

Hello and welcome to this next part of your ICSC seminar on the elbow, wrist, and hand. my name is Dr. Henry Pollard.

So as a part of my background with FICS, I have been a long time lecturer with FICS for about 20 years now, and I also I am on the education committee, and also, Chair of the Research Committee. So the course objectives are there for you to read about. we have got a lot to get through in a short amount of time, so you can have a read about that at a later time. I will, however, acknowledge that this course is for educational purposes, and I acknowledge that the pictures and the videos used in the presentation are owned by their respective copyright owners, and I strongly encourage you to seek out these vendors because they've got some great material that can assist your learning.

So, before we actually get into looking at some of the injuries of the elbow, wrist, and hand, and also some of the key examinations, I think there are some concepts that we probably ought to cover now. A lot of these concepts will be covered by other lectures, as well. So, I am going to go over a couple of them very quickly knowing that lower body assessments are going to go be covered in great detail, and a lot of the shoulder assessments which are very relevant for elbow, wrist, and hand are also going to be covered by Dr. Foss.

When considering all this, just general rules of operation I like to move from a central. So, from a spine to the extremity peripheral in the direction of my examination, golden rule of extremities is always examined bilaterally. As a general rule, patients like it if you check out the area that they're complaining about first, and then, roll through your entire routine. Now, that routine should look at functional assessments, whole body screens, the FMS, and other assessments, a spinal assessment, as well as then the extremity itself.

With regard to that, you inspect, look, feel, and move. This will include palpation and MOPAL which we covered by other lecturers during this course including range of motion and muscle testing. Then, we follow through various stress testing and orthopedic tests which will cover a little bit more today as well as, some neuro, and with the upper and lower limb, particularly upper limb, there are a lot of neuro-type conditions. I have had the truncate how much we go through because we haven't got that much time. I have just talked about the really common ones, but you really need to know your neuro for upper limb peripheral neuropathies. And then, after that, there are some special tests and then referral and performance testing which comes into play as well.

So, moving right along, one of the key concepts, I think that you will hear time and time again from the sports chiropractors is that you've got to look at the whole body. Now, elbow injuries are incredibly common in pictures for a few reasons that we will talk about shortly but have a

look at how dynamic that movement is. There is movement coming from all over the body, particularly hips, and spine, and shoulder. And these things must be looked at when you are looking at, particularly, overuse injuries, of the elbow, for example and to a lesser extent, the wrist. So that should be a part of your assessment. Once upon a time, a lot of these assessments were really in the realm of the coach where they assess motor function, and strength, and things of this nature, but increasingly good practitioners look at these things as well, and not just the straight orthopedic and neuro testing.

Another concept which is Michael Boyle's concept of the joint by joint approach. This is a concept where alternating areas of the body have a tendency towards getting stiff or loose and that alternates all the way from the ground up to the cervical spine and that is located there. The idea being here is that, sometimes, pain may be located at a particular location, but the loads that are acting on those tissues to cause the pain in the first place, maybe coming from elsewhere, and so, it is a good idea to have a concept that, you know, for example, the thoracic spine has a tendency to become very stiff and mobility is an issue that you need to chase there because if you don't have the mobility there, that mobility will be thrown off into other areas such as the shoulder or the elbow. These are important overall concepts that you might want to consider as a part of your assessment.

Another one here is again from another coach strength specialist Mike Reinhold, has suggested that when we are looking at this whole chain of events, the kinetic chain that probably the biggest impact is going to be on the joints, either side of the main area. So, for example, thoracic spine is directly relevant for the shoulder, shoulders directly relevant for the way the elbow works, et cetera, et cetera. So, as a concept, that is another one to bring into play.

Now, Tom Myers with his fantastic work on anatomy trains, I think this is something if you have not encountered this sort of work, you really need to get a copy of this textbook, which, I think, is now gone into a third edition, which- that is the second up there. It is really important. Now, this is essentially, together with the posterior line and the functional lines, really do connect the lower body to the upper body. And as you can see there through the spiral line, you've got the contralateral hip connecting the shoulder function through the scapula on the homolateral side. And so, straight away, the transfer of power, and in rotation, again, think the pitch and how much the hips contribute to the power that gets translated up into the shoulder, and then the extremity. This is how it happens, and so, it is an important concept to know that, and then, to have a look at, well, we may need to look at the hip flexors. We may need to look at the external you know, obliques and the serratus anterior, because they might have a lot to do with the way the shoulder is functioning either more or less than it should, and then how that may then be translated further down the outline. So, they have an effect on how the scapula works. And then, the scapular is also governed by the superficial and deep arm lines. And so, this is an idea where, again a series of muscles, transmit forces from the spine, posteriorly down to the

hand, and also, occurs anteriorly as depicted in those pictures.

