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ICSC Lower Extremity Module 5

Section 1.2_ICSC05

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Video Lesson: 1:32:42

Welcome to the Hip Module Part 1. I thought I would start by just telling you a little bit about myself. I am a Chiropractor in the USA, in New Jersey specifically. I have my Master's Degree in Sports Medicine and a certified athletic trainer. I have my diplomate from the American Chiropractic Board of Sports Physicians, and I am internationally certified as a Chiropractic Sports Physician. I have worked with athletes for many years, and this is my passion and education really are my passion. I am the current Education Chair for FICS and looking forward to taking you on this journey of Education, as you go through these ICSC modules and really embed yourself in the culture of being a Chiropractic Sports physician. It is a lifetime of learning so, thank you for taking part in not only today's lectures but all the programs. This is really a very exciting time to be a Sports Chiropractor as we are really welcomed and invited by athletes and sporting federations to participate in helping athletes achieve their optimal performance. It is really a great thing for the athletes and the sporting federations to notice that we are an integral part of that important team, that health care team, or that medical team in helping achieve one's goals.

We are going to move through this module and start learning a lot about the hip. Before I move forward, I just wanted to talk about the objectives. This is the first part of the hip module and we are going to be talking about the assessment of the hip. How am I going to look and explore the diagnosis of the hip? When I teach evaluation and diagnosis, I want you to consider the idea of laser focus, first on the diagnosis, so you get very good at making the accurate diagnosis, then come backwards and look at the functional components that might have predisposed the athlete to that injury. We are going to talk a lot about that as we go through today's lesson.

I want you to think about that though and understand that getting a diagnosis is not the last step in figuring out what is wrong with that athlete or patient. That is the first step in opening the doors to figure out the why or what is going on with that patient. Why are they predisposed to that injury? Because it is really about preventing injuries and not so much about just figuring out what is wrong because we are going on a journey with an athlete. We want to see them reach success and sometimes that comes with the injury but if we could jump over some of those puddles and help these athletes attain their goals without sustaining an injury that is where we need to be focused on. As I said at the start of this lesson, this is the first part, the assessment portion then your next portion of the hip will be the functional assessment and then the rehabilitation.

You have three parts in going through the hip and then the same with the whole lower extremity, the knee, and then the ankle. You are looking at assessment, at functional assessment, then looking at rehabilitation.

Let us talk about our course outline for today. We will be looking at the anatomical features of the hip and just going to refresh your memory on the muscles that are called to action as we go through different sports. We must attain an assessment skill of the hip, and be able to have in your brain the order of events you need to do to get a good hip evaluation. As you are starting out, I would like for you to do the hip evaluation in the same order each time and you know, honestly, when I evaluate the hip doing it this many years, I still do it in the same order. This way I am sure that I am not forgetting anything or leaving some nuance out that might predispose the athlete to injury. We are going to work on developing treatment plans and strategies for the acute, subacute, and chronic phases of hip injury, and then we will talk about sports return strategies post hip injury. When is the athlete ready to get on the field? When are they not ready? When do I start functional sport-specific training? When do I not start sport-specific training? We need to think about all these things as you are walking somebody through those cycles of injury.

The first thing we need to think about with hip injuries are muscular considerations. We have learned the anatomy in school but going back and understanding the anatomy sometimes is not the anatomy. If we look at these two different athletes here on the right side of your screen, we can really appreciate and understand that there are different things going on with each of them. Certain muscles are activated. Certain muscles are

ICSC Lower Extremity Module 5 / Section 1.2_ICSC05

inhibited. We have different structural confirmations. We might have femoral anteversion or femoral retroversion.

What are we talking about with overall tone and body confirmation postural biomechanics that might be predisposing to injury? Again, we are going to laser focus on that diagnosis. We need to be able to pan out and say all hips are not created equal. We need to be able to see there are different muscular considerations for different patients. For example, the patient on the left here, her QL on the right side looks like it is turned off to me. Why are her hips uneven? Would that predispose her to a left IT band syndrome? Possibly. Then let us look at the athlete on the right. This is a high-level gymnast. We can see a number of things going on here, but we can again, focus on that right thoracolumbar angle. That looks different. Why is her right shoulder activated different than her left? And how is that going to make her more predisposed to certain injuries in the hip? As we start panning back and talking about the why is later on in this lecture, these are the things I want you to think about. Not just keeping somebody on the table and evaluating them laying down.

Let us take a moment and just refresh ourselves with the anatomy. I am kind of an anatomy nerd and love going back over anatomy and actually, I really enjoy New York Chiropractic Colleges letting me go in annually and take a look at the cadavers and work through some of how we evaluate these sports injuries on cadavers. I wanted to really see when we are doing certain orthopedic tests, how are those structures affected and what other structures are called into play. So just entertain me for a minute and just refresh your memory on the anatomy as we go through muscle testing and diagnosis. You need to imagine these structures as you are evaluating. When students come to my office and I work with them, I say, "Listen. As you are palpating, as you are muscle testing, when you are going for orthopedic tests, I want you to picture that anatomy as you are doing it. It really helps to make sure you are testing the right structure. You feel that the right position is making sense to test that structure.

Let us look at the picture here on the left and we can see the psoas and the iliac coming down to attach here onto the lesser trochanter of the femur. I want you to appreciate here the breadth of this adductor group. It is not as often discussed as we would like to see in the literature. There are some articles on adductor injury but, however, it is not really like one of those very commonly talked about things in sports injuries. But if we look at it, how can we not? How can we overlook this very vast structure, group of muscles, this adductor group that is actually helping to align the hip with every step? We need all these muscles to be working in concert, or in synergy to allow a normal street gait of the hip. For that femoral acetabular joint to move straight forward, I need all those muscles working as well as working agonistically and antagonistically with the lateral structures, the abductors. Of course, we have that adductor group and then here we have your pectineus which plays a large role in the position of the hip. We can see if that is injured. What is going to happen to this femoral acetabular joint and the sartorius here?

Looking at the right side of your screen, we are going to go into this gluteus medius a lot later, but the gluteus minimus here and its insertion understanding where they insert on the femur will really help you nail down a diagnosis as you later understand. I have some mnemonics to help you out with that later on so that you can kind of remember when you are evaluating your patients and your athletes, what is injured, and why would it be important to know that. Why would I need to know if it is a gluteus medius versus a gluteus minimus injury? That tells us what action is causing the injury. Then we can take that one step further and think about which biomechanical fault might be overusing or underusing that muscle to cause the injury. Understanding the anatomy is just really the very small first step in evaluating the injury and figuring out how to prevent re-injury or new injury.

Looking at the external rotators on the posterior aspect of the hip would be your gluteus minimus, your piriformis, superior gemellus, obturatorius internus and externus, and that is separated by the inferior gemellus and quadratus femoris. Then here's your obturatorius internus here. We all know and are very familiar with the sciatic nerve and its course either under, through, or around the piriformis muscle in certain athletes and in patients as well.

ICSC Lower Extremity Module 5 / Section 1.2_ICSC05

As we move forward, we have to understand that we are going to look at the biomechanical considerations and hip injury. We need to know the anatomy, understand the anatomy function and structure as well as the biomechanical considerations with that anatomy. How might that change my diagnosis or my treatment regime, more importantly? Just watching an athlete like this, this is that gymnast we saw earlier, do a simple squat on a TRX, I need to see how her hips move with function. I am not just evaluating patients laying down or athletes laying down. I want to see them, do what they need to do. I want them up and moving. For her, I am going to have her do a squat for me. I am going to have her do TRX moves and I am going to really look at what faults crop up or biomechanical faults crop up that might be hindering her ability to use a muscle efficiently or overuse a muscle. I really want you to understand that. I would just take our time with that early on in the lecture.

