#339 Hand and Wrist Pain with Dr. Ted Parks

[The Curbsiders Disclaimer]

[The Curbsiders Podcast theme]

Paul: All right, welcome back to The Curbsiders. As longtime listeners know, one of my favorite things in the entire world is watching Matt Watto work up the right amount of energy to actually introduce the podcast. But sadly, he is not here. But happily, we have someone just as good if not better, we'll say better. I'm going to feel fairly rested about that. I'm joined today by Dr. Molly Heublein. Molly, how are you?

Molly: I'm doing great. Thank you, Paul.

Paul: We are here at ACP in Chicago and we just had the good fortune to be joined by Ted Parks, who you all know and love at this point. But before we get to that, Molly, will you remind us what we do on this show?

Molly: Sure, Paul. We are The Internal Medicine Podcast. We use expert interviews to bring new clinical pearls and practice changing knowledge.

Paul: We had a great conversation with Dr. Ted Parks. As you know, he's an orthopedic surgeon with a specialty in sports medicine, joint replacement, and reconstruction arthroscopy in Denver, Colorado. He is also author of the book, *Practical Office Orthopedics*, which is tremendous. In this episode, Dr. Parks talks us through hand and wrist pain, which is the subject of the episode. So, that works out great. We specifically talk about the approach to pain at the base of the thumb, things like de Quervain's tenosynovitis versus CMC arthritis. We talk about that old standby carpal tunnel syndrome, and we talk a little bit about the approach to diagnosing and managing trigger finger. So, unless someone has some spectacular pun, why don't we get to the episode and I'll just pause to wait to see if Molly has anything for us.

Molly: I'm googling it real quick.

[laughter]

Molly: But no.

Paul: Ted, welcome back. It's great to see you again. This is, what our, fourth recording?

Ted: I think this is number four. Yes.

Paul: Congratulations.

Ted: Four time's a charm.

Paul: You'll get the smoking jacket next time around.

Ted: [laughs] Fantastic.

Paul: I guess, we'll start out with some of the icebreaker questions. You have a number of fascinating hobbies that we've talked about before. Have you picked up any new interesting hobbies during COVID or you are still just building cars and designing video games?

Ted: Pretty much just building cars, designing video games. I had an old hobby that I resurrected during COVID. COVID really slowed our office down. So, I had time to do things I hadn't done for a long time. At one point in my life, I wanted really badly to be a portrait artist, and I did some portrait painting, and got a chance to do another one of those, it takes me forever to do. So, I had the time finally to do it.

Paul: Yeah.

Ted: I worked on that hobby a little bit. But other than that, I can't think of anything new and exciting or even just new.

Paul: [unintelligible [00:03:02] qualify. What was the last portion that you painted? Are we talking pets, family members, or loved ones?

Ted: Family members. I don't know. I guess, I could show you. This is something that'd be easier to see than to hear about, but it was a picture I took on my phone of my wife, actually, that reminded me of a portrait by one of my favorite artists, a guy named John Singer Sargent. I kept that in my phone, wanting it someday to make it into a portrait, and that pandemic gave me the opportunity to do that. So, there's the portrait there.

Paul: That's the portrait?

Ted: Yeah, the photograph of that. [crosstalk]

Paul: Who are you?

Molly: Let me see.

Ted: [crosstalk] you can warm it up, so that's the portrait. Yeah.

Paul: Just for the listeners at home, this is a photorealistic paint.

Ted: [laughs]

Paul: I cannot, I cannot with you. This is unbelievable.

Ted: Oh, thanks. That's nice.

Molly: That is beautiful.

Ted: Thanks.

Paul: That is gorgeous. Wow.

Molly: Wow.

Ted: If it were a Singer Sargent, she'd be holding a book, but she's got her phone, which is a really cool timestamp, because by now, that's all you can tell if you look closely at, it's an obsolete phone that's clearly from a couple years ago. So, I really liked having the phone in there to index what time this was done.

Paul: That's incredible.

Molly: Wow. I think we have asked you most of our regular questions. What I'm curious about is, can you think of something in the last few years that has changed in your clinical practice or something that you've changed in your teaching techniques, something that you're working on?

Ted: Yeah, I really am trying to be more open-minded. I think in my practice, for sure, I'm always trying to do too much in too little time. I'm mentally trying to make things more efficient and take shortcuts. Usually, it backfires and the shortcut actually makes me end up putting more time into something, because I missed something I shouldn't have missed. So, I'm really trying to keep my eyes open more and not just put my nose to the grindstone so much.

Molly: Excellent advice.

Paul: All right. Well, with that, why don't we roll onto some cases? We have a bunch to talk about. We're focusing on the hand and wrist today. So, I'm going to tell you about our first patient. She might be our only patient, actually, if memory serves. This is Ms. Kate O'Hare. She's a 50-year-old woman. She has a past medical history of high blood pressure and hyperlipidemia. She's coming to your office for the evaluation of right wrist pain. Ms. O'Hare has been working in the production line of a pretzel factory for years and just trying to keep this fully centric. Over the past few months, she has begun to experience pain at the base of her right thumb. She noticed this is mostly when cutting the pretzel dough, which she does with a knife in her right hand that she is right hand dominant. She denies specific antecedent trauma or injury. The pain has not improved with acetaminophen shockingly and she has not tried anything else for her symptoms.

