Successful Static Splinting: Foundations, Part 1
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- [Fawn] Today's course is Successful Splinting Series, part one, Splinting Foundations. Our presenter today is Dr. Kirsten Davin. She is a veteran occupational therapists of nearly 20 years with extensive experience in a variety of practice areas including inpatient, acute care and intensive care units, as well as the Central Illinois Regional Burn Center. Since initially obtaining her occupational therapy degree in 2001, followed by her OT doctoral degree in 2007, she has routinely worked in the acute care realm. Through her experience with clients who have experienced burn injury, she has a quite extensive knowledge in splint fabrication and application. Kirsten has fabricated hundreds of splints within her acute care career, many of which were custom fabricated individually designed on a case-by-case basis. Her splinting experience ranges from a standard safe position, and resting hands plans, to highly intricate custom fabricated splints for the hand wrist, lower extremities, and cervical spine, incorporating all varieties of materials and splinting medium. For the last decades she has been best known for her live national speaking tours, which to date have reached over 20,000 therapists in 46 states. She has conducted thousands of educational events on the topics of seeding and positioning, assistive technology, work-life balance, acute care, ICU rehabilitation, splint fabrication, orthotic application and more. Dr.Devin is an engaging speaker who strives to make learning fun. Welcome Kirsten, so happy to have you.

- Thank you, it's nice to be here. I appreciate it. Thank you Fawn. I assume you can hear me okay, is that correct? All right, great job. Well, hello everybody. I'm excited to be here today. I did a couple of series of courses a few years ago for OT.com, but it's been a while. So I'm glad to be back, and happy to do this four-part series with you. So if you're checking in with us today for our first splinting course, I'd like to invite you back for the next three. We're going to do a four-part series. This is the foundation's course, where we'll go through the materials, and we'll kind of get a feel for the background, and the knowledge base of splinting and orthotics. And over the next several weeks, we will be actually demonstrating how to fabricate certain splints for the hand, wrist and some other areas. So we're glad to have a great group today.

As Fawn mentioned, I've been an occupational therapist for about 20 years working in a trauma center at near my hometown of Springfield, Illinois. And I've also worked in the home health setting. For those of you who are therapists in the home health setting, you probably know that we have to get a little bit creative now and then with some of our interventions. So as we go through this four-part series, we're going to talk about ideally what would happen if we had the materials, and how everything should look, and how everything should pan out. But then occasionally, we're also going to talk about the what ifs. So let's say you are a therapist, and you have a shoestring and a hanger in your trunk, and you have to do something with a client, what are we gonna do, right? We've all been in that situation before. So we will talk about some alternative methods of getting the job done as well. So as we progress through today's course, please keep in mind that in addition to the webinar, and the webinar series that you're about to participate in, my team and I also offer live courses. And since the start of the COVID-19 pandemic, we've been offering a lot of real-time live feed courses, to individual facilities to guide and help with splinting processes.

So after you watch these webinars, if that's something you're interested in, feel free to contact me, and we're happy to set up some additional training for your facility, if that's something that you would like to do. So we need to get a couple of the nuts and bolts out of the way here. So many of the photos and images that you'll see today, not only within today's webinar, but within our four-course series are being used complements of Performance Health. They have a lot of splinting material options, some of which we'll talk about today, and they've been kind enough to let us utilize some of those images and some of those features as well. Our disclosure slide, obviously I'm getting paid to do this. But as we go through today, and the next several classes, there won't be any specialized focus on one product or the other. So we're equal opportunity in terms of the products being presented. So as we go through today's course, by the end of today, you'll be able to describe and better understand the history of splinting, and how it came about. For the quiz that's gonna be coming up, I'd like for you to know two factors that contributed to the advancement of splinting techniques. You might be surprised to see how long splinting, and orthotics have actually been around. While I'd also like you to be able to identify five anatomical landmarks that are used in fabricating upper extremity splints.