Getting into the bony considerations in Biomechanics 2. Let us just look at the basic hip structure here and understand this femoral acetabular joint here the labrum which is the cartilage and its function really is to deepen the cup of the femoral acetabular joints. We are going to call this the cup here. Can you see how this labrum crops out making this cup a little deeper, which speaks to the stability of the hip? When that femoral acetabular joint in the femur is snugged up into the acetabulum, we have greater stability and more acetabular coverage to stabilize that joint. Without the labrum, we'd have a little less coverage on the femoral head and more femoral acetabular instability. That is one of the functions of the labrum. Then, really understand the position of the acetabulum, the femoral head, femoral neck, and greater and lesser trochanters. That actual biomechanical position plays a huge role in our ability to recruit muscles. Let us just take a look at the multi-directional articulation of the hip as well and understand that this is the ball and socket. It needs to move in many different planes, unlike the knee. Understanding the blood flow and conditions such as osteonecrosis of the hip where we have a decrease in blood flow of the femoral head here and we get necrosis. That becomes a surgical intervention pretty quickly. How do muscular actions play a huge role in the function of this hip joint? How did the two come together? Understanding when we are looking at an injury of any body part, it is very rare that somebody has one pure injury. We are not going to just have a labral tear and nothing else has happened to the whole hip. Understand that we are going to have layers of injury. Maybe we have a labral tear and possibly, we have some rectus femoris irritation too because the rectus femoris originates up at the AILS. Maybe we have a combination of things. You need to do your job and your evaluation to tease apart which structures are injured and don't always be satisfied with just one finding, one finding. Keep looking until you are sure that there's nothing else going on there.

Talking about the structure of that joint, look at the bony anatomy, I want you to understand that we are all not created equal. We are all structurally developed differently. A lot of these structural developments are derived from the way you were sleeping when you were a baby. Did you sleep on your belly? Were your knees bent, were your knees out, were your feet tucked under? Then we develop structurally as a result of this. As part of this module, you'll see an article from the Pediatric Association that talks about these structural developments and how the ramifications of, when you get older, how our bodies develop. We are just going to take a quick peek at that here in these next couple of slides and understand the term femoral anteversion. This is a really important term when we are looking at hip injuries and predisposition and guiding athletes towards optimal performance. I am going to tell you why.

If we look at the normal femoral anteversion position here, between that 15 and 20 degrees, this of course here is your tibia. This is the posterior condyle of your tibia, this is the acetabulum, and your femoral head and neck. We can see if we draw a line straight across horizontal in line with the tibial posterior condyles, and then we draw another line in the center between the femoral head and neck, and we take a measurement of that angle and that angle. That angle in the adult is about 15 to 20 degrees. That angle actually decreases with age. When you were a newborn, that angle is very large. It is a 40-degree angle approximately and it decreases down as we get a little older. Let us look at this larger angle, this increased femoral neck anteversion. This would be more when you were younger, this larger angle, and understanding why it takes a little while for us to learn how to walk and balance. We don't really have good control but what I want you to take away from this slide here on the bottom left corner is to imagine the lack of stability in the joint with this femoral neck anteversion because the femoral neck has come forward here. Can you see? I don't have that femoral head snugged into this acetabular notch and

ICSC Lower Extremity Module 5 / Section 1.2_ICSC05

therefore have greater instability. This would be somebody that would be more prone, with a greater femoral neck anteversion, more prone to an anterior dislocation of the hip.

Conversely, we can look at a femoral neck retroversion. When it is retroverted it is deeper in there. What is going to happen with that? What are the ramifications of somebody maybe that structurally anteverted versus retroverted? Somebody that is more anteverted will have a different range of motion than somebody retroverted normally. We need to consider that in understanding how somebody performs and trying to get, let us say a rhythmic gymnast to do a certain maneuver with her hips, let us call it a split and maybe she can't do that because structurally, she is unable. Understanding the anatomy and how these positions of the femur and how they were formed when we were younger plays a huge role. As chiropractors, we always want to straighten everybody out. Everybody should be straight. But guess what? We can't straighten everybody out because our normal homeostasis is not always straight. We need to understand what is normal for that patient or athlete. We need to have them function in their normal playground and not in what we think is normal. A great example of this is this graphic right here that we are looking at and here would be our normal 15 to 20-degree femoral anteversion, that is with skeletal maturity. Notice the toe is straightforward. Here's the knee right here. Here's the patella. Then, here would be a pre-schooler aged 4 to 6 and we talked about how they have that femoral anteversion. The toe is still straightforward, but they have that larger degree up to 40 degrees. Then we talked about this femoral anteversion with in toeing. We see these patients walking around and we always trying to correct this in toeing, but understand, we can't always make that correction if we have a structural problem. We are trying to fix things sometimes that maybe can't be fixed. With this, we notice that this alignment is very different than this alignment. This would result in our in toeing.

Another thing to consider in evaluating athletes with hip injuries, is the center edge of the angle of the acetabulum. Again, it speaks to the stability of that femoral acetabular joint. When we take first, our first line is a straight vertical line here right to the center of the head of the femur and our second line is a line, if we look here, that comes just [inaudible] at the edge of the acetabulum and into the center of the femoral head. One of these two lines bisects here. We grab this center edge from an angle here. That should be around 35 degrees in females, and 38 degrees in males. A smaller angle means that the acetabulum is more vertically sitting and that means less coverage of the femoral head. That means more instability of that joint. All right? Let's just look at that. This angle was smaller. It would mean that my femoral head is not sunk into the acetabulum. It is out further here and that would speak to more instability as we are moving the hip as opposed to the stability you get being inside that acetabulum. That is how I want you to think about that. If we have an athlete that has a lot of instability in the hip you might want to take a radiograph and take a look and see if they have the center edge angle greater than 35 degrees. Then we might want to consider more stability exercises in the recovery process to build the muscle around the joint to help stabilize, and not necessarily more stretching exercises to make them looser because that would feed into the problem. Sometimes, as we are bringing somebody back to sport, we don't want to do things that we call cement in the problem, or make the problem stay there longer. We want things that get rid of the problem. Someone with a large or small or center edge angle would be somebody that is more of a perturbation-type recovery where we are doing lots of things for stability of the joint.

Then looking one more time at this angle of anteversion it is something that interests me because I see it so commonly with athletes that struggle with, not only technique but low back pain and hip pain. Low back and hip pain kind of go hand-in-hand. They have very intimately related. As I am evaluating my low back patients, every time I evaluate the hips of several athletes, I find the hip is the cause of the low back pain. So, you know, we want to talk about this acetabular anteversion because if somebody's acetabulum is slightly introverted, let us look down at this picture right here, this bone scan, we can understand here's an anteverted acetabulum. You see the angle that this is sitting a little more forward than its other side? So can you understand as we get this increased angle of introversion, we are going to have a different amount of stability. When we have an increased angle of anteversion we actually have decreased joint stability because now that acetabulum is rolled forward and now, I have more motion of that femoral head. Again, this speaks to recovery if somebody has chronic tendinopathy around the hip joint, maybe they have a slight increase in the angle of anteversion and maybe they would need more stability exercises.