When we are using techniques such as IRT or instrument-assisted work factor, things of that nature, you know, we will look at all of this and we will take the arm into functional positions to apply techniques. We can also do that as an assessment point to reproduce pain as well. So, conceptually, these are important things, I think, that give you a reason why, pain and inflammation tends to happen in the locations that it does. And so, it is something that we should consider as a part of our management.

Here's an example of a nicely dissected superficial posterior arm line and how the trapezius connects to the deltoid and the deltoid through the intramuscular septum and that vents into the extensors of the forearm, which then, ultimately, got it down into the fingers. So, this is a continuous structure. I know that as I learned anatomy, these are all described as discrete structures that there was no continuous connection, but it stands to reason, and you can determine this as soon as you try to do a stretch that the overall function is limited by tight muscles within it.

When we look at this diagram, just to the right here, we will see the traditional model where you have an origin and an insertion into the bone. But where it differs and where, I think, Tom Myers has brought this idea of fascial planes is that some of this content does not attach into the bone and just is continuous with the next set of muscles. So, what we end up having is an anchoring point forces, but we also have an ability to then distribute forces as well through an entire plane of movement. It makes sense that this is a protective mechanism, so we can help the distribute forces rather than have them overload a particular spot. I really like this simple little diagram here, because it describes a lot and it really does describe a lot of advances that have occurred in the last 30 years in terms of the concepts of why we get some of the injuries we get.

So, these kinetic chain concepts, once again, I have listed here from the big toe, all the way up through to the neck, a whole series of areas that are worth looking at. the various lectures will spend more time going through that. I will not go over that today other than to note them there for you to have a look at.

Here's an example of a test which begins to look at all of this. As a couple of sports chiros Dr. Nelson and Dr. Henry, are from Melbourne, and what you will see here is this, particularly on this right side here, this flexion or inability to extend this arm up through here, slightly increase thoracic curvature through here, but also notice that there are a difference in the leg length here, that this is elongated on that side which tends to load, and, again, think the transmission of all the forces here. So, there is some, certainly, some problems here, and within the thoracic spine.

So, these are just areas you might like to look at, but clearly, if this person needs to get up to this higher level this immobility here is one way to show in a functional way the limitations that are involved because you might be able to do this in a sitting position and you have full range of motion, but when the entire system is engaged, then you may see some shortcomings in the overall movement. So, it is probably a good idea, if that occurs, that you then, treat it in those functional positions, which is an important concept, I think that sports chiropractors need to embrace.

Here is an example, here again, of a more functional thing. What you will see here is an increase thoracic curve, very much reduced external rotation. Have a look at how much wrist extension is occurring here because of a lack of range of motion here at the shoulder. As opposed to our picture over here, he has got an extensive amount of external rotation at the shoulder and a much more relaxed wrist posturing. The loading that would go on in these muscles would, obviously be a lot more advantageous because this is mid-range loading. Where over here, we now have a lot in range loading, so there'd be a lot more of a pool going on the medial aspect of the elbow here, simply because there are a loss of external rotation in the shoulder. So, these are the sorts of analyses that you should familiarize yourself with and practice whenever you can.

So, there are various functional movement screens that are available now. And once again, these describe all the basic functions of life essentially. The trick here with these things is to look for symmetry left to right. So, if we draw a line up the middle here, there are left equal, right? Or if that leg rotates a little further one side, do we get a change in the opposite lane, which we often do to balance. There is this proprioceptive feedback here. There is vestibular feedback that comes into play here, and so we need to analyse all of this. We often look at injuries from largely, a sort of a hardware perspective, if you know what I mean, where there are just broken tissues, or there are inflamed tissues, but sometimes it is the software. So, it is the integration of the movements and things of that nature and I think that is where more the functional neurology side of things tends to come on and something I think we are going to be hearing a lot more about in years to come.

So, here is another example. I am sure Pete Garbutt, and a few others will talk about this a lot in their assessments, but, you know, something like an overhead squat. If someone has an inability to come down into a full squat, their ability to get their arm vertical then becomes a real problem, so they can overload a shoulder simply because areas lower down is not doing what they are doing. If we draw a line straight up and down the frontal plane here, we can see that this ankle here is pronating and somewhat externally rotating. We got a lot more valgus going on here compared to here, but that marries to a lot less abduction over on the opposite limb. So, this is out this way, so this has to go out this way to balance and so that can then

create changes in the opposite shoulder. It is for these reasons that we need to look at the whole person and not just the painful spot.

As I mentioned earlier, we can look at the range of motion issues, we could look at tightness issues, we can look at strengthening issue and then more functional issue. All of these really a good sports chiropractor should be looking at those and there are some issues there for you to review. Now, we will talk about the idea of weakness and relative weakness. Now, weakness is not something you are going to often see in athletes just frank weakness. You will see that more in your non-athletic population. But you will see relative weakness where one particular movement or function is not as good as opposing functions. Now, this really shows up, because if a muscle is less strong than it needs to be, it tends to go into spasm to create enough force to do what it needs to do about a joint.