I think before we get even too deep into Ms. O'Hare's specific case, I just wonder, I feel you always have these amazing frameworks for regional approaches to the body. So, when someone comes to you with hand and wrist pain, do you have a just general overall approach, but we get into the nitty-gritty?

Ted: Yeah, the first thing I'll try to do is just separate trauma from non-trauma. She would land in the non-trauma bucket, so that excludes worries about things like a scaphoid fracture. These things that can be broken or torn in the hand or wrist. I'm going to eliminate all of those and now I'm going to concentrate on her on just the atraumatic sources of hand and wrist pain. You can even divide those up into ones that are the result of nerve compression like carpal tunnel, ones that are a result of wear and

tear of joints, and ones that are result of tendonitis. Those are the three sub buckets. Right now, it sounds she's not going to have a nerve impingement problem because her chief complaint isn't numbness and tingling. Now, we've got her narrowed down to two of the sub buckets. I'm not yet sure whether she's in the arthritis bucket, joint wear and tear, or she's in the tendonitis bucket.

Molly: Excellent. For those of us who have forgotten most of the anatomy that we learned in medical school, what are the key anatomic structures and landmarks that a primary care provider should know when evaluating the hand and wrist?

Ted: I don't think there are any. I mean you have to be able to--

Paul: [laughs]

Molly: I like it. There's the thumb.

Ted: We spent so much time in my medical training on the snuffbox. The snuffbox we would think it was more important than the heart.

Paul: [laughs]

Ted: It's absurd really. I think if you can identify which of the digits is the thumb, it's the shorter chubbier one. That's all you need to do. That's all the anatomic sophistication you need to figure this stuff out.

Paul: We're at this point now where you're starting to narrowing things down. Historically, I guess, why don't we start with history first since we're internists here? What would point you more in one direction than the other? What kind of questions are important to ask you when you have a patient is coming to you with, at least, new pain, but someone who's maybe presenting with chronic-ish pain of their thermal wrist?

Ted: One of the things that she mentions is the location and that's key. She's having pain at the base of her thumb. Already, I'm zooming in on two diagnoses that are super, super common there. One of them would be arthritis of the first carpometacarpal joint. The metacarpal is this rod-shaped bone. It articulates with a thing about the size of a sugar cube. There's an opportunity there for wear and tear, because unlike the fingers, which move like hinges, the thumb moves in a lot of different directions. If you look at your own hand, there's a big wad of muscle that operates the thumb. A lot of more force than the fingers and a lot more directions of motion. The joint at the base of the thumb, the pivot joint wears out in humans a lot. That's on my differential diagnosis.

The other thing that causes atraumatic base of the thumb pain is deQuervain's syndrome, which is a tendinitis. So, those two are vying for her diagnosis right now.

Molly: What actually is the underlying pathophysiology for deQuervain's?

Ted: DeQuervain's tendinitis comes from the fact that the tendons that operate our wrist and fingers get from our forearm to their destination by passing through these short little straws, these little tendon sheets right about at the level of your watch wristband. If I could peel off my skin right there and look where my wrist is-- I've got a picture of it, I could show you, but that doesn't help much for the audio portion. The tendons pass through this section about the length of a cigarette, but that's like a straw and they help centralize the tendons and guide their pathway forward into the fingers.

The ones that go to the fingers are really going straight ahead without much deviation between the forearm and the fingers. But the ones that go to the thumb, they have to take a turn to get from the forearm, which is straight ahead off to the thumb, which is off to the side. If you think about a rope going through a little straw, the ones that go straight don't really chafe against the edge of the straw very much, but if they exit the straw, and then you make them take a big turn to the left, and then you rub them back and forth a lot, there's an opportunity for the tendon to chafe against the edge of the straw or in this case the sheath. In this case, the first extensor compartment tendons which are in that straw and headed off radically once they exit the straw, they chafe against the edge and that's what sets up this tendinitis, and why you don't see in the regular fingers.

Paul: For Ms. O'Hare, is there anything--? I guess, what I'm understanding is right now our differential is this CMC degenerative joint disease versus deQuervain's syndrome. For her, is there anything in her history that would point you in one direction or the other in terms of the occupational risks? Are they about the same for both diagnoses? Is there anything that we have right now that can point us in one direction more than the other one?

Ted: No, I think we've got as much as we can milk out of the history. So, we got to shift gears and go to the physical exam.

Paul: All right, this was what I afraid of.

Ted: [laughs]

Paul: Talk us through it. For seeing the patient, she gives the history, you're still between the two diagnoses, how do you approach it? Where do we go from here? Because I can tell you that my exam is mostly making a thoughtful face and just mashing on the fingers instead of looking-

Ted: [laughs] Yes.