ICSC Lower Extremity Module 5 / Section 1.2_ICSC05

Going back and looking at some of these angles just on a simple radiograph is very easy. It will really help us get that athlete further. We are reaching for optimal performance without injury. That is always our goal. One of the last lines that we were looking at when we talk about the structure of the hip is this angle of femoral inclination. It is super important when we are talking about biomechanical efficiency of muscle. We know that muscle is stronger or weaker on different levers. We learned about levers, third class lever, first class lever, and we understand that when a muscle fiber is shortened origin to insertion, it has a greater ability to produce power. When the muscle origin insertion is wider, it has a decreased ability to produce power. Let's just take a journey and put those two together and understand our normal angle of femoral inclination is 125, and that is this angle right here. Can you understand that if I have this C right here, coxa valga, and I have an increased angle of my femoral inclination, my femoral head is going to be further away from my ilium? What does that mean when we are talking about biomechanics? What that really means is let's just talk about the gluteus medius. The gluteus medius begins up on your acetabulum, I am sorry, your ilium up here and attaches onto the greater trochanter of the femoral head, femoral neck-- greater trochanter, I am sorry. It is going to be a long class, guys. So now we have that gluteus medius going from an optimal 125-degree angle of inclination where we can produce the most power or a good amount of power, now I have an increased coxa valga with 140 degrees of an angle of inclination. Now, my gluteus medius muscle becomes inefficient.

Why is that important for athletes? Let us talk about a basketball player. They need to get a good vertical jump, but if they have a large angle of inclination, their gluteus medius is not going to be performing well. We are going to be missing a little bit of abduction there. Therefore, a little bit of power. What can I do for that athlete that has a coxa valga that has an inefficient gluteus medius? We will cover that in the rehab section.

Taking it one step further, do I develop other muscles in the area that make up for the loss of the gluteus medius? Or do I have chronic gluteus medius tendinopathy because of this and maybe I need to change the technique or talk to the coach about how a technique change might constitute a more biomechanically efficient gluteus medius? So, we side step injury there.

As we move into our hip evaluation, we are going to go nice and slow. We will talk about our best way to get that hip eval in a step-by-step progression so that you can really digest and process what is going on. Remember that your hip eval is the first step and you have laser focusing your diagnosis, then we are going to ask the whys. We have got to get a good diagnosis first, which is your first step in everything. Let us take a moment and get really proficient at this hip exam. We are going to take our time as we work through here because I want everybody to really understand the hip is one of the most important joints to own this evaluation particularly as chiropractors because of that hip and low back relationship that we see so commonly.

We talked about all hips not being created equal. These are those same two athletes. I gave the command of simply, before I took this picture, simply jump up. I am going to take a picture. Well, look at these two different jumps, and this is just, again, my command was just jump. This tells me a lot about these two athletes, hip motion and hip mobility, and things that might be a problem. The athlete on the left, I am going to look at her hip flexors. I am going to look at why she is kind of just flexing her knee so much and not her hips. What is going on there versus the athlete on the right, who's a gymnast. We got a gymnast on the right and a weightlifter on the left. Notice how sports play a huge role in mobility or maybe the athlete chooses a sport because they have that mobility or don't have that mobility. It could go either way but understand that we need to really grasp male and female hips are not created equal. The age of the athlete plays a huge role in what injury you are looking for or not looking for. The sport, the mechanism of injury, what muscles is that athlete using in their sport most commonly? Because sometimes they get injuries of other muscles, but we need to go to the major muscles that they need to call to action as they are performing their sport. Then, what is the past medical history? The greatest predictor of injury is the history of past injury. Understanding that history will also lead you in the direction of that accurate diagnosis.

Let us go on a journey here, and put you out on a hockey game, and you are the covering doctor for the day. They have asked you to come out and travel with the team and we have got somebody down with an injury. What do you need to think about? We think a little bit differently when we are treating on the field or in this case, on the

ICSC Lower Extremity Module 5 / Section 1.2_ICSC05

ice versus in your office. But we always need to consider some things. Can the athlete bear weight on that body part? Can they walk, is there gait alterations? Is this an old injury with a new injury? We call that acute on chronic, old on new. What was the mechanism? Did he just get checked? Did he get hit really hard and fall? Did he hit the wall? Did he just step funny? Did he hear anything? Or what did it feel like? We typically talk about the athletes that ruptured a tendon or muscle. They all described it very similarly, kind of like that velcro, that tear. They know when something's torn because they feel that feeling and that is something that tends to stay with somebody once they've had a significant rupture, they understand what that feels like. Listen to the words they are using when they describe what is going on. Did it happen on the field or field of play or ice or mat or when they were walking in the parking lot or playing catch with a friend? So really getting that mechanism of injury. What muscles were being used during the activity of the injury?

So, we left the ice rink and now we are working here with this athlete. This is a track and field athlete. What are you thinking about here? As you become a sports chiropractor, you will be asked to cover events, if that is what you want to do. You need to be ready to handle situations like this. You need to have in your mind, what am I going to do first, second, and third. What do I do when I am asked to go out on the field of play in this situation? What do I do on the sidelines and what is appropriate in my office? Of course, we've got a meet going on and we can't spend an hour doing a wonderful examination with functional evaluation while everybody's waiting to continue the meet. As we have a situation like this, we need to understand what is appropriate for me to do on the field of play. That would be ruling out fracture or dislocation, making sure the person is good neurological and blood flow to the area, and making sure we have stability to transfer. First, calming down the person would be the first order of business, talking to them, and making them feel a little bit confident as you assess them that you are able to safely get them onto the side of the sidelines, that you can do a better evaluation, more full evaluation. Your on-the-field exam is really to rule out any major structures that you would need to transport to the hospital immediately. Nothing is dislocated, nothing is fractured, and there is no bleeding anywhere that I can't control. The patient is of good mental status. We don't have a concussion. She is able to talk, can calm down, and could tell me what the problem is. She has good blood flow to the area, good circulation, can wiggle her toes, and can wiggle her fingers. Great. How about we help you see if you can sit up? Let us see if we can carry you off the mat or the field or see if you can walk off to the sidelines where I can do a more thorough evaluation. So just making sure that we are competent in each stage that we are asked to perform as sports chiropractors because it is important that we put our best foot forward when we are working in events and we show our competency, and that we are not running out here and adjusting her neck. Point proven.

Now we have that athlete to the sideline, we are moving from an ice hockey game through the track game, now you are working a football sideline. We have the injured athlete off the field. He was able to walk off and now I am going to begin my more thorough evaluation. This is when we kind of get in the habit of doing the evaluation in the same order every time. In this way, we don't miss anything but, on the field, or sidelines just take your time making sure you are doing a nice thorough evaluation taking the shoe off.

Notice, if this athlete is getting their ankle looked at, the shoe is off. The other shoe is off too so I can compare side to side. Big, bilateral comparison is critical if you are going to get a good diagnosis that you are comparing bilaterally. Listen to the patient. Listen to what he or she tells you. "I injured this last year. It felt exactly the same. I injured the other side last year, felt exactly the same. That was broken. You need to understand, listen to what they're saying, and listen to how they're describing it. An old proverb says talk to an athlete long enough they'll tell you what is wrong with them. That is true for all our patients. We really need to take our time in that evaluation because in this scenario here on the screen, you are going to decide if that athlete can go back into the field of play or not. The athlete is looking to you for the right decision. The coach is looking to you for the right decision. You, morally and ethically, need to make the right decision so as to prevent further injury to that athlete. Keep them safe but allow them to do what they've trained to do. That is a very large role and that doesn't come without practice, and that does not come without proficiency. Really understand that this decision is a very big decision.

When I first started doing this years ago, I worked in an event with a chiropractor. At that time, I was an athletic trainer, and I was asked to work a football game. The chiropractor was a benefactor of the school. In other words,

ICSC Lower Extremity Module 5 / Section 1.2_ICSC05

he donated money to the school, and the patient the athlete football player ran off the field and said that he couldn't feel his arms at all. They were tingling and numb on both sides. Well, for an athletic trainer, that is a lot of red flags. For everybody, that is a lot of red flags. The chiropractor, not having any training in how to take care of athletes at all, just basically said to him, "Listen. Out between every play, run back down the field and I'll push down on your arms really quick, and then you can go in for the next play."