In addition to that, there are the whole concept of eccentric loading. So, if we go back to that lack of shoulder external rotation, and then you get an eccentric increased eccentric loading with a lag on the elbow flexors and it is well known that the eccentric loading is associated with injuries. I have a few references there for you to have a look at in that regard. Now, not only is it more likely that you are going to get an injury with an eccentric loading. So, for example, hamstrings eccentric loading, low back pain eccentric loading inflexion, whiplash injuries eccentric loading infraction and extension. Rotator cuff injuries eccentric loading at the point of the catch or in the follow-through. There is a real thing there, and there are reasons for that, you know, you tend to recruit fewer muscle fibers with eccentric loading and as a result of that we end up having increased injury potential. It is worth noting well of these things have some relative weaknesses or not, because they do contribute to injuries.

The management is also about exercise therapy as well and particularly eccentric loading and eccentric loading exercises have been known to be useful, for common extensor tendonopathies of the flexors and the extensors at the elbow and I have thrown a few references there for you to show that the concept of doing manipulative work plus exercise is better than exercise alone, and that is you know particularly adding C and thoracic spine therapies onto concentric and eccentric scheduling, which is probably what most practitioners do in the chiropractic world, but not necessarily outside of it as much. It is something that I think that we need a lot more research on because I believe it will show some good things in the future. But that is hopefully a few of you might move into research in time.

Let us now come into the actual injuries a little bit. So, starting with the elbow as with all things, one thing I will say before we get into this is that elbow, the further you go out in the extremities, I think you got an increased likelihood of fractures and dislocations that occur. Whilst that is not really the scope of practice for a lot of practitioners, it is certainly is for those that are involving combat sports and those that are involving collision sports. All your football

codes, MMA, UFC, your Jiu-Jitsu, all of these things target elbows, your wrist locks, elbow locks armbars, all this sort of stuff, and then there are the ball injuries as well, which can cause a lot of wrist and finger injuries as well.

The types of injuries you get a little bit different than what you would expect that as a shoulder where you get a lot more, avulsions, you get primarily things like impingements and tendon issues, so slightly different set of conditions but it is worth noting. As with all areas you observe, if you are in one of these combat sports or high-velocity sports, collision sports, you have the potential for fractures and so you have to look at that. Look for traces. Look at the deformity. Are they moving? Are they not? Always check the whole body and always check bilaterally.

One thing as a concept that I will say about the elbow, is that on the medial side, injury tends to be traction-based, so they are stretch injuries. Now, there is also the ulnar nerve there as well, so that can also come into play and be irritated. You can get on your neuropathies quite readily from injuries of that area. Now, on the lateral side, things tend to be more a compression-based mechanism, so for that, in the younger folk, you get OCD which can spawn loose bodies, which can lock up joints, and road joint surfaces, but you can also get radial neck and head fractures as well. Then when we look at the posterior aspect, and so, we are talking about the electron on foster and the articulation there, we can get stretch factors. We can also get shear-based injuries which can lead to tricep tendonitis and things of that nature in a chronic sense.

One thing we do get a little bit of particularly in the weightlifting crowd bicep ruptures. The most common bicep fracture is the proximal end which gives you the Popeye deformity, but you will also get some distal bicep ruptures. And the best way to test for that is to look for the hook test. I have got one here, where it is not a rupture, but I will show you the process, so here we go.

Watch Video: I want you to look at his hand then what you do is you take this index finger, you bring it right in here and you can see where I am hooking that right around the distal biceps tendon. If he had a distal bicep rupture, it is very difficult to find that tendon in to get to be able to hook your finger behind it. As you can see, I have got a really nice hold on Brian's here.

Dr. Pollard: It is quite easy to find that tendon if you ask them to load it you will just pick it. There is a nice thick tendon there, which is about the size of your thumb. In a lot of people, maybe a little smaller. But if it is not easy to find and they have talked about a mechanism, you know, the last one I saw was a fellow who did not quite park his car in the garage far enough and brand-new Lexus and the garage door came down and he tried to stop it by holding it up, and he blew his bicep doing that. Not a common injury, but one you might want to consider.

As I mentioned, three nerves pass through the upper limb and I am not going to go into a lot of

detail about this, because this is a lecture all by itself. but we have got the ulnar nerve which is associated with the stress-based injuries, and the common flexor group, of the elbow. Then you've got the median nerve, which is can also be associated with the pronator, but obviously, then carpal tunnel. And then you have got the radial nerve, which can be compression injury higher up around, the arcade of froze in between muscles and coming over the radial head and then over a Wartenberg syndrome down into the thumb, and in the first couple of fingers. There are multiple compression points in the arm, and, with the overuse injuries that tend to occur in the forearm and hand it is something that I think that you probably want to school up on a little bit moving forward.