So today, we're really going to talk about the anatomy, what are our landmarks? What are our boundaries? How do we use the anatomy of the hand to ensure that we're creating, and building the objectives that we want? So I'd like for you to be able to name five anatomical landmarks that are used in fabricating upper extremity splints, and identify some of the issues that are related to inaccuracies if we inaccurately use one of those landmarks. And also we're going to talk about splinting materials. So, by the end of the course today, you'll be able to identify three characteristics of splinting materials, and understand how these characteristics can be used in the decision making process, as related to splint fabrication. So this first course of the four is really going to lay the foundation for the next four courses to come. Before we really get rolling, there is one important delineation we should discuss because, and many of our splinting courses, this topic oftentimes comes up. So there is the great debate about using the term splinting versus orthotics. So many therapists who have been out in the field for a while, refer kind of uniformly to all methods of splinting and orthotics as splinting. And then there are some therapists that refer to custom fabricated devices as splinting, and orthotics as more of an off-the-shelf product, while still others abide by some of the more recent research, which is pushing to shift the conversation to orthotics as the preferred terminology.

So in an effort to standardize the conversation, today and throughout the next three courses of this series, I'll be referring to all orthotics, and processes of fabrication as splinting. So I know there's some debate there, the research says one thing, other therapists say another. So for sake of argument, we'll refer to it as splinting across the board. Now speaking of splinting, how many of you think that splinting is fairly new? When we think of splinting and orthotics, the first thing that probably pops into your head are all of these cool thermoplastics that are out there now. We've got Aquaplast and polyform and all sorts of options with memory and conformity, and all of these really neat thermoplastics that are out there. But in reality, splinting is a very old concept. And this is probably I think one of your first test questions, or one of your first quiz questions in regarding the age of splinting, and how long splinting has been a process. So the history of splinting, there has been evidence of splinting and orthotics dating back to as early as Egyptian times.

Now, of course, as with most things that are technology based, mankind has seen the greatest developments in splinting over the last 50 years or so. But actually, if you travel to... Nobody's traveling now with COVID, but if you were to travel to the Vatican, you can actually see some of the ancient Egyptian artifacts. And you can see where they have taken wood, and they've placed it next to bones, and they've strapped the wood next to the bones due to obvious fractures and deformities. So splinting is not anything new by any stretch of the imagination. But again, as technologies continue to develop, the great thing about it is our ability to be very specific, and our ability to really isolate those anatomical features that we want to isolate, we're able to do that even better. So within the last 50 years, we've seen a huge improvement in our splinting materials and our splinting capabilities. Now, much of this was due to wartime needs. So during the First World War, the Second World War, we saw a lot of advancements in the splinting process itself. But within the last 20 or 30 years, we've really seen a big advancement in thermoplastics. So it's the thermoplastics that we use today which offer a more intimate fit, greater comfort, and keep in mind some of the older splinting concepts. So when we used plaster casting for splinting, or we use some of the heavier splint options that were available, it was very heavy for clients to carry around this product that we had created for them out of plaster and other materials. So our current day thermoplastics are very lightweight. Some of them are very breathable with the option for perforation.

We'll talk about that in a little bit. But all of these advancements give us a more intimate fit, greater comfort, and that of course is going to improve client satisfaction, and the all important client compliance. So we'll talk about more about these advancements here in just a few minutes. So in order to understand splinting in and of itself, we need to first have a good knowledge base as to the anatomy of the hand. Now, we've all been through probably OT and PT school. I would assume most of us are OTs, but welcome to those of you who are not. And for sake of time today, we don't have time to go through, and do a complete anatomy review. But I do want to touch on a few things because these few landmarks are going to have an influence on how our splints function, and how our splints present in terms of fit, function and success. So the bones of the hand are gonna make up the framework of the hand, and the soft tissue is going to create the padding, and the contours that are needed. So we have three sets of bones, we have the carpal bones, which create the wrist, we have five metacarpals, and we have 14 phalanges, we have the proximal, intermediate and distal phalanges that you see there. Now the metacarpal bones are slightly curved, and slightly capped. This is what's going to contribute to the creation of the curved or the capped, or the concave palm. This is important.

We'll talk about why in just a few minutes. Now when we look back and forth at a couple of these slides, we'll come back to these slides in just a second. But we want to keep in mind that the hand itself is of course a three-dimensional feature. So when we splint we really want to be careful that we are maintaining that three-dimensional aspect. So this is an important takeaway from today's course. We want to splint or create orthotics to reflect the normal anatomy. We want to include those arches that we'll talk about momentarily, we want to address the functional position of the hand, we don't want to try to flatten those arches, we don't want to try to create a planar hand. We want to work with the anatomy that exists and not attempt to modify that. And the reason for that is we don't want to create any type of asymmetry or poor outcomes as a result of our work. And we'll touch on that a little bit more as we go through the course. So with the muscular features of the hand, there are two important muscle groups which are related to the hand itself. Those are the intrinsic muscles, and the extrinsic muscles. The intrinsic muscles, and this is a good time heads up, I would jot a note down here, as you probably will see a quiz question on intrinsic versus extrinsic muscles as well. But intrinsic muscles consist of muscles which reside completely within the hand.

