapists and chiropractic rehabilitation people use the word "strength" long, and we want to make sure that we look at hip stability and lumbopelvic stability before we get into strengthening. Lastly, our last step is ADLs. For our athletes, particularly, these activities of daily living could mean running and jumping and landing from tall heights, grappling against somebody. We want to make sure that our athlete is stable and strong before returning back to their sport.

As we get into the first tier of hip rehabilitation, we want to revisit a pyramid. If you have already looked at rehabilitation for the foot and ankle, you will have already seen something similar to this. This is a rehabilitation pyramid that we utilize here at Northwestern, like I said. In this first tier, that is where we are really discussing removing the negative, and looking at what that includes.

You will see that respiration pattern. We talked a little bit about paradoxical breathing patterns in the past, and especially for the hip, paradoxical breathing patterns certainly can influence how the hip pain might linger a little bit longer and maybe not recover well enough. If we have a patient with COPD or some sort of other breathing pattern it is probably going to slow the process of them recovering, so certainly do a little bit deeper dive on your own at paradoxical breathing patterns and how to recover from them. That extends outside the scope of our discussion here. As we move up to our second tier, third tier, and fourth tier, those will all be subsequent videos that we will have within our program here in that rehab module.

As we did with a rehabilitation pyramid for the foot and ankle, we are going to discuss how important education is for your patience, and then also, addressing engrams, motor behaviour, or muscle memory and how

important that is for your patient's recovery for hip issues. The first thing we want to address is removing these negatives. We are in **Tier One**, and we are beyond functional assessment; we've already assessed them. We have already come up with a decision that certain muscles are asymmetric in regards to their strength. They might not be functioning at an adequate tone. Maybe the muscles are a little bit on the short side, complicating hip extension, for example, so maybe the reflexes are a little bit tight. How do we address that? We want to address that right away within this first tier.

There are several different ways that we can lengthen tissues. I use the word "tissue lengthening" for several reasons. One, when you tell a patient to stretch, it seems like a lot of patients roll their eyes right away and say, "Oh, I don't want to stretch. It is too painful," but if we talk to them about how certain muscles might be a little bit chronically short, and we need to lengthen these a little bit and show them a tissue lengthening intervention, it sounds, maybe, a little bit more clinical and maybe doesn't have that bad feeling of stretching a muscle and it being painful.

We are going to talk about some Myofascial Release Techniques or MRT. Traditionally, in literature and several textbooks, they talk about five different ways that you can provide myofascial release. Also, there is another technique that we will show you called reciprocal inhibition. In addition, it is not necessarily a sixth level; it is just another way of applying a myofascial release technique. We will also show you some techniques for soft tissue manipulation. It is HVLA, High-Velocity-Low Amplitude. Soft tissue manipulation works very well on a good percentage of people.

As you can see here, we have the abductor. Here, we are showing a starting position and an ending position. You can see in the video that she is starting in an abducted position, and she is ending in an adducted position, while we are working on her abductors. Same thing with some of her glute extensors and external rotators, if we were looking at glute medius, for example, here's her starting position and somewhat more of a neutral position, and then we are going to bring her into hip flexion and slight control rotation while we are stretching. That is a high-level explanation of what these MRT levels are. Let's take you through a bit more of a tour of it.

This is just another example of a hip flexor, but we have a video that will be able to explain it a little bit more effectively. Let us look at this video. For MRT 1, we want to position the muscle that we are providing the care for in a shortened position. You can see, we have the rectus femoris, for example, in a shortened position. This is the MRT 1, you can see the hip joint is not moving. You can see that the provider has a very broad contact. She is not using the tip of your thumb; she is extending that interphalangeal joint. She is using the broad part of her thumb, making it a little bit more comfortable, and then you are less likely to bruise your patient, as well. Patients always wonder the next day when they are getting dressed where these bruises came from, and then if they are thinking about you, that probably isn't positive. Using a broad contact, your thumb or a couple of broad fingers, generally work, but again, MRT 1 is used when the muscle is in a shortened position.

Why would we use this? Maybe they are coming out of a cast or maybe they have been immobilized for an extended period of time, maybe their joint hurts so much that we don't want to take it through a range of motion, so we want to keep the joint still, or the patient is more comfortable, maybe, depending on the condition, more comfortable in this flex position. That is MRT 1, and we will probably do anywhere from four to ten, maybe 12 passes on this muscle. It really depends on what's going to benefit that patient. That is something for you, as an artist, really, the art of some of the care that we provide, to determine how that patient is going to respond. Maybe we will start off conservatively with just four to six passes, but we find out that maybe on the next visit, the patient could have actually tolerated more, and then we would progress appropriately.