Paul: -often in the middle distance, is there something probably more specific that I should be doing to evaluate?

Ted: Maybe some gentle nodding would help.

Paul: [laughs] Yep, [crosstalk] to the patient.

Ted: [laughs] No, we're really lucky for base of the thumb because we have a couple of tests that are actually useful, and they're simple, and easy to administer. That's the Finkelstein's test. To do the Finkelstein's test, you put your thumb down into your palm and then you close the fingers around your thumb. Your thumb is trapped underneath your fingers in your palm and then you tilt your wrist down toward the floor, toward the pinky finger side of your hand. What that will do if you have to deQuervain's syndrome? It will light up profoundly. It's one of the best tests we have because it's very, very sensitive and specific. It's a winner test. That test will easily sort her out toward the deQuervain syndrome diagnosis.

The other test which we use to find first CMC joint arthritis is helpful, but not as pathognomonic and that's to take the thumb and press it toward the wrist, and then think about grinding peppers up with a mortar and pestle. We're going to go around in a circle under that compressive force. What we're doing inside the thumb is, if it's arthritic, we're taking the exposed bone of the base of the metacarpal and grinding it against the exposed bone of the trapezius, the carpal bone there. If there's no cartilage there to protect us, they will feel and hurt as those bones rub against each other. That's a good test too, but the Finkelstein is a bulletproof test.

Paul: All right. For Ms. O'Hare, let's say, we do your bulletproof examination. Actually, she has a little bit of tenderness with palpation over the radial styloid and she has a markedly positive Finkelstein's test. You jerk her hand down, and then she jumps off the table, and is angry with you. The CMT compression test is not overtly positive that may be a little bit uncomfortable for her. Based on all of that, we feel pretty comfortable making a presumptive diagnosis of de Quervain's for her. [chuckles] Now that we have the diagnosis, what do we do with it? What kind of recommendations can we have in the primary care office, what kind of things can we do to help her?

Ted: Yeah, great. It's an inflammatory condition. One way to start would be with oral anti-inflammatory medications. I usually just ask what they have in their medicine cabinet. I don't prescribe anything for them. I'm not convinced the prescription medications are any safer or more effective than what they've got in their medicine cabinet. I ask what they have and if it's ibuprofen, I'll usually ask them to take three of those 200 milligram pills three times a day with food for maybe just a week, not a long-term course of that.

In combination with that we can give her a thumb spica splint. This is a Velcro appliable brace that immobilizes the thumb and the wrist in the very distal part of the forearm. Because if you think back about that tendon gliding in and out of that little stubby straw, if we stop that gliding and chafing, the inflammation can come down. Once the inflammation comes down, the tendon reverts back to its normal dimensions and it glides through the straw more easily. So, that's why that works sometimes and definitely it would be a good first start for that.

Molly: If she tries that for a month or six weeks and really isn't feeling better, what next step options might you be able to offer?

Ted: Yeah, you bet. There's always the option of doing nothing. Some patients feel it's a minor nuisance, but they're not really ready to do anything more invasive than that. But if it really bothers her

and she needs treatment, we have good success with a cortisone injection into that tendon sheath to decrease the inflammation of the tendon. DeQuervain's cortisone injection would be a good option for her if her pain persists and it's bothering her a lot.

Paul: Can we go back for a second? Along those lines, I feel this is where I fall down in the opposite. I'll start with conservative management with the splint and the NSAIDs, and I won't give the patient any time for us to expect things to get better or not. So, how long can we reasonably wait or should we wait before we actually start thinking about escalating treatment to the cortisone injection?

Ted: That's a great question. I would say that the minimum time would be two weeks. I would almost ask them to give me two weeks before we do anything more aggressive than that including a cortisone injection. I would say after six weeks if they're not seeing improvement, it's unlikely to get any better. If at six weeks it's not gone but it's still better every week, I would write it out and keep going until she sees a couple of weeks in sequence where there's not improvement one week compared to the other.

Paul: And with the cortisone injection, as we're talking about prognosis with that, is that something that you repeat over time or do you expect resolution of symptoms and then say, "Yeah, I guess, what options do we have moving forward from that?"

Ted: Yeah, so, you can repeat the injection. We like to wait at least three or four months between injections. If it works like magic for a week or two, it helps me because it means I've got the right diagnosis. If it were CMC joint arthritis putting it in the sheath of the first extensor tendon shouldn't make any difference. It's even valuable for me if it works only for a short period of time like a week or two. If it works for many months and let's say, next year, she has the same thing because she's doing another task at her job, where she's overusing her hand and wrist, we can do that again. But if we find that we're doing it over and over again and she wants a more long-lasting solution, there's actually a surgical procedure to open up the sheath, and when you open it up it heals with slightly bigger dimensions, and you widen the sheath to help decrease the friction between the tendon and the sheath.

Paul: Gotcha. You're not surgically doing anything with tendon itself like it [crosstalk] not mess with that, but actually just got space to do [crosstalk].