One of the ways to do that, which we will not go through today, but I will just bring it to your attention, is the upper limb tension tests that describe how they're all done, or I suggest that you go and have a look at the physio tutors. They have got some great videos on how to do all of that. So, make your way to their website and have a look at that.

When it comes to the ulnar nerve, as with all nerve injuries you probably want to start out by mapping the exact location of the sensations, and so they could be pain, pins, and needles, numbness, or if it is associated with motor weakness. These things are all present. Generally speaking, you are more likely to incur just pain and pins and needles, before they start becoming more serious. It is something you want to jump on quite quickly you know, tapping on the area of the nerve. You need to have an idea of where the nerve runs. The cubital tunnel is a classic one for the ulnar nerve as well as the down a guidance tunnel down in the wrist, the two compression points. Pitchers get a lot of ulnar nerve type issues at the elbow, cyclists get a lot of issues, maybe golfers get a lot of issues at the wrist, so there are various tests that you can do for all of that which are located there, but I will point one out for you, which is here, which is the ulnar nerve scratch collapse test. let us have a listen.

Watch Video: So, the way you test this is you assess external rotation strength. I want you to hold right here. Give me everything you have got. Do not let me push it in. Hold, hold, hold, hold, hold. Good.

Then you scratch the area of suspicion. Hold again. Hold, hold, hold, hold, hold.

Notice he has weakness there. So, that would be considered a positive scratch collapse test. You can see that happened with the carpal tunnel and other areas where you suspect nerve compression and they will develop some weakness on the second go around. It is not just weakness because he is tired from the first one, but it really kind of gave out, did not like you have you think about it, but it is just not there. That is called a scratch collapse test.

Dr. Pollard: So, this is an inhibition-based test. It is got some good statistics to support it, so I encourage you to practice that test. That common elbow injuries are the epicondylopathies or epicondylalgia which is the old tennis and golfers elbows. On the lateral side, we have got the so-called tennis elbow or lateral epicondylopathy if it is a chronic thing. Most of this test is quite a few variants, but essentially they palpate the origin of extensor carpi radialis longus and brevis on the supracondylar ridge and over radial head. You palpate that painful and then you muscle test those muscles with wrist extension or long finger extension and third finger. Either way, you get a reproduction of symptoms, and you have a positive test. Now, moving and the same thing applies to flexion as well, so, you are doing the same type of testing there as well.

We will move on now to injuries which are a little bit more serious and, on the medial side at least common and this is collateral so ulnar collateral ligaments at the elbow and then the radial on the on the lateral side. This is where the concept for stretch based injuries comes into play, and so it is quite common for those that have got restricted shoulder function, that are doing a lot of pitching, tennis serves, even swimming, you know, archery. There is a whole bunch of things where you need a good external rotation of the shoulder. If you do not have it or you have developed good, which is going to humeral internal rotation deficiencies. You can end up with these problems where forces are increased at the elbow and then the elbow begins to break down under the load.

One thing with testing collateral ligaments is a golden rule regardless of whether they are in the elbow, in the hand, in the knee, wherever. You test in two positions, you test in at zero degrees, or in full extension and then somewhere between 20 and 30 degrees, so always test both positions. So, that is an important point moving forward. Now, this one has a slightly different story. This one now we are talking about elbow instability and this can occur very much so in traumas, but on the medial side, it can also happen as a part of repetitive injury to the elbow and it is the sort of thing that Tommy John operation is used for in pitchers, and it is the one of the reasons why particularly in the younger pitchers, they limit the amount of pitching that they are able to do. That being the case it can be quite difficult to do this with the pain remaining because the patient tends not to relax. Just focus here for me, around this area here and have a look at the movement albeit subtle.

So, this movement is analogous to the pivot shift maneuver at the knee. It is a subtle movement, but you will see that that large movement that occurs. Now, in the instability phase, there is a continuum between this and then in the acute scenario, say for someone like a, you know, an armbar with the UFC maneuver where actual frank posterolateral dislocations can occur. That is just gone significantly further past instability to just frank, you know, instability. One is an elongated ligament whereas the other one is a torn ligament. So, not that these things are going to probably walk into your office too often, certainly not the UFC based injury, you would have to be on the spot, usually, they go to the hospital, but some of these

overuse ones here whether there is some instability through ligament lengthening and chronic injury. Those you will see particularly if you have got anything to do with baseball pitchers and the like.