The next MRT level, and it is not necessarily you do 1 first and then you do 2, you pick whatever MRT that is going to be appropriate for the state of that patient. In this case, the patient is not in a contracted state. We can put that hip joint in an extended position. Here, we have the rectus femoris again in the extended position but let us just say that maybe the hip has a little bit of pain in it, or maybe there is a stress fracture in the hip, and so any hip movement is painful. Again, for MRT 2, we are not going to move the hip through a range of motion. The patient can tolerate a lengthened position, that is why we have it kept in this length and position. You can

see, again, the providers at a very broad contact, going distal to proximal, usually, in a short distance or amplitude. To patient tolerance, how much pressure do we apply during MRT 1 under an MRT 2? Well, some patients have a very low threshold of pain, and some have a very high threshold. We need to certainly be sensitive to that. If they have a very high threshold of pain, we are not going to be applying more pressure than what we need to. After you have done it several times, you certainly start to develop an art of touch, if you will, no pun intended, of how much pressure is absolutely necessary, but if they have a lower level of pain tolerance, maybe they are a little bit more inflamed, we don't want to apply any more pressure than probably a 6 out of 10 pain level. If it is much more than that, maybe they're going to start squinting. They are not going to have a very good experience or probably less likely they will be compliant with their continued care.

Now, we are going to look at MRT 3. MRT 3 allows us to move the hip joint through a range of motion. The hip isn't painful when we move it, but then, passively, you can see that the providers are lifting and lowering the hip, so the patient is not contracting muscles with MRT 3. The provider is basically doing a pin and stretch. If you want to rewind this video and watch that again, you certainly can. We might have been aware of that type of technique. While the muscle is short, she is pinning it, and then she is lengthening the muscle underneath that pin. Again, it is done passively; the patient isn't actively doing it.

In MRT 4, it is a similar concept, but the patient now is actually moving their leg. The provider is applying pressure when the muscle is short, and then the patient is actively extending their hip. While the patient is actively extending the hip, the provider is just sliding just a little bit, a centimeter or so, over that lesion that is in that proximal or hip flexor.

MRT 5 involves eccentric muscle contraction. What's happening here is that the provider, again, is providing a pressure, a pin, and stretch application, in a shortened position; that is when she applies the pressure. Now, what the patient is doing is trying to pull his knee further to his chest, firing the hip flexors. What the provider is fighting that and stretching that contracting muscle in an eccentric manner. Personally, I am not a fan of MRT 5; I think it is very uncomfortable for the patient. It forces me to be very superficial in the muscle structure I'm trying to treat, and it does not allow me to get very deep, so I generally don't do MRT 5. I generally start off with MRT 3, for example. It is nice and relaxed, and I get to control the pace. The muscles are relaxed so I can apply deeper pressure, and then I generally go into this reciprocal inhibition.

For reciprocal inhibition, that is when the patient is going to fire the antagonistic muscle group. As we are treating, we see in the picture here, note that she is moving her hand to the opposite part of the leg. She is no longer grabbing the shin and pulling it down; she is putting her hand on the underside of the shin. What is going to happen here with the reciprocal inhibition technique is that the provider is going to apply pressure, a similar pin-and-stretch, to the proximal hamstring. The patient then is going to fire the antagonist, in other words, the hip extensors, and apply pressure down into the hand.

Let us watch this video here as it progresses. The patient is pushing the heel to the floor, firing to ease extensors. What is happening is a reciprocal inhibition of the hip flexors. In other words, the hip flexor should be turning off a little bit or toning down, allowing the provider to be a little bit more effective with getting a little bit deeper with the thumb contact. How many repetitions do we do with this? If it is a new patient, I might do four to six repetitions just to see how the patient responds. Especially if the patient is already responded well in that four to six number of repetitions, I am ok with that. If I feel like the patient can tolerate more, I might do a few more repetitions.

Another manner in which we can provide this therapy is using a technique called Post-Isometric Relaxation, PIR. When I describe this, a lot of people might call this PMF, Proprioceptive Neuromuscular Facilitation. PMF is very complicated and involves several different patterns of movements on usually diagonal patterns, D1 patterns, extension patterns, reflection patterns, and D2 patterns. Instead of calling this PMF, we should accurately call it PIR, which is basically a contract and a relaxed stretch. For example, the hamstring is probably a very common stretch. For the hamstring, the provider is taking a patient into a stretched position. The knee is extended, the foot is in dorsiflexion, putting a very good stretch in the posterior structures, and the provider brings the leg into

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a comfortable stretch; it shouldn't be painful. If it is painful, then the patient's going to be fighting a little bit. We hold that stretch for any time that you think is going to be appropriate.

