Good afternoon I’m John Fowler one of the hand and upper extremity surgeons with UPMC and today I’m going to talk about carpal tunnel syndrome which is near and dear to my heart as a hand surgeon. So carpal tunnel syndrome is very common more than 3.8 million people per year visit physicians with complaints related to carpal tunnel syndrome although not all of them end up having the disease and there’s more than 500,000 carpal tunnel releases performed per year in the United States alone. So worldwide there’s over 1 million which just tells you how common the problem actually is.

So one of the things we should do is define what carpal tunnel syndrome is because a lot of people have complaints that they think is carpal tunnel syndrome and in the end it ends up not being that. So carpal tunnel syndrome is compression of the median nerve at the wrist, the median nerve can get compressed in other places too either further up in the arm, around the elbow or even in the mid forearm. But carpal tunnel syndrome itself is by definition compression at the wrist. And patients with carpal tunnel syndrome mostly feel paresthesias which is numbness and tingling in the median nerve distribution which we’ll talk about later. Sometimes there’s some aching in the thenar eminence which is this kind of part of the thumb right here and they’ll have weakness of the muscles the median nerve innervates. And it’s a clinical diagnosis and we confirm that based on a physical exam as well as some other tests that we use. Most carpal tunnel syndrome is idiopathic meaning we don’t really have a reason why it occurs and that idiopathic form like I said is most common. That implies that there’s an absence of systemic factors such as rheumatoid arthritis, hypothyroidism and pregnancy. It’s more common in women compared to men and most commonly comes on in ages 40-60. That’s not to say that people over the age of 60 or younger than age 40 can’t get carpal
tunnel but that’s the most common age group. In more than 50% of patients it’s on both sides and interestingly it correlates most commonly with body mass index so people that are overweight are more common to get it than people that are not.

Just a quick note on carpal tunnel syndrome in pregnancy, it’s actually very common about 1 in 5 women who are pregnant feel carpal tunnel like symptoms. Most have the clinical findings but if we were to do nerve tests they end up being negative. It’s most common in the third trimester due to the generalized swelling that women experience at this point in their pregnancy.

Let’s talk about the anatomy of the carpal tunnel, it’s kind of more upside down tunnel. You know most tunnels sit like this a carpal tunnel more sits like this, upside down. The floor of it is the bones of the carpus and then on top of it sits the very think transverse carpal ligament and I always tell patients that it’s so think that when we cut it in the operating room it almost sounds like celery when we cut through it.

So inside the carpal tunnel itself is the median nerve which as we talked about is what’s getting compressed in carpal tunnel syndrome, there’s also 9 different tendons. There’s the tendons that flex all of your fingers and also the tendon that flexes your thumb. So one of the theories that we’ll talk about later is that people that overuse their hands a lot they get a thick inflammatory covering on their tendons and since there’s a hard bony floor and a very thin roof to the carpal tunnel the median nerve has no place to go and so it gets pushed on that’s what causes the symptoms in carpal tunnel syndrome.
As we mentioned the carpal bones are the floor. On the one side we have some of the carpal bones called the hamate, triquetrum and pisiform. On the radial side we have the trapezium, scaphoid, and then the fascia over one of the wrist flexors, the flexor carpi radialis tendon. The roof as we mentioned is that transverse carpal ligament it’s very thick and also some of the distal forearm fascia and aponeurosis.

Carpal tunnel is actually it’s narrowest at it’s leading edge so more proximal up the forearm it comes wider distally and I don’t know if you can see here on the power point my arrow you can see how it’s narrow here and becomes wider up here in the forearm. There is the recurrent motor branch which I’m demonstrating right here with the area and you can see how it goes right into the thenar musculature. So when people complain of weakness in the hand that’s because this nerve is innervating this muscle and when the nerve gets pushed on it doesn’t give it enough nerve supply and the muscle becomes weak and doesn’t fire as well. And as I kind of mentioned here in the slide it actually does 3 different muscles. One of them is abduction and also some opponents, so commonly patients may complain of difficulty manipulating fine objects, they might say they have trouble opening a can of pop or trouble opening a pill bottle as well.