This is unacceptable. This is an unacceptable standard of care. I expressed this and I would no longer work with that particular person because I feel like that liability exposes all of us. We need to really know what we are doing, not to pretend what we are doing. Again, thank you for taking the time to continue to learn and be the best you because it is all of us that strive to be the best version of chiropractic that we can that elevates our profession.

Where do we begin with this hip evaluation? Let's jump back into that. What is our first plan of attack? What is our second? How do I know what I am looking at? I am going to organize it all for you and that is how I want you to practice it. I want you to get a friend, a spouse, a family member, or a small pet, and I want you to practice this evaluation repeatedly until you can do it in your sleep in this order because this will allow you to be super proficient and win, and you'll gain your confidence in getting a good diagnosis.

We are going to organize our exam and do all the tests in one position and then have the patient change position. Taking into consideration if the athlete is injured, if they are in pain, we might have to alter this a little bit. If they are **not in pain** and they can kind of move the way I want them to move, fine. But just really, always consider patient comfort. Stop, put a pillow under their head or something under their knees if they need to alter that position as you are doing your evaluation. Change the position as infrequently as possible. Because the hip is multi-directional, we need to look at the hip from the anterior aspect, the lateral aspect, from the posterior aspect, and we can't forget about the medial aspect. We need to move the patient in three positions to do a really good hip-on-the-table evaluation, and that is even before we get them up to do a functional evaluation.

Let us talk about our first order of business. Don't forget the obvious stuff that we are there for. Don't forget to look at leg length differences, tibial torsion, or angle of the tibia, we talked about that a little bit looking at the structure of their bodies, bruises, and scars. Have they had surgery here before? Did this person have osteonecrosis of the femoral head? I need to know that. As you are evaluating an injury, please make sure you are looking in a discreet and appropriate way at the area and the skins. You can look for scars or bruises. Maybe they had some Kinesio tape on there because there was an old injury and they forgot to tell you. How about the shoes? What does the footwear tell you? Is it worn on one side versus the other side? What is the patient position of comfort? I want to talk about how shoes play such a huge role in Hip assessment. Actually, just last week, I had a patient come in with lateral hip pain and he was with his mom. And he's about 15 or 16 years old, very tall, basketball player male. They had been to physical therapy. They had been to an orthopedist. They had X-rays of the hip and he had right lateral hip pain and just could not get rid of it. I did a whole evaluation on him, the mom happened to be sitting down by his feet. I said, "Well, what do you think about the shoes he is wearing?" As she looked down at the shoe, she could see that the one hole outside of the shoe is completely worn down. Now the athlete was walking on two issues, one like this and one tilted sideways on the side of injury. Most times I see with this particular condition that it is more footwear related than hip related. He promised to throw his shoes away when he got home and put on new shoes. The next time he came in later in the week, he had little to no hip pain. If we are not really looking at everything, sometimes, we are missing the causative agent. We are so focused on looking at the body, don't forget to step back and look at the environment and this picture is a great example of that. What does that athlete need to do with their hip? What is the action that I need to get this hip to do to get them better? That is different from a runner different from a gymnast. This martial artist would again have something very different that I need to be acquainted with to get him better.

I like to start the exam in 3 ways. I do a supine exam first, then a sideline exam, and then a prone exam. We are going to go through each step. We are going to talk about what structures we evaluate in each position, then I am going to show you videos of the whole evaluation. You are welcome to play them repeatedly. Please practice them that way. You get very proficient at the hip exam. Think about the anatomy that we reviewed in the

ICSC Lower Extremity Module 5 / Section 1.2_ICSC05

beginning. Which structures do you think we look at in the supine position? Let's put your brain on that for a second. Think about, kind of in your mind, think about what would be most efficient to look at as they are laying face-up, on their side, and as they are laying prone.

Okay. Let's see if you are right.

Again, I talked about that I love anatomy so much and so that does not go unnoticed in this particular graphic right here that I made. This is an app that I keep on my iPad, great for patient education. It is called Clinical Anatomy. You can put layers of the muscle on, you can tease it down to Bone. You can put nerves on it. You can turn and rotate the specimen. I like to use it when I am talking to patients about what is going on in their body and I like to show them the injury and actually show them the muscle. When We are looking at this hip right here, we need to really understand that We are looking at the sartorius origin here and rectus femoris origin here. We talked about the iliopsoas and psoas muscles, really appreciating your gluteus minimus insertion point, vastus lateralis. Look at how high up those inserts. Then intermedius and vastus medialis, and psoas. Then this is pectineus, adductor longus, and gracilis. I use LIMP, lateralis, intermedius, medialis, and psoas as my cascade down the superior aspect, looking at that patient anteriorly for evaluation. These are our anterior evaluations. Some of the muscular structures, again, we are looking at muscle. Then We are going to look at structure, we are looking at bone, and then we can't forget about tendon and functionality.

When they are supine, begin your valuation with the log roll every time. It gives you so much information. It is a very, very simplistic orthopedic test but you really can see intra-articular pathologies or lesions. You just place your hand just where I have it, one on the thigh, one on the tibia, passively have the patient relax, and just gently roll the femur on the acetabulum in and out, just nice, and slow. What you are looking for is that the femoral acetabular joint is gliding smoothly through the joint. You are going to kind of roll and just appreciate. Does it feel like it gets stuck? Does it feel like it is moving slowly, or does it move nice and easy? And the key, this is compared to the other side because we want to see what one side does versus the other. Take your time in practicing this because I've picked up so many labral tears just by doing this, and it is pretty amazing. You also can notice any intra-articular edema or inflammation in the joint, things that are causing irritation to the joint itself. So, the log roll is your first order of business in the supine evaluation.

Then we are going to palpate the area of pain. I like to look at the bony landmarks as we talked about before. In understanding that, we have to know the gender and the age because if it is a youth athlete, they have growth plates that are open. They've got a lot of growth centers in the hip that you really need to be acquainted with. Understanding that sometimes their pain location might be a growth center and if it is somebody that is in that adolescent stage that is still growing well, then I can consider a possibly a Salter-Harris fracture, or an avulsion-type injury.

Here is a really terrific picture for you to call to memory on the growth centers of the hip as you palpate the hip in your youth athletes, really understanding that here is your iliac crest and these are your abdominal aponeurosis attaches here. Your ASIS or anterior superior iliac spine. Your sartorius origin here. Your AIIIS is your rectus femoris, very commonly injured in sport, one of the quadriceps muscles, very commonly injured. Whenever a muscle crosses two joints, it is more prone to injury. When you are really trying to figure out which muscle is injured, go for the ones that cross two joints in evaluation, and really take your time with those because again, there's more biomechanical area for them to injure. More than likely, they're injured first. Then we had your gluteus medius and minimus on the greater trochanter. Your lesser trochanter. Here's your iliopsoas, psoas. Hamstrings, of course, huge injury in the growing athlete, hamstring avulsion up on the ischial tuberosity, and your adductors in your symphysis, your pubic symphysis. My mnemonic for this is A Sargeant in his Army - ASRGIHA. That is the way I memorize my order of events that happen for the growth centers in the hip in your youth athletes. Again, you are going to cascade the pelvis during palpation and you are going to touch either of these structures. It is pretty amazing how quickly we pick up an injury when we know what We are looking for. Take your time. Palpate and look at these growth centers in your youth athletes and see if they have pain and tenderness there. Can we see how a rectus femoris injury would be mistaken for a labral tear? Very commonly. So, making sure that We are coupling, if they have pain here, We are coupling that with the muscle test of the

ICSC Lower Extremity Module 5 / Section 1.2_ICSC05

rectus femoris and then comparing that to testing the labrum. If I have all muscle injury positives and no labral positives, then I have a rectus femoris injury and not a labral tear.