Ted: Correct. It's so rare operation to have to do. So many times, the injection works best or works good enough that you don't have to go to the operative solution. One of the examples of deQuervain's syndrome that I see more than any other is a pregnant woman or actually, a postpartum woman. In the months after delivery, it's very common to have this in the mother. Other people observe that, people write about that. I've never really seen a great explanation as to why it would be like that, but it's definitely something that's a thing. Usually, that person gets an injection and by the time it wears off, they're no longer immediately postpartum. Whatever it is that caused this, went away. So, it's a one and done.

Paul: Which is ideal.

Ted: Yes.

Molly: And if her Finkelstein test is negative and you are more suspecting CMC arthritis, what would you change in terms of your management? How would you approach that?

Ted: I think the first step could be the same, which would be oral anti-inflammatory medications and immobilization in their thumb spica splint for a short period of time, maybe a week or two. Because arthritic joints, if we splint them too long gets stiff and the muscles around them atrophy. We aren't doing anything long term to improve the condition and move the ball down the field. So, I would maybe start with the same program and if she's not better in a couple of weeks to a month then move on to an injection, this time into the first CMC joint.

Molly: Ms. O'Hare returns to your office several months later, her thumb and wrist pain have completely resolved. She's composed a sonnet about how excellent a doctor you are, which she shares with you. It's awful. Unfortunately, Ms. O'Hare has a new concern. She reports that her ring finger on her right hand keeps getting stuck in the flexed position after making a fist. The finger may eventually pop up, but more commonly, she has to manually unstick the finger with her left hand. She denies any injuries. Shockingly, acetaminophen has not helped. [chuckles] So, for this kind of condition what's going on with the anatomy? Why is she having these stuck fingers?

Ted: Yes. With this one, the diagnosis is done. We've made the diagnosis. There's only one thing in life that can cause what she's describing and that's called a trigger finger. I don't know why it would be called a trigger finger because I don't use my ring finger to pull the trigger on a gun if I'm using a gun. I don't use my thumb or my pinky and any of those fingers can have this condition. I don't know where the name comes from. But what's happening there is the flexor tendon, the tendon that flexes the finger into the palm. It also runs in, not so much a sheath, but a little hoop. If you think about the eyelets on a fishing line that keep the fishing line close to the fishing rod, the tendon passes through those hoops underneath our skin. The very first one which is called the A1 pulley, which stands for the first annular pulley, it accepts the tendon approaching it from a number of different directions and angles. So, again, it's a chafing problem.

The second pulley has already gotten the tendon straightened out by the first pulley. Every pulley down the line has gotten it even more straightened out. The one that gets the most action is the first pulley, because the tendons approaching it from different angles and directions. There's an opportunity for chafing against the rim of that. We call them pulleys. They have nothing to do with pulleys. They're really little croquet hoops or something. Yeah, I don't know where these names come from. But anyway, they're called pulleys and chafing against the pulley can cause a nodular tendinitis on the flexor tendon. Imagine the tendon has a bulbous little pea size bump on it and that gets hung up in the pulley. It slides through when you flex your finger, but it's very hard to slide through the other direction when you try to straighten your finger. You can pull hard enough to pull it through and it usually pulls through the big old clunk and that's what triggering is in the trigger finger.

Molly: That makes a lot of sense. I think all of our listeners have your book by now, but it has some really great pictures of exactly what you are describing.

Ted: Yeah, wish I could share the pictures.

Molly: Yeah. I think that makes so much sense because I never really understood why bracing worked, why that would help, and that makes a lot of sense that there is this inflammatory swelling, and if we can allow that to come down.

Ted: Yeah. The neat thing about bracing is, you can use a little brace that just immobilizes the distal interphalangeal joint way out toward the tip of the finger. Just by decreasing the excursion of the tendon that much by mobilizing that one joint, you can keep that nodule from rubbing against the place where it's been rubbing and the swelling of the nodule can go down. So, bracing is certainly an option and it doesn't have to be the whole hand, wrist, arm, shoulder, body cast type brace. Just a little guy on the end of the finger does the job.

Molly: I was definitely recommending full finger. Very, very [crosstalk]

Ted: Oh, sure. [laughs]

Paul: Because I'm not quite sure in terms of where my patients are actually able to find these braces, are you able to find these typically in pharmacies or these things you have in the office or how-- [crosstalk]

Ted: That's a good point because in our office, I just wander over to our hand provider and I open the door when no one's looking I just grab one.

Paul: Right.

Ted: It would be harder for you all to get them. You could use, I guess, the old popsicle stick tape combo. But this probably is going to need to be on for weeks and that-- You can't wash your hands with that. It might be more difficult for you guys to come up with a splint that would be easy to comply with.

Paul: Gotcha. I think we're touching on the treatment options. Before we get there, it sounds there's no other special physical examination features like sometimes, I will just make the patient's finger pop just to prove to myself that it’s actually there.

Ted: No, you should.

Paul: Is there anything else in examination that is super suggestive or helpful for us here?