The median nerve really innervates from the sensory standpoint part of the thumb, the index and middle fingers and really it’s only on the palmer side. So some of these patients will come in with a complaint of carpal tunnel syndrome and they’ll say my entire hand goes numb. That’s always confusing as a hand surgeon because looking at their distribution there shouldn’t be one nerve
getting compressed that gives sensory loss to the entire hand. So in those cases often times I’ll start thinking of other things, we talk about diabetes, or rheumatoid arthritis or some other component that’s causing sensory loss to the whole hand. Classically patients will say that it’s really on the index, middle and sometimes even half of the ring finger. They may not come in saying that but when I start testing them often times they’ll say yeah the radial side of the ring finger is numb and the ulnar side is not and that kind of helps the diagnosis as well.

So I think one of the most important things in diagnosing carpal tunnel syndrome is actually the history itself. Some patients come in and they give you the classic storybook what carpal tunnel sounds like and other patients don’t and that kind of leads us down a certain path. If we go ordering tests on any patient that comes in, there’s always a chance those tests could have false negatives and false positives if we don’t order them in the right clinical scenario. So I really talk to patients a lot and look at their history and related to their age, as we said 40-60 year olds are the most common for this. So if I have a 15 year old and 18 year old even though they may have carpal tunnel it’s lower on my differential diagnosis. Their gender makes a big difference as we said females are more common than males 3:1, and occupation makes a difference too. We think that things like computer typing don’t necessarily correlate with carpal tunnel syndrome but other jobs do such as repetitive motion, a lot of industrial workers and also workers that do a lot of vibrational type activities such as jackhammers. The character of the symptoms is really important. There’s been some big studies in some of our hand literature recently that says that carpal tunnel generally doesn’t cause pain it’s really the numbness and tingling. So if patients have pain sometimes I make sure I’m thinking about other things that it could be instead of carpal tunnel syndrome itself. The duration matters, it matters
a lot based on what we do. So if a patient comes in and tells me that they only had the numbness and tingling for a few weeks I may definitely consider something like a steroid injection or splinting. Whereas patients that say they’ve had symptoms for 10 years the chances of making that a whole lot better with non operative treatment are probably less. I always ask if there’s something that happened you know if the patient fell and they had an acute episode and they started having numbness after the fall you might think there’d be some scar tissue in the carpal tunnel, there could be hematoma or a blood collection in there that could be causing the symptoms as well.

What kind of things make this worse? So a lot of patients will tell me when they drive they get carpal tunnel syndrome, and read a book. I think a lot of it has to do with wrist flexion and extension which as been shown to increase pressures inside the carpal tunnel. I’d like to know what they’ve had done so far. If a patient comes to me and says they’ve been wearing a wrist splint for the last 6 years and hadn’t had a whole lot of relief of their symptoms that might lead me to do a surgical procedure earlier than if they’ve had nothing done so far. And then as we mentioned earlier their medical, surgical and family history is very important too. We think a lot of this is genetic so if grandma, grandpa and also a sister or brother also had carpal tunnel chances are the patient has a genetic predisposition and may have it as well.

And as I mentioned the time of symptoms matters a lot so you can see in this study from the Journal of Hand Surgery in 1997 patients who had surgery 3 or more years after their initial presentation have worse outcomes probably because the nerve was getting pressed on for a very long period of time. As I mentioned different activities increased the pressure on the median nerve, as a mentioned
driving a car, vigorous grasping, vibrating equipment and also sleeping which we’ll talk about later on. Most people whether they want to admit it or not tend to curl up a little bit when they sleep which flexes the wrist and I’ll show in one of the studies that that causes a lot of pressure on the median nerve. So one thing people always want to know is did my occupation or my job or a certain thing I did cause my carpal tunnel. It’s a prevalent thought but it’s largely unproven in our orthopedic literature. We think it’s mostly a structural or genetic thing as I mentioned earlier if grandma or grandpa had it there’s a chance you may have it as well and I kind of show multiple studies here that show really no good correlation between things like computer typing, secretarial work and things of that nature as a risk factor for carpal tunnel syndrome.