Then we talk about the range of motion at the hip. What is the normal range of motion? They should be able to get to flexion 140 degrees and here's a good example here, and they should be able to get extension, 10 degrees of extension, abduction 45 degrees. That is pretty minimal. Remember, these are for normal people. We really want athletes to express more motion than this. We want the athlete to have a greater range of motion than just normal. Normal is our normal homo sapien walking around the planet earth. But if we are going to run and jump, we need more range of motion. Like 10, 15, 20 degrees more for my athletes, depending on the sport, of course. For example, 45 degrees of abduction is not going to fly for a gymnast or rhythmic gymnast, or ice skater. Then, of course, for adduction 30 degrees, internal and external rotation, 40 and 50 degrees. We can see that they're prone to internal and external. We are going to talk a lot about this a little while. I do my internal external exam of the hips supine in prone, but just understand that we get different degrees a little bit. But if you just put in your mind that you want about 40 degrees in each direction, that just makes it easy to remember.

As you are going through range of motion, you need to feel what we call the end feel. That means where it stops. It is that the brakes are going on slow, and when you get to that end feel, it kind of feels mushy or soft, that is called a soft end feel or a tissue end feel, which sometimes means we can get them further. If we get them into flexion of their hips, and I am hitting up against a brick wall, that is called a hard end feel. A hard end feel might indicate something like a bony issue. Like a femoral acetabular impingement. When you are testing internal and external rotation of the hip, and this is me here, checking a supine internal rotation of the hip, make sure you take it to the point that you feel the end feel, not that we are causing pain, but we are noticing if it is soft like the brakes are getting put on slowly or they're hitting up against something like a bony confirmation. That would be a hard end feel. Compare everything bilaterally when you are doing your range of motions and really understanding the nuances of the sport. If we are talking about a dancer or a gymnast, they might have more flexibility on one side versus the other. It is actually not uncommon for people to have greater flexibility on the dominant side, their hand dominant side in other words, most commonly right, than the other side. We actually stride larger or stride longer on the right leg than left, so it makes sense that our hamstrings might be looser on the right side than the left. Then also noticing if there are postural issues. Do they change posture or try to cheat the range of motion as you are looking at it? In other words, hiking the hip up, when I am trying to do internal rotation. We need to make sure we are getting a pure measurement of range of motion without cheating involved, like a change of body position, and then other gait problems that are leading me to look at this range of motion.

Then look at manual muscle testing in the hip. Again, just kind of taking you back. We started supine. We did the log roll and palpated. We looked at range of motion, and manual muscle test. We want to check the strength of the pertinent muscles and I like to do them all just because I like to be thorough, and I want to compare bilaterally because you are surprised sometimes the athletes are blown out on both sides and that is going to make you look in a different place and if you just tested the affected side and it seemed weak.

Let move onto talking about femoral acetabular impingement for a moment. The femoral acetabular impingement is a point where the femur and the acetabulum abut each other and get irritated so they hit up against each other. There are three causes of femoral acetabular impingement. We can have a cam. We can have a pincer and then a mixed. The mixed is it like 87% of your acetabular impingement and we can understand why. Here's an example of a cam femoral acetabular impingement where we actually have an outgrowth of bone on the femoral head and neck right there. Appreciate if we have this and we have that and then we go into flexion, that is going to hit up against that acetabular ridge. If I have a little bony growth here and I go into flexion, that is going to hit against the acetabular ridge right here. That is an impingement. We can also have an outgrowth of the acetabular ridge and that is your pincer form. The same thing happens. If the acetabular ridge has grown out, the same thing you go into flexion, it still hits up against the femur causing impingement. But we really then can appreciate how someone most commonly has a mixed. Because if we are taking this into flexion, eventually, even if we start with the cam and we are an athlete and we are in flexion all the time, hip flexion, that is going to cause the pincer deformity here. We are going to get irritation at this bone. We can really see why most people have mixed bag more commonly.

ICSC Lower Extremity Module 5 / Section 1.2_ICSC05

Here is a nice picture of what that looks like in pseudo, so to speak. Here would be our cam deformity, this little outgrowth right here, and the athlete let's pretend it is a rower, that is going into flexion a gazillion times every practice is hitting up against this acetabular ridge, which is causing irritation.

What we are also noticing is a labral tear that was repaired in this particular model here. Here is the stitching of the labrum. This is what that labrum looks like on the inside. That is a good example of a mixed femoral acetabular impingement.

Again, here is the cam deformity. We can see a little cam deformity here, and understand that over time, that is going to get larger. It doesn't get better. It gets larger with more repetitions of flexions. It is not going to go away. We have to talk about what can we do about this. How do we treat that? With the femoral acetabular impingement, we might want to consider distracting the joint and mobilizing the joint to get it more mobile so it is not quite so stuck. We also need to consider technique in the sport. What is this athlete doing? If it is a rower, do I need to get his knees out so that we can roll the femurs out away from the impingement? Because if he's rowing with his knees straight, he's going to continue to hit that femoral acetabular joint and it is going to cause a continued problem. Again, looking at the anatomy, looking at ways to cheat the anatomy, looking at technique, and always comparing bilaterally because it is not uncommon to have this on both sides.

All right. So, we did our log roll, manual muscle testing, palpation and we looked at formal acetabular impingement, which I will show you a little bit further how to orthopedically test for that. We are going to begin with the scour test as our next order of business. With the scour tests, we are looking for labral tears. Begin slowly. If they have a labral tear, you will know it. You don't need to kind of jack them into flexion. Basically, We are bringing the hip into flexion and then you are pushing down on the femur and pushing your femur into the acetabulum. Then you are doing a circumduction motion to almost try to agitate that labrum. That is what I am doing here in this picture. You'll see it further on as I show you the videos when we move on. That is your scour test for labral tears. Go nice and slow as you push down. Start lightly and then circumducting. Watch the patient's expressions and if they're kind of like, "That doesn't feel good. That doesn't feel good," you don't need to keep going. You don't need to make a tear worse. You are just trying to see when you add a noxious stimulus to the area if it makes it worse. Here's what a labral tear looks like in surgery, right here. It causes a lot of fraying and irritation.

Those then would be our supine exam. Log roll, femoral acetabular impingement, scour test for labral tears, muscle testing, and palpation of the anterior bony pelvis.

As we move onto the side-lying, I want you to just take a minute. I want you to think about what structures would I look at on the side. What is going to be? What is my exam that will look like on the side? That always starts with looking at the anatomy. Here is our side-lying patient right here, understanding and appreciating the muscular components, the bony components, and the functional components. We have to have all that in your mind as you are evaluating your athletes. Of course, we cannot forget about the gluteus medius and minimus and what is really critical to think about is the insertion point. Look down here on that femoral head and I want you to appreciate that. Gluteus medius is just slightly posterior than the gluteus minimus, which is slightly anterior. This is very important in diagnosing high-grade tears of the gluteus medius muscle, which is not uncommon at all, and tendinopathy of the gluteus medius muscle is not uncommon at all. If we can tease these two out, we can really isolate which rehabilitation exercises we need to do and what functional corrections we need to do. Everything starts with that laser focus diagnosis, and that'll help your overall success in recovery.