Fractures do occur and so as a general rule, obviously, a traumatic background is usually there. It tends to happen more in people older than 55 although it does happen in sport as well. You generally ask people to walk four steps, that will show if there is anything in the lower limb. But also, what happens is that people have an upper limb, they will carry and protect the limb that is involved. You will see changes in posture around the deficit. Look at the area for the darkness, bruising etc. As a general rule, ask them if they can move first, if they cannot, light palpation and then percuss, not at the suspected site, but away from the site and you also apply a squeeze test away from the site and then you look for the reproduction of pain at the site. Once all that is done, and you have an idea of what is going on, you can add resisted isometric contractions as well and you will find that they will be voluntarily limited and range of motion obviously, limited. So, there are a couple of meetings there for you to see and examine of an actual fracture so you can have a look at that at your leisure. What we will do is there is a test here, called elbow extension test. It is a fairly basic test, but it does outline something to do if you suspect an elbow fracture.

Watch Video: To perform the test, have the patient seated with exposed and supinated arms, then ask him to flex his shoulders to 90 degrees and then fully extend and lock both elbows. Injured and uninjured sites are compared visually and those would equal extension recorded as four extension. Patients who cannot fully extend the elbow after injury should be referred for radiography as they have a nearly 50% chance of fracture.

Dr. Pollard: You probably get an idea before that, but that is a test that you can do to confirm. So let us move now into the wrist and the hand to discuss some of those issues. So first of all, let us look at the inspection of the wrist and look for the posturing of the hand with if it is held? Is it not? Look at any gross deformities, there are a couple there, which are fairly obvious, but also, look at the palmar creases if they are still present, have they've been filled in? Are they cuts locations of, for example, blistering can be associated with fractures callus formation can be sign of loading and obviously, swelling? Always compare bilaterally.

One area that we probably need to mention does not happen all too often, but it does occasionally. This is vascular injuries. We can get vascular injuries as well, and these are much more serious concern when they do come and they occur in the hand. You can get compartments and rooms and other things that happen in the forearm, but we really have not got time to go into all of those. We will talk about some of these ones that can have that you can get simply by catching a baseball or a cricket ball or something a hard, object that it is travelling at a great pace. You can get basically an injury to the vascular structure itself, and so

it swells, and they can present particularly like this one down here and this one down here. Now these two here are acute injuries. These are not things that we are going to be applying soft tissue work to. This we need to have this settle down. You might want to ice this down lightly and allow this just to settle, but we certainly not going to do it.

This one up here is a different one again. This is a ganglion in the wrist and, I certainly was taught that if you get a ganglion, you find the largest book on your shelf and you belt the thing. Now whilst that might be okay on the dorsal side, I still would not go that way, but some would suggest you do. on this side here, a ganglion here is adjacent to the radial artery and they are often, they tether against it. So, if you break this structure, you possibly can break the radial artery. So, it is another reason why we do not use violent techniques in around these types of structures, and these particular group of injuries. So just a couple of quick test for vascularization.

Watch Video: This is going to be a quick test to determine distal blood flow in the finger. To perform the test, compress your patient's nail bed and note the time that it takes for the colour to return. Normally, the colour should return within three seconds.

Dr. Pollard: It is a fairly simple test, but obviously, colour changes, temperature changes end stage type of thing, you can get trophic changes as well in the nail bed and other things always compared to the other fingers and to the opposite side. This one here is a little more involved, so let us have a look at this one. Allen's test.

Watch Video: Ask your patient to open and close the hand several times as quickly as possible, and then squeeze the hand tightly. Then compress the radial and the ulnar arteries with your thumbs. Hold it quickly and then ask your patient to open the hand and release the radial artery and you can see how the blood is streaming back into the hand quickly. We will now repeat the same process and release the ulnar artery.

Dr. Pollard: So delayed refilling of the blood into the hand implies that there may be a vascular structure involved and that is something which should gain a quick referral to a medical practitioner. Let us go into some of the more overuse-based syndromes that you are likely to encounter. An intersection syndrome occurs at the intersection of these two groups of muscles here as indicated here, and so this is a relatively common structure. Remember that this is an overuse friction-based syndrome, and so managing this is not about applying a lot more friction to this, but it is having a look at what is going on around it and that is where we might consider again the role of the superficial and deep arm lines that I spoke about earlier in the anatomy trains. That is something that you are looking at any entire limb, rather than just focusing at one point. For very recalcitrant cases we can also use cortisone as a part of the management strategy in the short term to quickly put down the inflammation, but for the most part, you

don't need to do that, and you can manage these with manual therapy approaches.

The next one on the list is the De Quervain's situation. Now, the difference between the two, is that with the De Quervain's think of it as occurring adjacent to the radial styloid at about that level whereas the intersection syndrome tends to happen a little higher. That is the way you differentiate the two of them. Both of them will be determined by the Finkelstein's test, which is like so and then just radially deviates in a reproduction of pain happens. Management is essentially the same. Then we come into wrist instability. This is an area I think that does not get done particularly well, by a lot of folks and it is something that we really need to focus on. What I will say with a lot of these tests it is very much like, motion palpation of the wrist and the hand. In terms of, you need to be extremely specific between two adjacent carpal bones and that you need to block one whilst you create movement over the other. You can then also put combined movements in, so you can add that you can put it in radial or on the deviation or you can even look to rotate as well and do these types of movements and do the combined movement.