So these may be muscles that include the thenar, or hypothenar muscles, the muscles of the thumb, and extrinsic muscles are muscles that act upon the hand, but actually are located outside of the hand, such as the extensor digitorum, the extensor digiti minimi, flexor pollicis longus. You'll need to know the definition and the difference between intrinsic and extrinsic when it comes quiz time after this webinar is complete. So be sure that you are familiar with the fact that the intrinsic muscles of the hands are the smaller muscles that are located within the hand itself. Now it's also important to know, and we'll touch on this during the second and third course of this series, that it's important to know when hand-based splints are the most appropriate to recommend. If you are trying to restrict movement solely within the intrinsic musculature, some splints will allow you to do that via the fabrication of just a hand-based splint. And that will be either the second or third webinar. We'll touch more on that. But keep in mind there are some splinting and orthotic options that are out there that will allow you to incorporate either a short hand-based design or a longer wrist-based design if you do want to include the wrist itself.

An example of that would be a thumb spica splint. You can very easily create a hand-based thumb spica, or you can create forearm-based thumb spica. The concept is the same, the fabrication is very, very similar. It just is a matter of determining whether you want to remain hand based or forearm based with that fabrication. And we'll talk about why you would want to do each of those in our upcoming webinars. Now, along with the skeletal system, and the muscular system, we also have the arches. The bones and musculature make up these anatomical features. So the bones are the building blocks have the hand, but it's the arches that give us the ability to function. This is what sets us apart as humans, our ability to utilize those hands. So how many arches are there in the hands? The answer is at least seven. There are three significant arches that you can see here. One of which is the longitudinal arch. And this arch reaches from the middle of the third digit all the way down. Lemme grab my draw feature here. From the middle of the third digit all the way down to the wrist. That's the longitudinal arch. You also have a transverse metacarpal arch, which runs across the metacarpals itself. That's your light green one here. And you also have an oblique, some oblique arches. The oblique arches, there are four additional oblique arches. These arches are located and created by the thumb interacting with the other four digits.

So again, the longitudinal arch is going to run from the middle finger, third digit all the way down to the wrist. So this is a longitudinal arch. The transverse metacarpal arch consists of the arch is created by the metacarpals, as you see here. And we have oblique arches, which are created from the thumb to each of the second, third, fourth and fifth digits. So those trans, or those oblique arches are created, all spanning from the thumb up to each of the individual digits. So the takeaway here is that the importance of multiple arches of the hand cannot be overstated. The arches again are what give us our function. And the arches are what's going to allow us as therapists to accurately and appropriately create the splint fabrication, or to create the product that we're going to be placing with the client, okay? The transverse arch and the metacarpal arch, those are going to contribute to the collapse of the digits on the ulna side, okay? So it's the arch itself that supports the ability to grasp, and phalanges on the palmar surface are inherently a little curved. So again, that adds to that functional position. It adds to that arch process as well. So the big takeaway here is that splints need to include arches, they need to support the arches, and we want to support and not alter the anatomy that is present, okay?

So if you were to have a quiz question, and that quiz question said, which of the following arches of the hand reaches from the third digit, the end of the third digit to the wrist? Your answer would be what? Feel free to type it in the chat bar if you'd like. From the tip of the third digit to the wrist, okay? So this is right here would be what? Good, I'm seeing some answers pop up. They are all correct, very good. Longitudinal is your answer there. Now as a result of all of this anatomy, this anatomy in turn creates something called creases within the hand structure. So creases are extremely important to splint fabrication because these creases are going to serve as our roadmap. These creases are going to tell us when splint borders need to be shortened, and where are those splints need to stop in order to either allow range of motion to occur, or to block range of motion from occurring. So if you're aiming to allow range of motion, let's say for example, you are creating a volar wrist cock-up. And you bring this splint, I'm gonna do my best attempt at drawing this on this palmar surface here. So we bring that splint up. And I'm not gonna draw it around the thumb very well. So I'm just gonna come down like this. You'll see it pop up on your screen here in just a second.