This is gluteu minimus, appreciating that it originates a little more anterior, we like to say this at 12 or 1 o'clock position on the femoral head. I like to, when someone's side lying for evaluation, think of this femoral head as our clock. It is really where most of those muscles that I am interested in are inserting. I kind of Imagine this circular clock called the femoral head there and understanding and appreciating that your gluteus minimus is up in this one o'clock position here. Your gluteus medius is going to be about this 10 or 11 o'clock position here, and then your hip external rotators are posterior to that. Here's quad femoris back here. Looking at that like a clock when they're on their side actually helps you grasp what is going on. Then, if we go slightly interior in this three o'clock

ICSC Lower Extremity Module 5 / Section 1.2_ICSC05

position, that is your vastus lateralis. I didn't think I was palpating the origin of my vastus lateralis side-lying, but you are.

Let us talk a little bit about gluteus medius and TFL because we see these injuries very common in athletes so that gluteus medius we just talked about a little bit. I have a little graphic here and this is going to show you the motion of that gluteus medius with abduction here when it is called into play. That is really its major function is this abduction and really understanding that it is really used a whole lot more intensely than we give it credit. It is not the hugest muscle.

Let us look now at our tensor fascia latae with abduction and internal hip rotation. This is also your gluteus medius function because it is an abductor and also helps with internal rotation because of the way it originates and inserts. We can appreciate that TFL and that function of the TFL as well.

Iliotibial band and tract assessment is the other side-lying assessment that you are going to be doing. Basically, let's take a peek at some functions here. Again, similar to gluteus medius. That is why we always see these two a hand in hand is abduction and a little hip internal rotation, and really understanding that when someone has a TFL injury, they're going to have a lot of pain up here. When you palpate this area, if you get your thumb right in the front of this band, you are going to feel a nodule here. You are going to need to release that for them to have pretty quick pain relief. But understanding the function of the muscle is also very, very important here. Let's look at that iliotibial band and tract as it traverses down and approximate the lateral knee and understanding how that problem that starts with tightness at the hip predicates a knee injury or lateral knee compression on the lateral structures. For someone with hip and knee pain, we need to make sure we are looking at the iliotibial band and tract and understand what I need to release. Again, a lot of times this particular condition is footwear driven. Do I need orthotics placed on this athlete? Are they trying to run barefoot shoes and maybe they don't have the full intrinsic muscle strength to support that? Do they have old shoes that are broken down? Are they running on one side of the road? If the road is curved, they typically create the roads curved so that the water drains off. If we are always running on one side of the road, say I go out on my run on this side and I go back on my run, on this side, I am always running with the right long leg, left short leg. That is going to predispose this iliotibial band to work over working. I need to think about how I can direct that athlete. Looking at the footwear, looking at foot structure, looking at foot intrinsic muscle strength, but also looking at the terrain of training and guiding them to run out on one side of the road and back on the same side of the road. That way one leg is short on one, half of the run, and the opposite leg is short on the other half of the run. In that way, we kind of even them out a little bit or try to get them on this flatter surface is actually optimal.

I talked a lot about this iliotibial band and tract because we work really well with some release techniques side-lying, but making sure as you are evaluating on their side, that your palpating the whole breadth of it and really starting a little more anterior than you think you should. Because as I said, once you get your thumb in there usually right about here, there's a big nodule in somebody that has tensor fascia latae and then iliotibial band and tract issues. Then I want you to appreciate how the confirmation of the gluteus maximus comes and invests with an aponeurosis into the iliotibial tract. That gluteus maximus insertion is really more into fascia that is part of the iliotibial band and tract. I have anterior pull, and posterior pull on the hip that comes and tethers together. How does tightness in one or weakness in one call to action that hip differently? If I have over tightness here, that hip is going to be an internal rotation, creating faulty patterns. If I have a weakness here and overactivity here, then my hip is going to be externally rotated. What injuries are we going to have there? Make sure we are looking at the synergy of muscles as we are doing evaluation and that they're both activating when you need them to activate. We are going to talk a little bit about that when we go through the functional assessment section of this and how to really notice that and how can you screen for that.

Again, going back to our side-lying evaluation, we have manual muscle testing. We are going to test that gluteus minimus. Gluteus minimus is a straight to the side, toe pointing forward muscle test. Gluteus medius is the hip is slightly extended, toe pointing towards the ceiling. TFL you are 45 degrees flexed at the hip with your toe pointing towards the floor. That is part of your side-lying exam. I start my side-lying exam with palpation. Remember that

ICSC Lower Extremity Module 5 / Section 1.2_ICSC05

clock we talked about, looking at the gluteus medius and gluteus minimus, vastus lateralis, understanding the TFL tensor fascia latae, iliotibial tract, and the gluteus maximus.

Now, we are moving to muscle testing. We are going to check these three muscles. Then, we are going to move into Ober's Test. This Ober's Test tests for tensor fasciae latae tightness or IT band syndrome. Basically, we make sure you stabilize that hip and a 90-degree angle. See my left hand here is really holding that hip. The athlete wants to roll forward and cheat that motion. You've got to take good control with your left hand and hold that hip in that steady position. Don't let them roll forward or back. You are going to abduct and extend the hip, and then you are going to release the knee and see if the knee drops. When somebody with a tight IT band syndrome, we are going to see that the knee only drops a little bit. It is like the brakes are on. Somebody that is looser, that knees going to collapse towards the table quite nicely. So, somebody that has hip pain, we want to evaluate if all these lateral structures are too tight. Therefore, we talked about that if the lateral structures are too tight, the external rotators quite possibly might be overworking.

The Faber's Test is one for the supine position, not the sideline position. For Faber's Test, we could be looking for sacroiliac problems, lumbosacral problems, or hip problems. As you are doing Faber's Test, really understand where the pain is coming from.

Back to side-lying, palpating these structures we talked about, we have got to think about the bony confirmation, the bony issues, as well as the muscular issues in talking about that anatomy. We talked a lot about that today. Understanding where am I going if I suspect the gluteus medius tear? I muscle test and the gluteus medius is weak, where am I going to palpate that insertion where it most commonly gets injured? I am going to go down on the femoral head. I am going to go right at that eleven o'clock position right around here and palpate for tenderness. A lot of times they have exquisite tenderness there. That is going to make my confirmatory diagnosis that I have a gluteus medius tear. Then your IT band, when your proximal tensor fascia latae, greater trochanter, and we can't forget to rule out bursitis because we have a tight IT band and tight TFL that actually causes friction over the greater trochanter. Wherever we have hip and tendon friction, we have an increase in the bursal size, so we develop bursitis. When you see hip bursitis in somebody, that is point tenderness right on the greater trochanter, right in the center of the greater trochanter. If this is our clock, so to speak, right in the center of the clock here and slightly inferior, if we have point tenderness here, and the athlete says, "Oh yeah, that is really sore," we have bursitis but understand that bursitis, a lot of times, is caused by a very tight iliotibial band and tract. We need to then keep going and see if that is the issue as to why we have bursitis. Bursitis is an okay diagnosis but it doesn't tell me why or what happened. Looking at the anterior superior iliac spine and the anterior inferior iliac spine, again we talked about that those are growth plate injuries for our youth athletes, making sure the ASIS is our sartorius, the AIIIS is rectus femoris, very commonly injured, and We are going to look at the hip capsule. With them side-lying and their knees slightly bent actually puts the capsule in a little bit of a relaxed position so I can feel inside the capsule and see if We are talking about more of a labral issue with the area or if it is soft tissue issue with the capsule.