So, here is an example of the Watson's test around the scaphoid. Say you are feeling for clicking and thudding around these movements and it is not a particularly difficult test, but you just need to be on the right spot. So, visualizing your mind when you are testing these the carpal rows and where exactly you are looking for that. So, the best thing to do in this situation, come to the proximal end of the thumb and work your way up into the scaphoid around that.

The other side of the wrist now the TFCC, which of triangular fibrocartilage complex, there is a little disc in there and there are a series of ligaments as well. Now, these ones are acutely often managed with a brace for four to six weeks followed by, often associated with management away from the healing site, but they do tend to become quite chronic. If they tear the structures enough, they will require a surgical outcome and I have an example of one of those that are following. Let us have a look at this one first.

Watch Video: There is a suspicion that he had a TFCC, a triangular fibrocartilage complex injury to this area, and I will show you how we derive that, okay? So, the first thing I did with him was a supination test. So, I am going to have you hold your hands like this. He has a hard time supinating, because he also has a small impaction fracture at the radial neck. Okay, so I want you to lift up on my fingers as hard as you can, and that hurts, doesn't it? Okay, right around this area. Now, we are going to take you here, so that is a supination test. Then we are going to do the TFCC load test, where we take the wrist, and we bring it into ulnar deviation. And he doesn't like that, okay? I am not even 50% of the motion getting into that area. If I palpate, we are tender right there also. Okay. Now, the next one we are going to do is going to be the piano key test and I am going to have individual videos and show notes of this video so you can go to those two. So, I am going to do a little piano keys. I am going to stabilize the wrist and radius. I

am going to take the ulna, and I am just going to depress it a little bit and obviously, that is painful, so I am not going to push any harder than that. The last thing we are going to do is going to be a press test. So, I am going to have you go ahead and sit in the chair and we are going to keep an eye on his left wrist. I would like you to put your hands on the armrests and I would like you to try to push yourself up and you do not have to if it hurts, tell me. Yeah, it is quite painful right there to try to get it. Okay, great, you should just sit back there.

Dr. Pollard: Okay. So, that is very nicely done. Always, watch your patient all the way through their movements because he was guarding, he was protecting that wrist and the practitioner did a great job of not overloading the risk. Particularly, when we are talking about, more serious injuries that have, you know, longer-term outcomes. We do not want to overload it and add to the problem with our testing. So, be gentle and progress the testing slowly.

So, here is another example now of the distal radioulnar joint, which can be associated with the TFCC tearing as well as other structures as well. Let us have a look at that one now and we will go up to there and way we go.

Watch Video: If you see this, ulnar deviation you will see that there is some movement at the DRUJ (distal radio-ulnar joint) region. This is physiological movement. You can translate the ulnar shaft both dorsal-ly and volar-ly. This is physiological movement. How do you differentiate whether it is physiological movement or pathological movement due to instability? All you need to do is instead of [ulnar deviation] taking the wrist to [radial deviation]. You can try the same thing I can barely move it. So, you will see some movement because it is not [awful?] if the joint has got some mobility for the moment decreases. So, this tells me that the previous movement was physiological and once I have collected from all our deviation to reveal deviation, I can barely see this movement, and this is pretty normal for me. Now, I am going to demonstrate the same thing in the patient, and I will also demonstrate a piano key sign. This is a [gentleman from] a year ago and has been troubled by painful rotation, especially [pronation] and supination. So, if I do the same thing ulnar deviation, you can see it is already [subluxed]. You can see how much it is moving. There is a lot of movement at the ulnar region. It's a lot deviated even when I do radial elevation still there is lot of translations, this tells me that this is pathological movement like the piano, it will go down and it will pop up. So, you can see here I am pressing it down and it is popping up like a piano keys. This is also is kind of be a redistribution when I press it down, it goes down when I lift it up, it goes up. Looking from this profile, so you see I can press it down and as I leave it pops up. So, this is piano key sign for instability of the region.

Dr. Pollard: So, that was very nicely demonstrated there. Hopefully you won't see too many of those, but when you get your positive findings on those tests, it really is off to the surgeons after that because they have to weave their magic and then you can be involved in the

rehabilitation post-surgery.

Another test, which is commonly done, for well, in this case lunotriquetral, but you can apply it across all of the carpal bones, and I will just get that ready and load it.

Watch Video: Place it on the treatment table. The test is a Dorsal Palmar Shear test. So, the fingers of one hand, locate and grab the lunate, and the fingers of the other hand, grab the adjacent triquetrum. Then you fixate the lunate and perform a dorsal palmar glide of the triquetrum.