So this, if I want to allow flexion of those fingers and free flexion of those MPs, we're going to have to create a splint border just before that distal palmar crease. So if we are wanting to allow range of motion, we need to make sure we stop our split material here, roll back that split material, and allow these MPs free motion. Now let's say we had a situation where we didn't want to allow that function. I'm gonna change color here. So hopefully it'll look like a different view. So if we wanted to block that function, we would do the same thing. We'd bring that back up, whoops, we get the same color, okay. Technological error on my end. But you would bring it up a little bit further to go past that distal crease, and therefore it would block the ability for those MPs to function. So we need to just think about what the goal of the splint, or what the goal of the orthotic is. If you're aiming to allow motion, you're going to stop short of one of numerous creases, and if you're aiming to block the joint, and to create immobilization, then you're going to bring that splint past the crease itself. Now, an easy way to do this and to identify this, it's very difficult to look at a flat hand, and say, okay, well I see the crease there. So if I stop here-ish, that's probably fine. Because keep in mind, if you are creating orthotics for a 10-year old client versus an 80 year old client, they're going to have a very different presentation.

Also, if you're creating orthotics for a small 10-year old girl versus a 60-year old construction worker, that hand, the soft tissues of the hand are going to present oftentimes very differently as well. So many times, it's oftentimes easier just to have the patient, if it's indicated medically, have them move that joint, and you'll be able to very easily identify where the crease is, how much soft tissue was involved, and it's the soft tissue that will tell you how far back you have to pull that split border in order to effectively either allow range of motion or block range of motion. So this is where that first evaluation of the individual becomes very handy. So we can just take a look, see how the fatty tissue lays, see how the pads of the hands present, see where our creases are, and go from there. Another thing to think about is that there's a significant difference between the padding and the skin quality of your palmar side versus your dorsal side.

So when we're talking about the hand itself, the dorsal skin is going to be.... or the dorsal side rather, is going to be a little bonier, you're gonna have a few more bony prominences there that you'll have to work with. And the palmar side tends to be a little better padded, it tends to have a little less risk of skin breakdown because the the pads of the hands are more used and better padded as compared to the back, and traditionally, there will be fewer bony prominences. So if you have an option of either splinting that individual from the palmer side or the dorsal side, keep that in mind as well. Think okay, what are the risks that I have here? What would be the best approach for me to take? So one of the creases that we're speaking of. As you can see, in this image, the distal palmar crease, okay? Our distal palmer crease, otherwise known as the distal transverse crease runs just below the MPs right there. We also have a proximal transverse crease. And it is located right there, okay? And then we have a couple of thenar creases that we need to pay attention to. So you see the thenar eminence, which is essentially that the base of the thumb, the padded area at the base of the thumb, we have the thenar eminence here.

As a result, there is a crease that occurs there. We also have a hypothenar eminence, which is the meaty portion of the hand, which is on the ulna side below the fifth digit. So if we are creating some sort of a thumb-based splint, or some sort of a thumb spica, or a bowler wrist cocked-up or something like that, we wanna be careful about ensuring that this area right around this thenar eminence does not run the risk of breakdown, because that is a fairly, surprisingly a fairly common place to have some breakdown. When we try not to open up that thenar eminence area enough, oftentimes they'll rub, and you'll have some skin breakdown there. So be just a little bit mindful of that. All right, I think there's a quiz question here on this slide as well. So the question reads, when we're fabricating hand-based splints, which of the following is true? So the big takeaway here, the information that you'll need to know for this question is make sure that the palmar creases, okay? Your distal palmar crease, your proximal palmar crease, your thenar eminence, your hypothenar eminence, There are other landmarks of course, but I would say those are the top four landmarks for hand splinting.