We got through our supine exam, and we did our side-lying exam. Now, we are going to move into the prone exam and think about what structures you need to evaluate prone and why are you looking at that. Let's put that together. Again, always start with inspection. In all these positions, you should be looking at muscle symmetry, muscle confirmation, position that they're lying in for comfort. Is their hip internally rotated or externally rotated? What are their feet doing? Is one hamstring smaller or larger than the other? What are the gastrocs doing? What are the glutes doing? Then of course, we cannot forget about looking at the upper back. Looking for scars. Looking for swelling. Looking for atrophy. When the hip is prone, we are going to start with a range of motion. We are going to look at internal external rotation prone. We are going to look for knee flexion. When I flex the knee up, I am looking for the hips to pop up so then to kind of flex their hips. I call that a hip pop. We should be able to bring that knee into flexion up to about 110 degrees before they start flexing their hips, a hip pop type of thing. When I see that happen prematurely when they flex their hips too soon, it is a sign of core weakness or instability. We

ICSC Lower Extremity Module 5 / Section 1.2_ICSC05

need to just take your time when you are looking at that knee range of motion, I am really looking for the hips to pop and at what angle they'll pop up. That is going to tell me what is going on with the hip and the core.

We are going to manual muscle test prone. You are going to manual muscle test your gluteus maximus, your hamstrings, and hip internal and external rotators. At this point, you should kind of almost have your preliminary diagnosis. You need to then think about what your possible positives are, and maybe consider flipping your patient and redoing some tests your questionable on. You should be able to go back and review and take a relook because sometimes when you do an orthopedic test the second time, the patient doesn't have any pain. Maybe they're just a little apprehensive the first time. If I am really suspicious and I am not sold on the diagnosis, I will go back and I'll relook at it again. This is where you are going to order any follow-up tests. Do they need an MRI of the area? Do they need an x-ray of the area? Do I need to refer out to an orthopedist? Then you are going to create your treatment plan. I am going to talk a lot about that as we get a little bit further into evaluation, functional assessment, and rehabilitation. But we need to think about creating treatment plans for the acute athlete, the subacute, the chronic, and those that are not getting better. Those that are not getting better, you've got to go back to the drawing board and reassess everything again including a functional evaluation and a video evaluation. Video evaluation is huge for you to pick up any discrepancies that might be promoting the prodromal nature of this injury.

As we put it all together, let us take a look at the hip. I have a video, and some videos in each of the positions. I am going to kind of talk them through the first time letting you watch them, and we are going to play each one two times. In that way, I want you to really get in your brain the order of events, and how I would like to see you develop your hip evaluation.

Let us go to our supine and remembering our supine exam. We are doing the log roll. We are doing flexion range of motion. We are going to look at hip internal and external rotation. We are going to scour. We are going to look for femoral acetabular impingement. Femoral acetabular impingement is where We are flexing the knee up and noticing if the knee drop straight or to the side. I am going to go further into this and we'll go through it on the video but I want you to watch it first. The scour test we talked about and We are going to manual muscle test. Rectus femoris, sartorius, pectineus, and the adductor group, and We are going to tease apart those muscles. We want to do an iliac compression test for hip fracture and We are going to palpate the pertinent muscle groups. Again, considering male or female, considering that We are being appropriate in palpation, and then also the age of the athlete.

So let us look at this evaluation here. Log roll, comparing side to side, very important to really get a sense of what is happening with that hip. Our manual muscle testing rectus femoris, pectineus, sartorius, and checking the adductors. We are going to do pectineus again. Roll the foot in a little bit. Do adductor brevis. Foot straight forward. Adductor longus, a little weak there that is why I tested it two times. Adductor magnus slightly internally rotated all the way in, gracilis. I am looking at femoral acetabular impingement here now. You walk the knee up. You want to see if it drops to the ipsilateral shoulder or drops out laterally. If it drops out laterally, it is a sign of femoral acetabular impingement. If I suspect that, then I am going to internally rotate her in-flexion and see if that irritates the problem. Again, I am comparing side to side to see that this knee is going up to the ipsilateral shoulder which it is. In this case. Really paying attention to that bilateral comparison. Here is my scour test. There is internal rotation. Again, I am checking for an impingement. Now, I am looking at range of motion, hip internal-external rotation. It is very important that you take your time for Faber's. Good scour test. Checking femoral acetabular impingement with flexion and internal rotation. Then checking the internal-external rotation range of motion comparing that to the other side. Muscle testing, Faber's Test. Iliac compression test, palpating the important structures that we reviewed on the bony pelvis. ASIS, AIIS. We talked about all those iliac crests.

Let us play that one more time just so you can get that in your brain. It is very important that we get all the structures down. Log roll. We are looking at labrum possible labral tear or intra-articular pathology, also arthritis. Rectus femoris. Is this a youth athlete with a rectus femoris avulsion? Pectineus. Sartorius. Checking that adductor muscle group and appreciating the vastness of it that we talked about in anatomy at the beginning of it. And goes pectineus, adductor brevis, adductor longus, and then slightly in is adductor magnus, and then all the way

ICSC Lower Extremity Module 5 / Section 1.2_ICSC05

internally rotated, is gracilis. It is important to know which muscle is injured, not just an adductor. I don't think that is acceptable. This is your femoral acetabular impingement, looking if the knee drops out to the side or straight to the ipsilateral shoulder. If it drops out to the side then I flex it to 90 and I internally rotate it and see if that causes pain. That would be a positive test for femoral acetabular impingement. Compare everything from side to side, particularly when you are looking at femoral acetabular impingement because that is really how you pick up the nuances. Scour test. Again, labral tear. Flexion internal rotation for femoral acetabular impingement. Hip internal-external rotation for range of motion. Faber's Test. Is it painful in the hip? Is it painful in the sacroiliac joint? Is it painful in the low back? Very important for Faber's for us to understand where the pain is coming from. Scour. FAI. Hip internal-external rotation. I want to get to at least 40 degrees in both directions. Faber's. Iliac compression looking for iliac fracture. I picked up several discrete factors with it. Very simple test. Get the supine exam down. Wonderful. Let's move on. Like I said, make a copy of this and just watch it over and over until you get it.

Let us talk about the side-lying exam. Manual muscle testing. Gluteus medius, minimus, and TFL. Ober's test for TFL tightness, palpating the pertinent muscle groups, and the bony regions for tenderness. That is what we are going to see here in this side-lying exam. So manual muscle test. Extension. External rotation. Really control that hip with your right hand. That is gluteus medius. Here's gluteus minimus and you got to hold the hip with the other hand steady at a 90-degree angle, and that is TFL. Oberst test. Flexion extension, abduction, and drop the knee down. Comparing that side to side is really going to be your tell-all as if we have a problem or not and then palpating the important structures. This is a great time to palpate because the patient feels less guarded than lying on their back and you can get a little bit deeper in that rectus femoris area, which is the AIIS, and then also around the hip capsule. Remembering that femur as a clock and looking at gluteus medius, gluteus minimus, and then also understanding where we are going to get bursitis.

Let us watch that one more time. You are going to compare this side to side. See me grabbing that right hand and holding her pelvis steady so she can't cheat. Gluteus medius. Gluteus minimus. TFL. Ober's test for TFL tightness. I always do it a couple times and just really try to see if that knee is dropping and compare that to the other side. Then we are going to palpate important groups. I am going to palpate the proximal TFL. I am going to palpate the ASIS the AIIS, the hip capsule area. Then I am going to use my femur as a clock and I am going to palpate gluteus minimus, gluteus medius, where there's bursitis and the whole TFL and tensor fasciae latae and IT band.