So after I’ve done the history part of it the next thing I go to is physical examination. You can tell a lot just by looking at a patient. I try to observe their skin see if there’s any skin changes, you can look for things like thenar atrophy which I’ll show a picture of on the next slide, you kind of look at their nails and see if they’re using the hands, sometimes nail atrophy or nail changes can be suggestive of nerve injuries and then I’d move onto some other things here which I’ll go through on some of the other slides.

But here’s a classic example of thenar atrophy. You can see that right here is they have a nice robust thenar mass, we see that it’s undergone atrophy. As we mentioned earlier that’s because the recurrent motor branch to the median nerve gives innervation to these muscles and when it gets compressed on the carpal tunnel prior to giving off those branches it can cause atrophy as demonstrated in the image. The next thing we do is sensory testing so we do Semmes Weinstein
Monofilament testing. Most patients should be able to feel a 2.83 millimeter Semmes Weinstein Monofilament. Patients with carpal tunnel syndrome generally have elevated sensory testing. The second thing we do is 2 point discrimination so this is a disk that has these different posts that are a certain distance apart and we’ll try to trick the patient, we’ll have them close their eyes and then you touch their finger with one or two of the posts to try to determine what distance they can feel between the two posts. A normal range is between 4 and 5 millimeters, patients with severe carpal tunnel sometimes can’t even tell you’re touching their fingers. A lot of times they’ll get a little bit elevated in the range of 6-7 millimeters of 2 point discrimination.

Next I move on to motor testing. As we mentioned the abductor pollicis brevis receives its innervation from the recurrent motor branch, you start to get atrophy but you also start to get weakness. So we will test the abductor pollicis brevis. This one can be a little bit tricky because it’s hard to test and hard to isolate. Usually what I’ll have patients do is put their hand flat on the table and ask them to raise their thumb directly towards the ceiling and that’s really testing thumb abduction. I always learned that the motions of so the range of motions of the thumb are 90 degrees to the fingers. So if this is finger flexion and extension the thumb, finger flexion and extension is in this plane. If this is finger abduction and adduction this is thumb adduction and abduction so it’s completely opposite. And then we generally try to get a sense of how weak or how strong it is. Now one of the downsides of testing for the abductor pollicis brevis is that a lot of patients in this age group 40-60 especially women will also have thumb cmc arthritis and they may have pain or weakness related to that so sometimes you really have to differentiate between the two.
The next test is something called Phalen’s test one of the most classic carpal tunnel tests and this really relies on the whole idea that wrist flexion increases pressure on the median nerve. So generally I’ll have patients put their hands like this at 90 degrees and you really have to hold it for a long time. Now patients with moderate to severe carpal tunnel syndrome really in the first 10-15 seconds they’ll tell us right away they’re starting to experience the numbness. And another important point is that it can’t just be numbness in the back of the hand or numbness anywhere, it really has to be numbness in the median nerve distribution to be a positive Phalen test. And you can see relatively good sensitivity so sensitivity is good for screening and relatively low specificity not that great for a confirmatory test.

The next slide we look at is the Tinel sign so you can do a Tinel sign really anywhere even the body, that’s tapping over a nerve and looking for a shocking sensation and a correct distribution. So for the median nerve I would tap on the wrist right here and try to see if I feel any shooting pains or numbness, tingling going into those median nerve fingers. Importantly if it runs retrograde up the arm or it goes to the ulnar digits goes to the dorsals in the hand that’s not a positive test for Tinel sign. I think it’s always interesting how much force you put on this looking back at some of the early studies of this in the 70’s and 80’s they actually would hold a reflex hammer 12 inches above the wrist and then drop it. That’s how much force they’d put on it so it’s actually more force than you think to really tap on that nerve.