Ted: Only one thing and that is if you palpate in the palm, a centimeter or two proximal to the metacarpophalangeal joint, a little crease where the finger attaches the hand go one centimeter or two proximal, and press hard there. A lot of times you can feel that pea-sized nodule on the tendon. As they wiggle their finger, you feel they glide back and forth on the tendon. Things are close enough to the skin that you can actually feel that sometimes. Finding that tender nodule is just another physical exam finding that supports that diagnosis. But for sure, the winner is the triggering, especially I do what you

do. I ask them to reproduce the triggering, so, I can convince myself that this really is what's happening. Once you see it once you'll never forget it. It's very, very profound.

Paul: Yeah, it's a satisfying diagnosis because it is so easy sometimes.

Ted: Yes.

Paul: I guess, the same questions for the splinting we talked about before with the de Quervain's, how long is long enough and when should they be wearing the splint? Is it all day all night? Again, where I fall down, I think, is counseling around something, I'm like, "Yeah, just get yourself a splint from the pharmacy and we'll see you in three months," which is probably not satisfying for anyone. So, what's a better way to do that?

Ted: This splint you probably have to wear a full time. It's funny because patients tend to complain most about triggering in the morning when they first get up. I think that people sleep with their fists clenched and I don't know maybe if your hands get swollen at night or something, I don't know why they would be more prone to this. But it's definitely observed consistently that the morning is the time when triggering is the worst. I would wear it at night for that reason. Then during the day, that's when we're using our hand and rubbing that tendon against the edge of the sheath. So, during the day, too. I wear it day and night. Remember, I'm just immobilizing the distal part. So, it isn't a huge incumbrance. I would ask a minimum of two weeks and if they're hot to try to two weeks and claim that they're not having any improvement, we could go to the next step and maybe a maximum of six weeks. At six weeks, if they're not getting better, they can either live with it or go to the next step to get it treated.

Paul: All right. I think we're there. What does the next step look like? Is it cortisone for everything or do we have any other options for this patient?

Ted: I think cortisone is the best option. This is a place where cortisone really shines. A cortisone shot here works so effectively, we hardly ever get to do the fun little surgical procedure that we do to take care of trigger finger, which is also really fun and satisfying. But cortisone injections work really well here.

Molly: And I'm probably never going to do these in the office, but I assume it's a smaller dose that wouldn't be for a knee or a hip.

Ted: Yeah. Half cc which for most cortisone preparations is 20 milligrams of the corticosteroid and then another half cc of lidocaine.

Molly: Okay.

Paul: And you mentioned the surgery being fun. I'll never be doing that either. But for you, in terms of patients are often like, "What does this surgery entail, if I were doing some counseling?" So, what does surgery look like? Should we actually get to that point?

Ted: Yeah. It's different from what you might intuit. The way I've described it, the troublemaker is this nodule on the flexor tendon. So, we're attempting to go in with your surgical knife and whittle that down, so that the tendon no longer has that bulbous nodule. You can do that for sure, but what is a problem is that the connective tissue in the tendon would be injured badly enough by that. The rupture rate is really high if you treat it that way. Instead of doing that, we go to the other side of the equation and cut the pulley, that hoop that the tendon is getting irritated through. When we cut it, we let it just stay cut and a little bridge of blood probably connects the two ends of that pulley or that hoop and effectively we've increased the volume or the size of that hoop. By increasing its diameter, we lessen the chafing against the hoop.

I always wondered why then the second hoop wouldn't develop this, because isn't getting the guidance it used to get. But I've never ever seen and never really read much about the second pulley causing triggering. So, once you get the first one enlarged, it tends to take care of the problem.

Molly: When people have the first round of cortisone shots and it usually fixes the problem, is it frequent that they will have a recurrence or--? [crosstalk]

Ted: Certainly, not unheard of, but not frequent.

Molly: But not-- Okay. So, usually, they are just [crosstalk]

Ted: This is one and done deal.

Molly: Yeah. Excellent.

Paul: All right. She gets a trigger finger, she eventually gets a cortisone injection, Ms. O'Hare, and it works wonders, and she is elated. She has written a haiku about the experience it is also awful. As a result, Ms. O'Hare's bosses at the soft pretzel factory are moving her to the front desk to spare her more hand pain. The job involves a great deal of typing and data entry. She types, and she types, and she types more. Over the next few months, she develops numbness, and pins and needles in the fingers of her right hand specifically in the thumb, the pointer, and the middle finger. The pain is especially bothersome at night. She says that sometimes she tries to hang your arm off the side of the bed just to alleviate the pain though it doesn't really help all that much. She also feels she's gotten a little bit clumsier with her right hand. As a reminder, she is right hand dominant.

I think one of the reasons we save this complication for the end here is because I think all primary care doctors, as soon as someone says, they have any hand or wrist pain makes the diagnosis for carpal tunnel syndrome [laughs] and they're right maybe about half the time. But I think some of the features probably would prompt us to think about that. I wonder for this patient are there any historical features that jump out and are we headed in the right direction if we think this might be carpal tunnel syndrome?