Did you get it so far? We are going to move on to the prone exam now and talk about the prone exam. We are going to look at again. Everything is an evaluation. Looking at how they are using their body parts differently. Do the glutes have symmetry? Do the hamstrings have symmetry? Do the gastrocs have symmetry? How is she laying down? Is she favoring one side? We are going to look at the range of motion, not only knee flexion, but I am also going to look at hip internal-external rotation. Craig's Test. Now, we talked in the beginning about femoral anteversion. Craig's Test is the test to determine if there is femoral anteversion or not. We are going to walk through how to do that. I am going to show you and then we'll go through it nice and slow. Nachlas and Ely's Test. Manual muscle test for hamstrings and glutes. Hip internal-external rotation. We've got to look at foot structure. You cannot evaluate the hip unless we look at foot structure.

All right, so let us play that through. Hip external rotation. Internal and external rotation, comparing side to side. I blocked the sacrum base so that they can't cheat and rotate the sacrum when we are testing. I always block that, so I get pure hip motion. See how she tends to flex her hip up, as I am getting her into external rotation there. This here is Craig's Test. We are going to talk about that for a minute. If we are going to check for femoral anteversion, what we are going to see is they're going to have an increase in internal rotation, and a decrease in external rotation. We use Craig's test in this manner. We bring the knee to 90 degrees. We palpate, you see my left hand is palpating the greater trochanter of the hip, as you bring her into internal rotation. You are going to feel the greater trochanter disappear from under your fingers, then you are gradually going to bring the knee back into neutral and feel when that greater trochanter is most prominent and stop there. At that angle, you are going to evaluate where the leg is. If it is a greater than 15-degree angle and internal rotation from neutral, then you have femoral anteversion. Let's look at where I stop this here. This would be a little more than 15 degrees internal rotation. That would preclude her, which would include her as having femoral anteversion on the right

ICSC Lower Extremity Module 5 / Section 1.2_ICSC05

side. Again, we talked about why that is significant and what injuries they might be predisposed to or what technique I might be able to do differently. One example of this particular injury here is I had a powerlifter who's having chronic low back pain for over a two-year period. He came in to see me, we did an evaluation, and I looked at his low back. It was certainly jacked up as how powerlifters are but wasn't overly impressing me. I had him shift only his squat, and I noticed that it looked like he was having some hip issues with his squats. I put them back on the table, evaluated his hip, did Craig's test, and noticed that he was femorally introverted on the right. I stood him back up and had him squat again, externally rotating his foot 15 degrees. In doing that, he had zero back pain. Again, speaking to training according to how you are structurally derived is something that is important. Now the powerlifter lifts significant weights. I see him on Instagram, all the time. He had his foot just a little bit rotated externally and he has zero back pain. That is just what his body-- he's femorally introverted on that side. So, we are just trying to compensate for that by just changing his technique the littlest bit. It is okay sometimes to not in-fit into a box, and that is my point with these exams. Our body is not structurally perfect. We are not all the same and we need to understand. We need to be diligent enough to notice when there's a difference to guide them in a path of success.

That is Craig's test. Then we are going to move on to Nachlas and Ely's. A very important point, I look at every hip when I look at low backs. I look at Craig's Test on every single person now because I see it is so common. I think that hip position plays a huge role. Here's Craig's test here. Manual muscle testing, hamstring in two positions. We checked the top, the proximal, and the distal aspects of the hamstring. Then the gluteus maximus of course, too. Hamstring in more 90 degrees and then more extension so we can check proximal and distal and checking gluteus maximus. It is very important that you are not forgetting to palpate the low back and look at all the low back structures as well as alignment, and leg length differences. Do they have an AS pelvis or PI pelvis? That plays a huge role in the position of the hips. As I said, hips and low back are so commonly related. That doesn't mean because they're athletes, it is different. She has a right hip problem here. You can see she jacks her hip up when you asked her to go into flexion and internal rotation. But she has that extra internal rotation much more than 40 degrees which is telling me we, more than likely, see how she goes out, more than likely having femoral anteversion on the right. Look here, see if we can stop this in time. Let me just take this back just the littlest bit there and look at her feet. This is why it is so important to take a look at the feet when you are evaluating your athletes and anybody with hip pain, low back, or low extremity. That right foot is so different than the left. She's using the right foot completely different than the left. The toes are in a different position. The arch is very different. The heel is different, her great toe is different. We need to think about and watch her move and function. After I get them off the table in my preliminary exam, I get them on treadmills. You see a treadmill in the background here in the back of this picture here. I have a couple of treadmills in the office. I typically will get them off the table and on a treadmill and do some video analysis of them moving in them. In my mind I have the idea that she's femorally introverted on the right and in my mind, I have that she's got a little higher arch on the right than left, and she's using her toes more on the right than the left. Why not the left?

I want to put all that together as to the whys. But if we go back here, see if I can get her in a prone position for you. There. Can you appreciate the findings of her having a femoral anteversion on the right in this position? Can you appreciate that, this hip is internally rotated versus this one? That is a little bit of a look of an introverted hip there on the right side. Let's just run through that whole thing. So I stopped at a hundred times, one more time so you can just have that evaluation your brain. Good. Holding that sacrum and really, really concentrating on do I have at least 40 degrees in both direction. If I have much more than that in internal rotation, I need to be looking for FAI. If you are limited in external rotation, it also is an indication that there might be femoral anteversion.

There we go. Craig's test again. Take your time and check this Craig's Test out. Again, we are looking for anything greater than 15 degrees from neutral, for a positive Craig's Test to determine femoral anteversion. Checking manual muscle testing, hamstrings. I do hamstrings proximal-distal so that I can check up by the ischial tuberosity as well as checking distally. Then your gluteus maximus. Look in here. Good gluteus maximus. Really notice as you are doing this manual muscle testing, I want to talk a little bit about this in your next section, your functional assessment, what muscles are activating. Athletes' bodies are pretty crafty. When I am muscle testing, they, maybe, can do the action but are they using the appropriate muscles to do that action? What muscles are firing

ICSC Lower Extremity Module 5 / Section 1.2_ICSC05

first, second, and third? When I am checking glute strength, are the glutes activated or is the low back doing that exercise? Noticing that as a key component in our functional evaluation, that is going to lead to creating your treatment plan because if you are asking for the glute to contract and they're doing that with their lumbar paraspinals first and the glute doesn't kick in till way later, I've got to go back and I've got to do some neuromuscular control retraining and get the glute to fire first before I can get rid of that injury. Not only just muscle test, but I also want you to notice. Does that muscle fire at the appropriate time or is it just lazy and firing too late?

As we sum up this lecture here, we are going to talk a little bit about our takeaway considerations. What are we thinking about? What are we taking away from this lecture? Just think not all hips are created equal. That is my major thrust here. Understanding that we have different structural confirmations. We have different muscle confirmations. We use our muscles differently. Athletes are asked to use their muscles differently, depending on different sports. We are going to look at nuances that might be a factor in predisposing to injury. This picture right here, this athlete right here has femoral acetabular impingement. Notice how this stretch exercise is just so poorly done. He can't really get into the stretch exercise because of his right femoral acetabular impingement. When we are giving exercises and stretches making sure again, we are not cementing in the problem. We are giving an exercise of stretch that is ameliorating the problem or working away from that problem, and not asking him to stretch into an impingement that is actually causing more impingement. Let us become proficient at a high-quality exam for every patient. Remember the order of events that we did. Supine, side-lying, and prone. Remember what structures you are testing as you do your manual muscle test. Is that muscle firing appropriately or are they just strong and they're using lumbar paraspinals instead of using the glute or the hamstring? Making sure that we are really answering the why's. Laser focusing on your diagnosis, and then we'll be able to add in all the great functional stuff that you are learning in the upcoming lectures.

I want to thank you so much for taking the time, it is my pleasure to teach for you today and I look forward to working with events with you guys in the future and seeing you at some of the FICS events. Thank you so very much.

[End]