Generally, I hold this stretch for about five deep breaths, which should take about 20 or 30 seconds, then I back off just a couple of degrees and make it a little bit more comfortable. I have the patient then push against me, firing now this muscle that you are trying to stretch. They push not real hard, maybe 30% of their muscle contraction, so it is not a real intense contraction, and they hold that force, that contraction, for about seven seconds, maybe about one breath, maybe two breaths, and then you relax. After they relax, you should be able to take them into a slightly greater stretch.

How many repetitions do we do? Generally, my response is that we perform the repetitions until we see no longer greater improvement. In other words, if I'm on my third rep and I got some more range of motion, I'm going to hold that stretch, back off, hold that stretch for five deep breaths, back off, and have them push for seven seconds, push, relax. If I could not move them any further into a stretch, I feel like that patient is probably not going to benefit from another one and another one. Generally, also from experience, three to four repetitions are usually sufficient for performing these types of PIR stretches.

Here are some examples of how to stretch or position the patient for abductors and for piriformis. This is a video that I think will be helpful for you to understand how we perform this PIR stretch for hip flexors. You will note that as the provider is taking the patient into a flexed position, the athlete has their foot on the chest, the knee is in full flexions, and as the provider is leaning forward and taking the hip into further flexion or even into the pelvis, we should see the hip go into extension. The femur really should not move, but what you will note is when the provider was hitting the hip, that left leg, the left hip was coming up into flexion, so basically, a Thomas test. That is telling us that that hip flexors are a little on the tight side and could benefit from some stretches.

Let us watch how the provider then provides a PIR. You saw her cue. The patient by tapping on the leg to lift up that left leg, in other words, it contracted defectors. Now, you see her pushing down on the leg to get a little bit more stretch, and then after seven seconds a stretch, he is instructed to pull the leg up into more hip flexion against her resistance, and then about 20%, 30% muscle contraction, and then relax again so that she can push him into further stretching. Very effective.

Somewhat traumatizing, honestly, for the hip flexors, my experience is that when athletes now pop up into a seated position, that hip flexor is a little bit uncomfortable because that stretch is pretty strong, it is pretty powerful. You may want to do some real simple actual PNF patterns, taking that leg through a diagonal pattern, D1, D2 patterns. If you are not familiar with that, you can just take them through a range of motions and how to de-traumatize a little bit, if you will, that hip flexor, because it is a little bit uncomfortable.

This is a video of an assessment for performing HVLA manipulation of the soft tissue. You can see the provider here, identifying fascia glides and also assessing the sector of the different muscle bundles, and just trying to look for a restriction. When we find what we think might be a restriction, we want to assess the lateral, S to I, and I to S, and find out where that restriction is. She found out I to S restriction of this rectus femoris muscle group, and then she does an HVLA manipulation, just like what you saw. She might need to hit it a couple of times just to make sure that that faster restriction that she identified, truly, was remedied. Very fast.

Again, if you get in the habit of performing some sort of paradoxical maneuver such as, let us say the patient had pain when they were squatting. They go into a squatting motion, they have this quadricep pain. The provider, you, will assess the soft tissues, do a quick HVLA for that restriction that you feel, and have them stand up, and see if their squatting pain is improved. If it is, magic, the patient is able to see that what you are doing is beneficial to the complaint.

We will now talk a little bit about some evidence, though, of soft tissue therapy. This was a study published not too long ago in 2016. They are looking at the effectiveness of physical agents. This was an interesting study where they looked at 10,000 papers that mostly look at ultrasound, cryotherapy, shockwave therapy, low-level

laser, different types of strapping techniques, and how they benefited soft tissue injuries. Well, it probably will not come as no surprise that there was a lot of bias, as well, especially if it were a laser. Maybe it was a study or was done by a laser company, maybe it was a cryotherapy product, then there will be some bias there. That is not uncommon, and we need to critically read these types of documents.

Of the 10,000 articles that they found, they found 43 that really met their inclusion criteria. Of those 43, about 20 of them had some pretty strong bias, where they then narrowed it down to about 23 papers that had some decent non-biased outcomes in the paper. Basically, what they found was that the effectiveness of most of these interventions that I just described - ultrasound, shockwave therapy, etc., the outcomes or the effectiveness were rather unclear.

Another recent study, a systematic review, looking at a lot of different things that we probably have in our office, again, the outcomes really aren't that beneficial, possibly. We just don't know if it is that effective. Keep that in mind as you reach for your next laser, your next cryotherapy, but really, the proof is in the pudding. If it helps the patient, great. If it does not, you should not be surprised and you might want to consider them another type of intervention. One of those interventions might be foam rolling. Foam rolling was really common; it is rather inexpensive to offer in your office. The compliant seems to be generally pretty good.