Ted: Yeah, we're definitely headed the right direction. She's made it easy for us because she's complaining not of pain, but of numbness and tingling. We know this is a neurologic problem or

condition. She's telling us it's in the median nerve distribution like textbook. Thumb, index, middle finger, if we asked her some more, she'd probably even say, “Even the radial side of my ring finger.”

Paul: [laughs] Specifically [crosstalk]

Ted: Which we see exactly textbook.

Paul: [laughs]

Ted: She's helping us, she's leading us right down the middle of the fairway on this one. What doesn't make sense and we see sometimes is, the first two conditions she had, people calling that carpal tunnel. It is true that it's tempting to bunch all hand and wrist problems into being carpal tunnel. Typically, carpal tunnel isn't as much pain as it is numbness and tingling. Someone who has pain only and no numbness and tingling in my book doesn't have carpal tunnel. I suppose there are rare instances where that might happen, but I'm looking for numbness and tingling, the pins and needle feeling that she's describing. It's a classic thing.

Now, I know I'm in the nerve bucket, and I know that it's either a peripheral nerve entrapment, and there are a couple locations along the length of the nerve where that can happen, or it may be something from the cervical spine. Now, the next task is, “Okay, we've got to figure out where along the pathway of the nerve, all the way starting in the spinal cord and ending at the tip of her fingers, where's this nerve impingement happening?”

Paul: The book, we shouldn't keep reading the book-- Oh, I'm going to keep reading the book.

Ted: [laughs]

Paul: The book is so good, but I also specifically the explanation of the pathophysiology is why this is more inclined to happen, I thought, was fascinating. I sort of changed the way I thought about that. Would you mind talking us through why the median nerve is specifically prone to this condition and what factors have to be in play for carpal tunnel to develop?

Ted: Yes, I'll do my best because it's hard for me to explain that even with drawings and visual aids, but let me do what I can. The thing that really intrigued me when I started learning about this is that it turns out that this nerve malfunction that happens with peripheral nerve compression is really a vascular phenomenon. The nerves are running these ATP driven membrane pumps to maintain the membrane potential you need for an action potential. That's very expensive. You have to run a lot of energy through those pumps 24/7. If you do anything to induce ischemia, then it doesn't take long for those pumps to slowly motor down to nothing. Then you lose the action potential because you lose your membrane potential. If you just press your thumb deep into your palm and pull it off, you'll see that it blanches for a second and then it pinks up. That's just because the pressure of your thumb is exceeding capillary filling pressure. So you are creating-- If you did it long enough, you could actually cause skin necrosis from that.

Paul: Let's not do that though.

Ted: Let’s not. We won't do that today. But the principle is the same. Pressure can cause ischemia. What happens in the carpal tunnel, the median nerve is in there in a place that does not have the flexibility to accommodate any swelling. It's got a bony firm floor, this tunnel, it's got two bony firm walls, and then the roof is this transverse carpal ligament, which is thick, and fibrous, and unyielding, and not flexible. It's in a physical tunnel. If anything in that tunnel creates pressure, the flexor tendons don't mind it, because they are very resistant to pressure and ischemia. But the nerve malfunctions because the pressure physically stops flow of blood to the axon. Without blood, it can't run the transmembrane pumps and without that there's no membrane potential, without a potential, there's not an action potential or conduction the way we expect it. So, you start losing sensation which is the numbness that she's experiencing.

Molly: And how on exam do you try to differentiate, actually, carpal tunnel versus a cervical radiculopathy?

Ted: It's hard to do on exam. We have some tests and they're not great, honestly. There's the one where you tap on the palmar surface of the wrist, so you are tapping right over the carpal tunnel, and these membranes if they're not really getting a good blood supply and the transmembrane pumps aren't doing their job very well, it's very easy with just physical tapping to depolarize the membrane and cause that shooting into the fingers. That's Tinel’s sign. There's also Phalen’s test where you put the backs of your hands against each other with your elbows up in the wing to position right and left, and what you're doing there, if you imagine the carpal tunnel, if you take a piece of paper and just roll it into a cylinder, and then you take that cylinder and kink it in the middle, that compromises the dimensions of the tunnel and that's what we're doing when we cock our wrists down like that in Phalen’s test. If you hold it for 30 seconds or a minute, and you recreate or worsen the numbness in the median nerve distribution that's a positive test for carpal tunnel.

It's really the same thing that happens ergonomically when you use a mouse or a keyboard, and your wrist is either flexed too much or extended too much, you're kinking that tunnel in one direction or the other and compromising its dimensions in increasing pressure on the median nerve. All the ergonomic modifications that people do to their workspace are to try to keep their wrists straight. The Velcro wrist brace that we use for treatment is trying to keep your wrist straight. If you keep the wrist straight, then the tunnel is as open as it can be, it takes pressure off the nerve.

Molly: I think we saw a lot of work from home, COVID cases of carpal tunnel.