The most sensitive and specific test on physical exam anyway for carpal tunnel syndrome is this Durkans compression test named for the author of the test in 1991 in Journal of Hand Surgery, is the
most sensitive and specific test for carpal tunnel syndrome and it’s a very simple idea overall and I’ve got a picture on the next page. You’re really just holding pressure directly over the median nerve and as I’ve mentioned with the Tinel sign it’s actually a lot of pressure. Durkan used 130 mm of mercury for the test and you can see him here pushing in on a blood pressure cup to show how much pressure he’s using. And again for it to be a positive test it has to reproduce the symptoms in the median nerve distribution.

So we have all these clinical exam findings and I think if you have one or the other sometimes it’s hard to put them all together. A gentleman named Brent Graham from Toronto developed this clinical diagnostic tool that he called CTS6, there’s 6 of these findings and then you get different points for each one and he showed that if you have more than 12 points your chances of having carpal tunnel syndrome was greater than 80%. As you can see that if you have numbness predominantly in the median nerve distribution as we talked about only in the index, middle and thumb, if you have symptoms awakening you at night another part of that history so most patients will say doc I just can’t sleep at night. I wake up and my hand feels like it’s asleep and most will say they shake it out. Now shaking it out probably won’t actually improve their systems really probably what it is, is waking up and getting the wrist out of flexion that makes it feel better. Thenar atrophy or weaknesses we talked about before the Phalen test, loss of the 2 point, and positive Tinel sign. So this is something that I use clinically to determine if patients have carpal tunnel syndrome. It kind of organizes things for me in my mind.
So after we’ve done the clinical examination a lot of times we will order testing to see if we are correct or not. It’s kind of like you think somebody has a fracture, you get an x-ray to confirm that. So electrodiagnostic testing is our go to and our electrodiagnostic testing is a big term that kind of covers multiple tests. One of them is nerve conduction testing the other one is electromyography and this is our current gold standard for confirmatory diagnosis. The specificity which is good for confirmatory tests is very high, somewhere in the range of 95-100%. So what is electrodiagnostic testing? We said nerve condition studies, and what we do and you can see in the pictures here that they’ll place sensors on the finger and you actually deliver a very small, hopefully not painful shock that runs across the median nerve and we test how quickly the nerve conducts the signal and if it could slow down then we know it’s getting compressed over the area that’s being tested. So we’ll test it down here at the wrist, we’ll test the median nerve up closer to the elbow, you can test it up by the shoulder to make sure that we’re really identifying the location where it’s getting compressed. The lower picture is the electromyography portion where the electrodiagnostic technician actually puts a needle into the muscles and checks how it responds and a lot of it can tell us that things may be going on where approximately is the muscle chronic denervated which would be a bad thing. And I just put some numbers down here of things we look at to see how slow things are being done at the carpal tunnel. So we look at 2 different things for nerve conduction studies we look at the motor you know how quickly is it conducting a motor signal and also the sensory as well. Sensory tends to get worse first that may be one of our early signs and once the motor starts to get delayed we start to see more advanced carpal tunnel. Again electromyograph is when we put the needle in the muscle and we look for different things such as sharp waves, electrical silence which is a very bad thing meaning the nerve is chronically denervated and also look at fibrillation potentials which might
be an early sign of the nerve not getting enough supply. One of my research interests is into ultrasound and its use in carpal tunnel syndrome. It’s nothing new there’s actually more than 10 studies looking at ultrasound for the diagnosis of carpal tunnel syndrome. I like it because it’s painless for the patients which is a great thing overall even though we’re delivering very minimal shocks it still is uncomfortable and no one really likes needles, they don’t like the electromyography portion either. I’m showing a picture here of me measuring how large the median nerve is at the wrist. The idea behind ultrasound is the median nerve is getting compressed in the carpal tunnel so it tends to swell just proximal to that and we can measure how much it’s swollen and if it’s over a certain cut off then we would say they have a positive diagnosis. I actually wrote a metaanalysis on this a few years ago and looked at the sensitivity and specificity and you can see that ultrasound actually does very well overall, sensitivity in the mid 70’s and specificity at 93% when compared to clinical exams. So it approaches that of electrodiagnostic testing but it doesn’t have the pain involved.