Here is a 2017 study, not long ago, and they look at the effectiveness of myofascial release through foam rolling. It was a narrative review, and they found that foam rolling seemed to improve range motion. Great, that is what We are trying to do. If the range of motion was one of those negatives that were going to prevent our patients from recovering from the rest of their rehab, that is great, then foam rolling has the role.

Foam rolling will impossibly improve range of motion, but there may not be any effect on strength or performance. I don't understand why they're measuring performance because to me, range of motion certainly is a performance indicator, but there seemed to be no clinical trials addressing myofascial pain, which blows my mind. It should be a pretty easy study to look at myofascial pain patients and just intervene with foam rolling and see if it helps them. I think this might be a study that I might have to encourage my fellows' review.

Let us look at some of these foam rolling techniques. This is more for the lateral hip, really simple. The only complication is maybe for some of our aging patients to bear weight on their upper body and get into this position, but I would assume that most of our athletes should be able to assume that position. Looking at more of the proximal anterior medial thigh, maybe some of those anterior abductors could certainly benefit, as well, from foam rolling. There's certainly a need for increasing trials for looking at foam rolling for myofascial pain syndrome.

We will look at a couple more videos here for foam rolling. Here, we have something more of a proximal anterior hip, which works great for that rectus femoris that we are showing from MRT techniques on earlier slides. I'm a fan of this. I think a lot of my chronic low back pain patients have some chronic shortening of the rectus femoris, and this is a really simple technique for them to implement, especially for my athletes. When they come in, we have them foam roll almost right away before we can start doing some adjustments. Foam rolling for the posterior chain, for the posterior calf, bend down to hip, and cross from the hamstring, again, fairly effective. Again, it is just a little bit more challenging position for some of our aging patients or if they've got a proximity problem, as well, but again, most of our athletes should be able to get into these positions.

Now, I like to put a little curl on some of these key things that I think are important. I think it is very important that our patients go home with knowledge: some things, ideas, and lessons and exercises that they can do at home. Home stretching, I think, is one of those key things that we should be sending our patients home with. Home stretching, I think, is really important. A really simple piriformis stretch while they're seated in a figure forward position, good chest up posture, leaning straight forward at the hip, not so much at the low back, getting a good stretch in the piriformis.

Another picture down here at the bottom is a stretch for a hip flexor. It is really important that the knee does not go past the toes, so that might put a little bit more pressure on the anterior knee. We want to be cautious of

that. We want the shoulders to be over the hips, not leaning forward at the waist. We want the shoulders over the hips, and then we want to instruct the patient to push their hips forward and focus that stretch a little bit more on the hip flexors. That is why we also want to always review the stretching with our patients on that second or third visit, to make sure they are doing things right.

I think active stretching is very helpful. What is active stretching? Well, earlier, we showed PIR of the hip or the hamstring muscles, the posterior chain, probably reached for PIR. This is an active stretch, so the patient can very easily lie in their bed or lie on the floor, we have them keep their knee straight, dorsiflexor ankle just like we did with the PIR stretch and we have them actively contract their hip flexor mechanism. They actively contract this, strengthening and bringing their hip into flexion as far as they can, until they feel a stretch on the back side, on the hamstring.

One theory behind this active stretching is they are actively contracting the hip flexor, which, theoretically, should cause a reciprocal inhibition of some of those hamstrings and posterior chain muscles. It is a very effective stretch. Oftentimes, if they have got very tight hamstring muscles, for example, in this case, their hip flexors are probably weak, as well, which, then, this active stretch, not only is lengthening the hamstrings but is maybe, to some degree, strengthening and conditioning the hip flexors.

Here is another example of another abductor stretch as we are forcing this one leg into abduction. There's a whole book and a plethora of different stretches that we can certainly consider for our patients.

Now, one of the considerations, as well for our patients with removing the negatives is neuromotor control. If you would remember from the hip video you probably watched on hip assessment, you saw a close-up. We are talking about Ianda's hip abduction test, we saw that when he was trying to hip abduct, he was getting early engagement of his hips. The lateral paraspinal muscles and the pelvis was starting a hip hike before he was even going into hip abduction. In other words, he was not controlling his pelvis very well.

Here is how we were correcting some of that neuromotor control. We were having him actually push against the provider's hand, so he is actually pushing his pelvis, his hip joint, inferiorly, and then while applying pressure against his hand, he was then abducting. What you will notice is that his hip, his pelvis, does not hip hike nearly as early as what he did earlier when we were watching the functional assessment video. This was part of our assessment, actually. When he was coming to our clinic, we were including this as part of the treatment plan, have him push into his hand, and then work on this neuromotor control. We always want to think about what we can do to send the patient home with a similar exercise.