Dr. Pollard: So, some of the positive test is pain, reproduction of clicking, particularly painful, and an excessive movement compared to the other side and also surrounding articulations. So, as I said to you before, it is quite similar to a lot of the motion palpation work that you will do for the wrist. I think that we have the potential to be quite good at assessing these things, but we just have to be in a have in our mind's eye. I think, an image of what it is exactly you are fixating and what it is you are exactly moving so that you can then put the movements in the correct locations. And then when you get good at it, you can combine movements as well with radial and/or on the deviation.

Another common one is a fall on the outstretched hand and the so-called FOOSH injury can have problems with fractures in the carpus particularly the scaphoid radial pylon fractures. You can get a radial head, which usually involves a bit of rotation, but then also shoulder injuries with rotator cuff and in particular supraspinatus or then all the way through up to even AC joint grade three-tier. So, a fall on an outstretched hand, FOOSH injury, is an extremely common mechanism and you will see a lot of injuries in your careers with that mechanism. But anyway, this basic one is fairly straightforward. It is about power painting the scaphoid in the anatomical snuff box, which is just located here. So, you will see this happening now.

So, you palpate first and a lot of the time, just the palpation will be painful obviously, compared to the other side, but you can also get painful palpation too if the joint has some significant fixation or if there is some laxity present as well. So, obviously, degree and then when you add the radial deviation or compressing of the scaphoid, that probably gives you a better and if you get a positive and it was not a problem beforehand before a fall and you've got an immediate positive afterwards, that is an issue. Just remember that scaphoid fractures have the potential to heal with avascular necrosis, and so it is not something that you want to actively pursuing. They need to spend time in a brace to allow healing and you need to monitor the fact that that is occurring, and they usually follow up with CT scans afterwards to make sure that there is healing going on and you are not having that non-union going on in the scaphoid of the two poles.

We are starting to get close to time. So, we have got carpal tunnel syndrome. It is extremely common. These are the three tests, that you need to have a look at. I think they are fairly straightforward, so I won't go into those too much. Just remember, it is the first three fingers that are involved with the symptoms, as well as a loss of power as well, so in the theorem and so, check for that and that should be quite clear. Now, the thumb itself basic range of motion, and then we come up to the radial collateral.

Watch Video: Place this finger, you push. Normal finger. Try this to dislocated finger.

Dr. Pollard: Yes, exactly. So that is a relatively uncommon injury, radial collateral injury of the thumb. far more common is the next one, which is the ulnar collateral ligament. Let us have a look at that.

Watch Video: Clinical examination of a patient ulnar collateral ligament injury showing gross instability of the metacarpal phalangeal joint on radioulnar deviation.

Dr. Pollard: So, inabilities, is one way to do all these but quite often what occurs when you get a tear of the- you see a ligament, this upon neurosis here the proximal end of that pops out and so there are no way for that ligament to occur to heal, sorry without having that being reattached. This is called a Stenner lesion, when this occurs and generally with excessive range of motion, you are going to get one of these things, so it needs to be screened for that, with MRI. I will put it down now that we are seeing more and more masters levels at level athletes, immobility with the various arthritis is common. Just know the most common arthritis is probably AC joint for in the upper limb closely followed by the CMC joint. So, mobilizations of these structures and assessing of the basic range of motion and you can get deformity with these things as well. These are all injuries that we should follow up.

Now, as a part of that, always when looking at the dysfunctional side of things rather than just, she broke in things, you know, the scaphoid there is a, you know, a keystone of the arch this way, but equally, there are a keystone of the arch that way, and the scaphoid sits at the intersection of the two of them. It is one of the reasons why I think we get as many problems as we do in this area. Add to that then the fascial attachments, of adductor pollicis, then you have got the extensor carpi radialis and on the flexor side as well, on the heads of the metacarpals, this whole area here, tends to lock up a lot responds really well to soft tissue procedures, as well as mobilizations, that target, the heads of the second and the third metacarpals, whereas you often get a lot of high permeability at the CMC joint over here. So, just consider this because this is very common in tradespeople, who are using their hands heavily for a living as well as sports folk that are doing the same type of thing.

We are going to finish up with just having a look at the fingers now. So, the first thing that I will

say is your basic range of motion. The key thing here with the fingers is because they are little joints, it is easy to sort of make a movement and have movements flow off into other joints around the target joint. So, the key here is to be as specific as you can be with your assessments. Here is an example, looking at the palmar side on the flexors where they have stabilized the proximal end of the finger and they have just muscle testing in this particular case, the DIP joint. Then they have moved up by stabilizing the other one and the placement of the finger is in between are on the phalanx here, middle. So that only the joint movement is occurring here. So, this specificity is really, really important.