We also did a cost effectiveness analysis that we published last year looking at which one was better either nerve testing or ultrasound and we actually showed that in the hands of a specialist hand surgeons and the like, that ultrasound was the more cost effective first line test. So I actually use that in my practice to try to save patients a little bit of pain. It also saves money for the system too, nerve testing does cost money and at least in my hands ultrasound is free overall to the system.

So what can we do to prevent carpal tunnel syndrome? Unfortunately there’s not a whole lot we can tell. You can control the contributing disease so people that have diabetes we can try to prevent
them from getting polyneuropathy and swelling of their nerves. If they have rheumatoid arthritis we can try and control that with medications and if they had hypothyroid is we can correct that. But the true idiopathy carpal tunnel we don’t really have a good solution for at this point. There’s not a whole lot of evidence saying that changing your work habits or your ergonomics really helps and next we move onto different types of treatment.

So here is the list of things we try. I’ve got some more slides based on this as well. But splinting is a big one, take the pressure off the nerve especially at night so one of the first things we try is prescribing is night splints to try to prevent the flexion and extension people do at night. Non steroidal anti-inflammatories are being used less now there’s been some big studies that have kind of shown not a whole lot of benefit and we all know there’s a lot of GI side effects from a lot of the non-steroidal. Often times we’ll try corticosteroid injection into the carpal tunnel that also works as a diagnostic tool to see if they get better, that confirms their diagnosis. And then the therapist will often do nerve and tendon gliding exercises. Remember next to your nerve run all 9 tendons that flex your fingers and your thumbs so if we can kind of calm down the inflammation in those nerves and get them moving again, sorry in those tendons and get them moving, sometimes we can make the symptoms of carpal tunnel syndrome better. So we splint the wrist in neutral these are a standard we call it a cock up wrist point that kind of brings the wrist out of a little bit of flexion. Varying results, I think that sometimes patients don’t like wearing them at night they’re uncomfortable, people like to sleep curled up so if you do anything to change that sometimes they don’t sleep as well and don’t’ wear them. And the average duration of symptoms in patients treated non-operatively is somewhere between 6 and 9 months which is very un-American in a lot of ways. We
like to see things get better quickly, we all want a pill or surgery that will improves things quickly and therefore a lot of patients don’t tolerate the nonoperative treatment or don’t like it.

One of the more interesting studies that I’ve seen looking in the literature is by a Dr. Gelberman who way back in 1981, that was actually the year I was born, measured carpal tunnel pressures in patients who were getting ready to undergo carpal tunnel surgery. He actually put in a catheter into their carpal tunnel after they were anesthetized and checked the pressure. As you can see in patients with carpal tunnel syndrome their normal resting pressures were 32 mm of mercury compared to control patients who did not have carpal tunnel it was only 2.5. So we know there is something in that carpal tunnel that’s different. Either the bones have kind of settled over time as people get older, maybe there’s a genetic factor that for some reason the pressure is higher than it should be. Once the patient flexes the wrist to 90 degrees you can see that pressure jumps up a lot to 94. And wrist extension surprisingly was even more pressure than wrist flexion. You can see in the control patient, the ones that don’t have carpal tunnel syndrome, even with wrist flexion their numbers did not even approach the resting neutral pressure in patients with carpal tunnel.