We found some programs or elastic strappings, the CLX strap. We had him put his foot into this loop. He would then provide tension; he was pushing his heel downward just like he was doing it to this provider's hand. You are pushing against the resistance of the TheraBand. While he was pushing against the resistance of this TheraBand, he was going at the abduction.

What is happening here, from a neuromuscular perspective? Well, we get better engagement of the hip abductors, and what is happening with maintaining the pelvis in this depressed state, especially above, is that the opposite adductors or the downside abductors are contracting, holding the pelvis into that depressed state, and not engage, so we constantly see these cross patterns happening. Again, with him pushing his heel inferiorly, we are getting increased adduction contraction, which is helping with stabilizing the pelvis with his open chain hip abduction, and then the hip abductors are able to contract more effectively.

There are a lot of different interventions that you probably have in your office, instruments, such as mobilization. Certainly, you are adjusting the extremity in the hip, in this case, maybe doing some other therapy or strapping techniques, kinesiology taping, biomechanical taping such as dynamic taping, and maybe some other passive supports.

Let us just look at some of the literature on this. We might have covered a little bit of this with the foot and ankle if you recall back, but this was a systematic review looking at IASTM. I remember the IASTM, Instrument-

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Assisted Soft Tissue Mobilization, is fairly new at the time of this recording. It really became quite prevalent in the '90s. I know guasha has been around for probably centuries, but not much regarding literature or research on the topics until about the '90s. This is a systematic review, and I believe it is about 200 abstracts and narrowed it down to about seven randomized control trials.

Certainly, one of the complications is that these randomized control trials were not very similar; there are a lot of differences between the studies, so it is really hard to do a systematic review on these studies. The outcome was that there was some evidence to support the ability to increase short-term range of motion. Like foam rolling, there was some benefit from range of motion. Again, it could be one of those negatives of preventing the patient from advancing into rehab is because their range of motion isn't improving. Again, foam rolling, IASTM might benefit to help that patient with their range of motion deficits that they might have.

Everybody's eyebrow should perk up a little bit. When we look at the manipulation of the lower extremity, what type of evidence do we have for the benefits of manipulation? This study goes back a little way in 2009. It was a merger review, and they looked at roughly 39 citations. There were quite a few citations that they went through, but they narrowed it down to 39 citations. They found that manipulation of the lower extremity was safe, so that is great information that we can share with our patients.

The lower extremity where the joint was hypermobile, where hypermobility was identified, it may be appropriate to clearly include manipulative therapy. With joint hypermobility, in order to identify that, you need to be really good at motion palpation. Motion palpation is a lot of different complex combinations of movement, especially with the hip. We know the hip can circumduct, which means it goes through all different types of motions. We can have hip flexion along with internal rotation and along with abduction. Just the combination of those three movements is going to influence the capsule[?] in a way where we might find a restriction. We need to be able to be quite savvy in motion palpating the hip joint in complex motions, and maybe not just in motion, but also adding muscle contraction. Maybe we need to do weight-bearing motion palpation, which means probably weight-bearing manipulation, as well.

All of this lower extremity motion palpation hands-on experience and training come with our hands-on modules. With the CCSP through Northwestern and the ICCSP or the International Certificate for Chiropractic Sports, the hands-on modules take you through the step-by-step on how to assess an athlete in a complicated manner, so be sure to attend those hands-on courses.

Lastly, the study showed that it appears that manipulation therapy with stretching, that is why We are talking about myofascial release and other tissue interventions, if we do manipulative therapy with stretching, it seems to be superior, the combination of those, versus just providing one of those therapies by itself. Again, the practical application to the study from 2009 is that if We are looking at the lower extremity kinetic chain, then we not only want to do just manipulation, but we certainly want to implement some sort of active care exercise, hence, our discussion on rehabilitation. It seemed to be beneficial, especially for knee osteoarthritis.

If you follow along with this entire rehabilitation module, you will probably see me discuss the slide along each region as we get into the knee, and it was beneficial for the ankle, as well, but not so much. It didn't seem to be as helpful for hip OA, but it really depends on the severity of the osteoarthritis. Clearly, in earlier stages of hip OA, my personal experience was that it was very beneficial. As a hip joint becomes more arthritic, it does become pretty complicated to manage that patient.

As we finish this lecture, I want to thank you for attending this Tier 1 conversation with hip rehabilitation. The next tier, of course, is going to be addressing hip stabilization exercises.

[END]