Make sure that you're familiar with the fact that those are going to guide your placement of your splint borders, and help you make the determination of where to end those splint marks based on whether you are trying to allow range of motion, or block range of motion. Make sure again, you're also familiar with the fact that these palmar creases are gonna serve as a visual guide to help you with those splint borders, and that the pad side or the palmar side of the hand, traditionally, is a little more durable, if you will, as compared to the dorsal side or the posterior side. So we're going to get into some splinting materials here very shortly. I've got a few videos that I'm gonna show you that compares the thermoplastics that are out there. But before we do that, I want to give you a brief rundown of the types of splint options that are out there. Now, we're gonna start with static splint options. This first four-course series is all going to involve static splinting. So we're not doing any dynamic splinting at this point. We are talking about potentially doing another series, which would bring dynamic splinting into the mix.

So that's exciting because surprisingly, it's sometimes it's difficult to find courses and see the use on splinting itself, but it's even more difficult to find information on dynamic splinting. But keep this in mind, the key to a good dynamic splint is the static splint that you've built under it. So in order to have good dynamic capabilities, you have to have that good static splint already created. So step one of this entire process is going to be to create a good solid functional, well placed, static splint. So this is the most common type of splint. It has no moving parts, and a static splint can be used to immobilize, produce rest, prevent pain. You can use this to address muscle shortening, you can use it to address contractures in clients who present with, who are status post CVA, or who are immobilized for a long time in the ICU bed. You can also use static splints as a means of protection. So near where I live, we have a meatpacking plant that's not too far away. It's one of the Smithfield plants. And every now and then we get a client who got a little bit close to a bandsaw, or to one of the cutting devices that's on the floor of that plant. And many times the plastics will go in and they will reattach fingers, and you'll see some pins that are coming out of the ends of those digits that are helping with the restoration process. And many times we'll get a splint order that will say, do whatever you need to do to create this splint, but make it so those pins and those fingers are protected. So sometimes with static splinting, sometimes the only goal is just to protect the work that has been done.

So if that's the case, that's where oftentimes we need to get a little bit creative on what it is that we do, and how we take that approach. Now with the static splint, to be mindful of the fact that there are several methods to fabricating these types of splints. So, you may find in your hospital, or in your facility, that there you may take an entire sheet of Ezeform, or some type of thermoplastic. You may take that big sheet, you might trace a pattern on it, heated up, cut it, fabricate it, and while other times you may have the luxury of having some precut splint blanks. And split blanks are what you see here. So these splint blanks are precut, preformed, prepatterned, I guess you would say, pieces of split material that you would be able to utilize. They're already cut, they're ready to heat, they're ready to apply. It really streamlines the process a little bit. Now traditionally, many folks think that the precut splint blanks may be a little bit more cost efficient. Be careful, sometimes that's the case, but not always. It depends on the materials you're buying, and it depends on how much of it you're buying. So we will talk, I won't get into the specifics of costs, but we will touch a little bit on what may be more cost efficient, because as most of you know, you're probably in same situation as I am, tight budgetland, and we were trying to do as much in a cost efficient manner as possible. So each type of static splint option, whether it's a precut splint blank, like you see here, or whether it is a, just the sheets of material, they each have their pros and cons.

We'll talk a little bit more about that as we go on. But just keep in mind, there is not a set rule as far as which one is in fact more cost efficient. So your static splits again, most common type of splint used for a bunch of needs, and they have no moving parts. Your serial static splints consist of the fabrication of several splints over time to allow continued application of sometimes a consistent stretch or a consistent extension of that end range. So a good example of this, and this is a terrible case study, but or terrible situation I guess you would say. A number of years ago I had a woman who was in her mid 80s. She was admitted to our local burn unit. And she was residing in a nursing facility. And sadly, the nursing facility, as a result of running out of footstools or ottomans, they decided to put this individual's legs on a space heater to allow her to have a footstool. Well, the space heater was turned on. And you can imagine there was a lot of burn, and a lot of damage all the way up the backs of her legs into the peri area, and up, sort of up towards the buttocks region. And she initially came in, had grafting done, and long story short, she did have some contractures of those legs over time. So they asked us to come in, and do a series of serial static splinting, where we would perform extensive range of motion of the leg, we would then create a splint. And you can also use casting material for this. There's a product called QuickCast 2, Q-U-I-C-K, cast C-A-S-T two, that is a very good option for some of these serial static splints that you may want to make. Also quite ideal for finger splints.