I mentioned corticosteroid injections, this is a good option for us. We think that those tendons have maybe swelled a little bit and there’s a limited amount of space or volume in the carpal tunnel so if we give an injection we can decrease that inflammation and hopefully give more room for the nerve. So it doesn’t prove symptoms. David Green back in the 80’s did a study where he found out that corticosteroid injection or at least relief after steroid injection was the best predictor of outcomes with carpal tunnel release. So if patients get better from the injection you have a very high chance
that they’re going to get better with the surgery which as a surgeon you like to see, because we don’t want to do surgery on something that’s either the wrong diagnosis or a patient who won’t get better from it. There are some risks I think it’s low, patients that have any kind of immunocompromised state or are at high risk for infection, the result is the chance we could inject the steroids either into the nerve because we’re doing it kind of blindly or maybe lacerate the nerve with the needle although that’s very rare. So patients that get injections they do great for the first few months you can see that over 50% of patients have complete resolution of their symptoms with a steroid injection. But you can see it really does tail off quickly so for the first few months we’re still around 50% and then by 6-8 months only about 10% of patients still have relief. But as I said it’s a very good diagnostic tool, they get better with the injection they should get better with the surgery.

So I’m a hand surgeon I love to do surgeries so let’s talk about the indications for surgical treatment. Really the big ones are they either don’t improve with the non surgical means which I see a lot. You know we’ve got the people that come in they’ve had symptoms for 6 months and they’ve already tried hard with the their wrist splints, they’ve tried maybe an injection and they got better and then the symptoms came back, they’d be a good candidate for carpal tunnel release. And also patients that start to show very moderate to severe disease, so patients that already start to see their muscles are atrophying, they’ve already started to lose some of their innervation, we know from a lot of our studies that once they start to get that the chances of it getting better or coming back is actually not that great so we like to catch it before it gets to that state. There are a couple different surgical options there’s the standard open carpal tunnel release. There’s an endoscopic release which means you use a camera to look inside and cut the ligament from the inside out. There’s several different
minimal incision releases that do a lot of the release blindly to prevent big incisions inside the palm.

One of our more important surgical landmarks is something called Kaplan’s Cardinal Line and really this identifies the superficial arch of the arm or artery so we don’t injury it. So often times we’ll mark this out in the OR and try to look for different areas where we’ll place our incision just proximal to this so we don’t end up injuring the blood supply under the skin. Here’s a clinical picture of a case that I did earlier in the year looking at someone with an open carpal tunnel release you can kind of go back to the last slide and Kaplan’s Cardinal Line is going to come right across here marking the edge of the superficial arch and we’re going to make our incision in line with the border of the ring finger and bring it towards the wrist. Down towards the wrist of course you want to stay a little bit more ulnar because on this side the recurrent motor branch comes off at a point about right here, I drew a measuring line from the middle finger down, the recurrent motor branches come up here, we’re going to stay as ulnar as we can to avoid injury to that. And you can see here we’ve cut through the skin, this is some superficial fascia and aponeurosis over top of the carpal tunnel and I’ll show you the next slide, this is after we’ve divided the transverse carpal ligament and we’re looking at the median nerve here in the palm. So again we’re going to stay, here’s the recurrent motor branch, the ring finger is probably right here and we’re going try to stay a little bit on the ulnar side that to avoid damage. And we have to be careful because if you look here you can see the ulnar nerve and artery are actually very close to the field as well within about a centimeter of where we are so it is a balance, you can’t go too far ulnar or else you risk injuring the nerve.
I’ve actually converted over to more endoscopic carpal tunnel releases. It’s a more minimal incision and patients tend to recover a little bit faster which I’ll talk about soon. So instead of you having the incision out here on the palm, you’re actually making the incision proximally in this proximal risk crease. And I think that a lot of the problem people have at least in the earlier immediate post OP period is that when you put the incision right here in the palm that hurts a lot every time you move your thumb or move your had or make a fist you’re kind of pulling on the incision and that tends to hurt. So if you can take the incision and the pain out of the palm I think people get better a little bit quicker and their grasp returns to them faster. So you can see you put this tool in here and then it actually is a little bit like a V, there’s some plastic on either side here on the top it’s open and there’s a little blade at the very end which you can see in the picture right here and so basically we put it inside the carpal tunnel, we look up at the carpal tunnel ligament, and then slowly draw back and cut the carpal tunnel ligament. The median nerve will be sitting right over here, a lot of times I’ll actually turn the camera and look at the nerve, make sure I know where it is and then turn back and then do the carpal tunnel release and you can see here’s just a cross sectional view of it where all of your flexor tendons are below where we are. We actually put the endoscopic equipment right on top of the nerve, we kind of keep it below us or off to the side while we do the carpal tunnel release.