[laughter]

Ted: Exactly.

Molly: Yeah. And I'd say the Phalen, having someone hold it there for a minute, feels like a long time in the office.

Ted: It does feel like a long time.

Molly: Yeah.

Ted: I usually say, “Okay, minute is up.” It's actually been like 18 seconds.

Paul: [laughs]

Molly: Yeah, exactly.

Paul: I feel I see presumptive diagnoses in Internal Medicine offices specifically of bilateral carpal tunnel, which just feels weird to me. Can you talk to me a little bit about how common is that and should that prompt this thing about cervical radiculopathy or is there any way to help us differentiate those things?

Ted: Yeah, I think it definitely exists. I don't think it's common to have bilateral disease. Let's say that you need to break up your driveway, and repave it, and you go out and rent a jackhammer, and spend the Saturday afternoon busting up that concrete. I wouldn't be surprised if you had bilateral carpal tunnel from just the swelling of the jackhammer pounding into your palms. I guess there are instances where you almost expect bilateral disease, but that's unusual. There are a lot of things we have to keep in mind when we look at compression neuropathies and try to figure out where they're coming from.

One is back to location. We know that she's got the location of the median nerve, because it's her thumb, her index, and her middle finger. But if it goes from there all the way up her arm to her shoulder, that's not typical of carpal tunnel. Typically, carpal tunnel syndromes are isolated to the palm, the hand, and the fingers, and not proximal to the wrist. If their symptoms are proximal to the wrist, it makes me wonder, “Am I really on the right track?” Because the more proximal nerve impingement lesions like a cervical radiculopathy, the C6 distribution is the index finger and the thumb, which we could certainly apply here and that would be more longer track of symptoms down the arm by the elbow, shoulder, etc.

Paul: Gotcha. Anything else an exam like thenar wasting, I feel they are brought up sometimes. Is there anything else, so, we should be looking for specifically that would help us out here to nail the diagnosis?

Ted: Yeah, the thenar wasting, especially in a younger person-- it's something that you can see in older people as part of aging. But in a younger person, if you see thenar wasting, it definitely indicates a chronic denervation of the thenar muscles. That you see with median nerve dysfunction, but only if it's been there a long time. The most important thing about finding it is that again, tells us this is long-term and chronic. Probably, a lot of the symptoms that are bothering our patient may not be reversible. A lot of times we still treat them and we treat them to arrest the progression, but we have to explain to them that in this case, it's not realistic to have our goal be to eliminate symptoms. It might happen, not likely. So, just to make sure expectations match results, it takes a couple extra minutes of explanation in that patient.

Molly: And you mentioned the wrist splints to keep the wrist straight to avoid kinking. Are there other conservative treatments that you recommend? With the wrist splints, how do you counsel patients on how to use those?

Ted: Yeah, the wrist splints work remarkably well. The neat thing about the wrist splints is, really start by just using them at night. They're not nearly as cumbersome as if you had to wear it night and day. The reason we use them at night is, people often sleep with their wrists bent just unconsciously, that's how they prefer to sleep. And so, all night long, the nerve is getting compressed and if you just use it at night and even just for a couple of weeks that can be all you need. So, it's really safe, simple. You could buy them at the pharmacy. You don't have to have a medical supply company set you up with these.

Molly: I was just going to ask about like $15 ones online fine, okay perfect?

Ted: Just as good as the $300 ones that we sell in our office.

Molly: Excellent, wonderful. Uh-oh. [laughs]

[laughter]

Paul: Great. And then in terms of the role of cortisone, I feel I'm sensing a pattern here.

Ted: Yeah.

Paul: When do you consider that and are there other things that help you prognosticate how patients are going to do in terms of the response to them?

Ted: Yeah. I favor a cortisone injection, maybe more than a lot of providers in orthopedics for carpal tunnel. I like it because it is diagnostic and therapeutic when you use it. In other words, it's not always textbook like this case, where the distribution is exactly the right fingers and its numbness, and tingling, and pins, and needles. Waters can be a little more muddy than that. I'm at a point where I'm not getting anywhere with conservative management, meaning a wrist splint at night, oral anti-inflammatory medications, and I want to try a cortisone injection. And I do the cortisone injection and I get no relief, then that's the patient where I really am wondering, “Am I on the right track? Am I getting fooled? This is some other compression neuropathies elsewhere along the path of the nerve.” That for me is the time to send for EMGs.

If I do the cortisone injection into carpal tunnel, and the pain is gone, and it's gone for a week, or a month, or six months, or forever, number one, it confirms, “Okay, I am on the right track. This is carpal tunnel syndrome,” because a shot of cortisone in the carpal tunnel isn't going to touch a cervical radiculopathy. That won't improve it at all. It also means that if they come back and say, “Wow, doc, that was great for X number of weeks, but now it's back.” The fact that it went away before it came back tells me that it's reversible. Only patients who don't get better with carpal tunnel surgery are people who don't have carpal tunnel or people who have it, but it's so chronic and severe that it's not reversible. So,

if they got relief and it comes back at some point, that's a good patient that tells me I'm going to be successful with the carpal tunnel release surgery.