So if you have some finger contractures, and you're working over time to gain that extension, QuickCast 2 is a good product that's out there for that. But this was a situation with the woman in the burn unit where we had to go in every two or three days and take the existing splinter product off, incorporate more range, try it again get to that end range a little bit further than we did last time, and then recast or resplint. So serial casting can be a bit of a process. And it involves a lot of material because you're repeatedly going back in, and reapplying those splints over time. If you have splints that you can adjust, that'll be helpful, but you are having to go in and make some adjustments very, very, very, very routinely. Now another option that's out there is in terms of types of splints is a static progressive splint. Now the static progressive splint oftentimes includes a low load prolonged stretch. So you can see here we have, this is a threaded screw, and you have a knob on the end, right here on the end of this splint. So if you have a client who presents with finger flexion, some sort of flexion asymmetry, and you're trying to extend that finger out into a fully extended position over time, you can incorporate a static progressive splint, because this is going to be far easier on behalf of the fitting therapist, and on behalf of the patient, because the patient themselves will be able to make those small adjustments.

So if you have a patient who is going to be compliant, they're very motivated to do well, and you have someone who's able to address the fact that they know they need to do a half turn, or a quarter turn or whatever that is every day or two, this is going to be a good option for them. I do see a question that popped up from Melissa. She said can you repeat the name of the splinting material that's used for serial static splinting? Yes, you are correct Melissa. It was quick, Q-U-I-C-K cast C-A-S-T two, like the number two. And we use that many times to achieve this result that you see here. We use that many times on finger splint, or finger serial progressive splinting to try to bring that finger into more of a neutral position. You're welcome, Melissa. I got that note too, thank you. So if you have a client who's motivated, you have a client who is, they're compliant, they're going to follow the directions that they give you, the static progressive option that you see here can oftentimes be a good one. Because with the threaded screw that you see here, you have a knob on the end of it, and you'll, this of course up here is hinged, you will first apply this splint to the finger in question, and instruct the client to make those adjustments, whatever is appropriate. So is it a quarter turn a day? Is it a half turn a week, whatever that is, along with their home exercise program and their stretching routine, and so on and so forth. But this static progressive option is really going to allow them to be able to assist, and to keep them out of clinic because they'll be able to do this at home, okay? One thing you want to make sure you educate your patients on, if you are looking at a static progressive option, you want to make sure that they understand that they don't want to be too aggressive with the load that they're applying to the tissue.

So sometimes people, clients will put this on, and think, oh, if a little bit is good, a lot's better, right? And they'll really crank that screw all the way up there. Well, you wanna be careful of that because too much stretch in some situations is not going to be a good option. Oftentimes we want a low load, prolong stretch, not aggressive. There's another question that popped up that reads, are these prefabricated? Yes, so what you see here, you'll have the hinge that you see there, you'll have the threaded screw. This all comes as you see it here. So you will apply this to your client as seen there. And this is just an example of one of the splint options that's out there in terms of static progressiveness. There are other options that are out there, but most of your static progressives, I mean you could make this from scratch but it's gonna take some time and some effort. So there are a lot of options that are out there which will accommodate for that static progressive to achieve that low load static progressive splint, okay? And then finally, we have our dynamics splints.

So, again, like I mentioned before, we're considering launching possibly another four-part series specifically designed for dynamic splinting. And the dynamic splint consists of two parts. It consists of a static base. So you can see this static base right under here, okay? So there's looks like a dorsal wrist cock-up splint that we have there. And again, your dynamic splint is only as good as the base on which you put it. So make sure that the base is well fit, and looks good, and is comfortable, and is durable. Because all of the outrigger options that you put on there, everything that goes on top of that is going to rely on that base being of good quality, and of good fit. So the dynamic splint consists of a static base as you see there. And oftentimes we'll put levers, springs, pulleys, any number of things, rubber bands, elastic cords onto that splint to encourage passive range of motion, or in some cases active assistive range of motion. The key takeaway with the dynamic splints is that again, it's a method to provide a low load prolonged stretch. Sometimes it's a method to assist with joint range. Oftentimes it will substitute for some loss active range of motion. So it can augment that active range of motion through joint assistance if necessary. The splint itself to look at it looks a little complicated, but really it's just five dynamic features. In this case, in this splint, it's four or five dynamic features that run side by side. So it looks a little daunting, but I'm happy to walk you through it, and take you through the steps of fabrication if needed. So don't be scared by the looks of it. I know it looks like it's a scary one, but it's definitely doable. And now for the fun part. For what I think is the fun part, and oftentimes the daunting part. So just, if you wanna type in the Q&A box, I'm curious if you had to rate yourself as scared to death of splinting, or pretty comfortable, but I think I could know a little more, or totally an expert, I don't even know why I'm taking this class. So zero to 10. Zero, I know nothing, 10, I know almost everything about splinting. Where would you put yourself on that spectrum?