Now, on the extensor side, one of the ways that we do that is to use the edge of your treatment table where the hand will come over and that you can specifically focus, a movement using the table here, so that we can get a specific movement like so, and then you move down like that so you get like so. We are not getting these combined movements and particularly in assessments. Now, the same thing also applies, with assessing of the collateral ligaments, you stabilize the proximal segment and then you move with finger either side of the shaft of the finger here and then you move into varus and valgus. This is important to be specific when it comes this because they are little joints.

Common injuries, particularly with all the ball sports is catching a ball on the end of the finger, and then, tearing the tendon or avulsing the tendon out of the proximal end of the distal phalanx, so we can get injuries here. Have a look here at the way one of these presents. Here you go.

Watch Video: Not too severe and there are not very much in the way of swelling. The most obvious finding is these flexed fingertips. When you feel, you are looking to see if there are any tenderness, there are not much tenderness and the normal bony alignment is within normal. There is no dislocation of the joint, and there is no obvious swelling, or synovitis. There are no temperature changes and that is really it for palpation. Then when it comes to movement, you want to ask the patient to make a full fist. Make a full fist for me. You can fully flex and open up straight and when you also do extend, you see that you cannot fully extend. you cannot fully extend. So, now when a patient can't fully extend, the question you have to ask is that, is there a fixed deformity called a fixed flexion deformity? Or is it an inability to extend called an extensor lag? So here, you can see this patient. She has full passive extension. I can easily extend there, but when I let go, it droops down and that is an extensor lag as opposed to a fixed flexion deformity. FFD, fixed flexion deformity. The same goes for the ring finger.

Dr. Pollard: You will see that with the cricketers and anyone who has got to catch a hardball that type of the not so much in the baseball because you wearing mitts, but certainly cricket, you will get a lot of that type of thing. Basketball, you get a lot of that type of thing. Note it, I can recall a patient I had who was a rugby player. He got the next injury that we are going to

talk about the Jersey's finger, as well as he had a few of these. Because he had done nothing about them, he essentially had a fairly unusable hand because they all eventually from being just an extensor lag, they moved to a fixed flexion deformity and he ultimately could not move the joints, and they were the source of a lot of pain. At the time he was 28, so he had a lot of problems in his future. Obviously, if you get that with the avulsions you should get an X-ray for these things, because if the avulsions are passed, 20 or 30% of the joint size, are they really ought to be pinned, and so that will be an orthopedic consult required.

let us have a look at the other common injury now, and this one's based about grabbing jerseys and things of that nature. So, really all of the footy sports and all that type of thing. Let us have a look flag football, I think you guys call it, as another example.

Watch Video: Caught somebody's jersey and had an aggressive flexion pull on his flexor tendons and had immediate pain. Went to the emergency room, had X-rays and as you can see, we have some bruising along the finger. 2 to 3 days ago, was significantly worse than that, had a lot more swelling. This is now starting to settle down a little bit. And in looking at him, notice that he was having some difficulty flexing. Extending, he is doing really well with that. But if we take your hand and hold it like this, do not let me push the tip down, hold it. So, he has a very good resistance into extension, has a little bit of bruising over the back of the finger also, but on the volar side, you can see here, we will have him bend the finger. Okay. Good. Good motion there. We will do our PIP joint and bend there. And we have some motion there. And now we are going to isolate the DIP joint and flex, and really does not have anything there. You are just getting full-finger motion.

Dr. Pollard: Nicely performed, gentle in the application, and very specific once again on the assessment, so, good practitioner. So, I am just going to finish up with a couple of slides on fractures, because finger fractures and dislocations are quite common, again with all the ball sports. So, again, it is all about the inspection. A lot of these things you know, they will play through them in a lot of cases if they are not too bad and so you will use your buddy taping as demonstrated there. But, have a look at the fingers, you know, bruising under the nail for a distal phalanx fracture. You run the risk of not only with the fractures, but you know you have got a dislocation possible. You have got a motions of the tendons, the central lift slip on the flexor side and on the extensor side you got the extensor hood are all structures that can be damaged as a part of, excessive finger motion.

Now, one thing I will put up, you will notice that these photos here, on this picture, all done with the fingers in extension. Now, a lot of the time there is some rotation component or a side bend component to a broken bone, which may not be obvious when you just simply look at the hand when it is in a sort of natural extended posture, but it will become evident when you ask them to flex the fingers and when you do so, you begin to see rotations of the fingers occur,

right? Whereas normally we would just come up and you will see no differences whatsoever, but when we start seeing fingers cross over like so that is a sign that you are looking at a fracture or dislocation. So, it is a simple little test, but one to just kind of take note of.

So, that is brought me to the end of our talk. So, thank you very much for your attention. I believe that you are going to go away and practice some of these things if you have not already. Thank you for your attention and good luck with the rest of the course.

[END]