Molly: In this patient with pretty classic carpal tunnel symptoms if she doesn't respond to conservative treatments or the steroid injections and she's thinking about surgery, do you always have an EMG before surgery? Is that required?

Ted: I don't.

Molly: Okay.

Ted: I think that I'm different from most providers that way. We have to backtrack a little bit because we were talking about not responding to conservative therapy. The patient that I would recommend surgery is one who did respond to a cortisone shot, [crosstalk] but only temporarily. So, you're right. Didn't get rid of it, but it improved it for a finite amount of time. That predictor to me is more powerful than EMGs that they have carpal tunnel syndrome and that they'll get better with a carpal tunnel release.

Molly: Okay. What does that surgery look like?

Ted: It's a really simple surgery. We make a cut in the palm, and we can use either the lifeline or the love line, the two lines in our palm, and we open the skin that way. We like to put the incision in those lines because when it heals, it's almost imperceivable that you made an incision there. Right underneath that is some palmar fat, and you dissect through that, and right underneath that is the transverse carpal ligament. It's unmistakable because it's the only thing under there where the fibers go transversely east to west. Everything else, the tendons, the nerves, the important stuff, the arteries, everything else is going longitudinal parallel to the long axis to the forearm. When you see the transverse fibers, you know you're at the transverse carpal ligament and we just divide that cautiously because right underneath it is the median nerve. Once it's divided, we leave it alone. The two edges boink apart from each other because they're under tension. Then we close the skin over it. Very important, not to close the transverse carpal ligament or you reestablish a tight carpal tunnel.

By leaving it alone like that, the first annular pulley that we released for trigger finger, there's a gap between those two stumps of the transverse carpal ligament that immediately fills in with blood and the blood hardens into scar tissue connecting the two. So, just with the trigger finger release, we're basically increasing the volume of the carpal tunnel so much so that it can accommodate whatever the swelling was or the increased pressure that caused the carpal tunnel in the first place.

Paul: That sounds like I could do it in the office.

Ted: You could.

Molly: Yeah.

Ted: You could do it right here on this table.

Paul: [laughs]

Molly: See those transverse fibers, you got this.

Ted: Yes.

Molly: There's our emergency.

[laughter]

Molly: [crosstalk] surgery.

Ted: That’s right though, I’ll keep my phone on.

Molly: Yeah.

Paul: Listeners at home, there can be a YouTube video of us trying this right here on Chris Chiu's wrist. It'll be great.

Ted: [laughs]

Molly: Chris is ready.

Ted: We got the wrist splint already.

Paul: All right. Well, this was tremendous. Extraordinarily helpful as always, but before we let you go, would you mind recapping your main take home points for the listeners? What would you actually like them to walk away from this with?

Ted: Yeah, boy, Finkelstein's test is probably the number one winner. It's easy, doesn't require any expensive equipment, and it's super sensitive and specific. The other concept is that to really have carpal tunnel syndrome, you have to have neurologic symptoms. Numbness, tingling in the median nerve distribution. Wrist pain, numbness and tingling on the dorsum of the hand, numbness and tingling in the ulnar distribution of ring finger and this pinky finger, or a glove of numbness over your whole hand, which is more like neuropathy. Those things aren't likely to be carpal tunnel. So, probably not wise to go and operate on those using the carpal tunnel operation.

Paul: That's not the patient I will start on. That's fair.

Ted: Right. [laughs]

Paul: Right. And then, is there anything that you'd like to plug other than your excellent book? This is *Practical Office Orthopedics* as a reminder to our listeners. We'll have a link in the show notes as well, but anything else that you'd like to plug?

Ted: Go ahead, that's good. That works, the book and that'll work.

[music]

Paul: This has been another episode of the Curbsiders bringing you a little knowledge food for your brain hole.

Ted: Yummy.

[laughter]

Molly: I was trying to avoid it.

Paul: I was thinking we're going to make [[unintelligible 00:42:01]]. I was just about to move one.

Molly: [crosstalk].

Paul: [laughs] Get your show notes at the *curbsiders.com*. While you're there, sign up for our mailing list to get our weekly show notes in your inbox, plus twice each month, you'll get our new Curbsiders Digest recapping the latest practice changing articles, guidelines, and news in Internal Medicine. We are committed to providing you with high value practice changing knowledge and to do that we need your feedback. So, please subscribe, rate, and review the show on Apple Podcasts or contact us at the *curbsiders@gmail.com*.

Molly: A special thanks to our writer and producer for this episode, Dr. Paul Williams and to our whole team. This episode was produced and edited by the team at Pod Paste. Elizabeth Proto runs our social media and Stuart Brigham composed our theme music. Until next time, I've been Dr. Molly Heublein.

Paul: And as always, I remain Dr. Paul Nelson Williams. Thank you and goodbye.

[Transcript provided by SpeechDocs Podcast Transcription]