So I’ve always been told that 90% of patients get 90% better which is pretty good overall. I think almost everyone still feels maybe not quite normal and that’s that 90% better part of it. I think once you’ve had surgery things are never quite the same but a lot of times it’s better. The nighttime symptoms almost always get better relatively quickly. The daytime symptoms can linger a little bit and especially in patients that had a more advanced disease, a more severe carpal tunnels that had the
atrophy, sometimes their symptoms can last about 6 months or even more. Even though the numbness and tingling and some of the nighttime symptoms get better, grip and pinch strength can take up to 10 months which again is a long time. People want to get better quick and I think once the surgical incisions heal most people feel like they should be getting better or doing better but sometimes it does linger a little bit. In the 2 point discrimination we had that little wheel and we check how much they can feel in between 2 different posts, sometimes that’s primly abnormal especially in the severe group. We follow these patients a long time and in orthopedics in general and even in medicine it’s hard to follow patients for 10 years but our group was able to follow 140 patients that had open carpal tunnel releases for 10 years and they surveyed them and about 75%, so 3 and 4 were still completely happy with their surgery and all of their symptoms were gone at 10 years. That’s a decent response to the carpal tunnel surgery. It’s unpublished research that I’ve been working on comparing the severity on nerve testing to how quickly their symptoms resolve. If we think that the mild carpal tunnel patients get better of both their nighttime and daytime symptoms within a week, the moderates take 2-4 weeks and as I said the severes take 6 months. We had about 85 patients in this cohort and there is still probably 6 or 8 of the severes that are more than a year out and they still feel some daytime numbness. That’s the reason we want to get to it early before they get to that severe state.

After the surgery, especially in the open carpal tunnel and even so in the endoscopic group as well, people tend to have pain in the palm here. We call that Palmar pain or Pillar pain, after we’ve cut that transverse carpal ligament, the carpal tunnel ligament the one that’s really thick and sounds like celery when we cut it, patients do have tenderness in that area. You can see the numbers here so
even in a month about 40% still have pain there. At 3 months a quarter, even at 12 months, those are the unhappy patients that 6% the unlucky 6% that still has the pain they’re kind of a little bit miserable. It happens because we change the carpal arch. Remember it’s a tunnel, the ligament sits on top. I think after we cut it there’s a little bit of settling that occurs, I think we change a little bit of the anatomy in the wrist. We also have those edges of the transverse carpal ligament if we cut it they open up a little bit to make more space and I think they’re a little bit tender when we push on them or grip or do things like that.

So there are a group of patients that for some reason don’t get better, I earlier reported 90% of the people do 90% better. We think that anywhere from 2-3% of patients do get a recurrence of their carpal tunnel symptoms. Sometimes maybe we had the wrong diagnosis initially and we try so hard with the history and physical exam to really narrow it down. Some patients will have cervical radiculopathy causing numbness in the fingers and we do a carpal tunnel release and maybe it was their cervical radiculopathy all along causing their problem and not the carpal tunnel. They can have other areas of compression remember I said the carpal tunnel nerve, the median nerve can get compressed further up in the forearm and that could be contributing as well. And sometimes the transverse carpal ligament is not fully released and leaves an area of compression that can cause persistent symptoms.

The bad things that can happen with carpal tunnel syndrome one of them is you can cut the median nerve which is in one of those disaster cases. Even in open carpal tunnel release we’re cutting directly down on top and we kneed the scissors or knife and as careful as we are there is a very small
risk of actual laceration of the median nerve. But tendons as we said run right next to it so sometimes you can cut some of the flexor tendons to the ring and small fingers are next most common. And you’ve got infection, infection is pretty rare, .5% or 1 in 200. I just had a picture of thankfully not one of my cases, but of one I saw of someone that had their median nerve cut during an open carpal tunnel release.