I'm just curious because I want to kind of see... Someone types definitely scared. Definitely scared to death. Okay Lindsay, well we are going to take care of that for you. Okay, good, so we have a good mix. Thank you all for putting it in there. We have a good mix of, we even have a zero, okay good. So I see several of you are scared. All right, so we have a good mix of knowledge levels, I guess you would say as far as, or comfort levels as far as splinting is concerned. And again, keep in mind after this webinar series is over, if you want to set up an individual tutorial, we can do a live Zoom, we can do a live interactive session where we walk through how to fabricate splints, you can practice, it's not the same as being in the same room. But in light of COVID, many clinics aren't offering continuing education, and many clinics are not offering visitors to come in to do any type of education. So if that's something that you're interested in, my contact information is here. So feel free to reach out if you feel like you need, or want some one-on-one training for either yourself, or for your facility. So for the thermoplastics. So how do you make sense of all these types of splint materials is the question. There are a number of split materials that are out there. And before we break down these types of splint materials, I want to make sure that you understand the whys.

So why are we picking different types of splint material? So different diagnoses are going to require different types of splint material. So for example, if you are just incorporating a small finger splint, if you just want a small finger extension splint, you don't really need a high level of resistance, you don't want a really thick material because this finger is going to be next to the other one. And if you have a big fat, clunky type of thermoplastic on here, it's just not gonna work well with functionally with that client, and how they're performing. We've all probably sliced a finger or something, and what you'll find is that big bulky dressing is pretty limiting. So small finger splints, you don't need the thickness, you don't need the resistance to stretch. You don't need to even really necessarily create a formal pattern for that. We'll walk through that in the next webinar. Oftentimes, the difference in thermoplastic selection really has to do with clinician preference.

As you get more comfortable with splinting and orthotics, you'll find that you have your favorite materials, and therapists do. They have a favorite material that they kind of tend to go towards and work with. And you'll also find that some therapists have a light touch in terms of fabrication, and some are a little bit heavier with the push, and a little more aggressive. So you'll find out what type of material works for you. Alright, so we're gonna look at the following characteristics here, the first of which is thickness. Now the chart that you see here is from Performance Health. They have a lot of good information out there, that relates to the qualities of the thermoplastics. So in consideration of the thicknesses at a glance, you can get anything from one 16th of an inch. So these are gonna be more for your pediatric clients, for your finger splints, for your hand-based splints. It's a very light, a very thin material, a very easy to use material. Also very easy to cut when it's cold.

So if you are getting the big sheets of this, and you want to take the exacto knife, and slice off a chunk, the one 16th thickness is going to be helpful for that. These thicknesses range all the way up to a three 16th, which is going to be your maximum rigidity. These are gonna be more of your aeroplane splints, your splints, they're gonna be really faced with abnormal tone, where you have a lot of hypertonicity fighting the splint, lower extremity splints, foot plates, that type of thing. So oftentimes kind of a middle of the road option are your 330 seconds. And with your 330 seconds, you'll see many splint thermoplastic materials will fall within this 330 seconds range. The 330 seconds is very ideal for a wide range of applications, static, dynamic, your progressive splints that we just touched on. The nice thing about the 330 seconds is it gives you a little bit of a lightweight option, but still gives you quite a bit of strength that you would see in the one eighths, or the three sixteenths. Now another feature that we wanna make sure we touch on is the concept of drapability or conformability. And I believe there are two test questions that come from this slide.

So drapability is the ability of the thermoplastic to conform to match the anatomy of the hand without manual assistance. So drapability, if I took this piece of black Aquaplast that you see back here, if I took this Aquaplast and I placed it in the heat in this splint pan, I heat it up, and I just laid it on top of this client, it would drape around them, and it would conform to how that client presents, without much assistance from me. So drapability is the ability of that thermoplastic to conform without assistance. Conformity is different. Conformity is the ability of the material to conform to a small or intimate detail of the client's anatomy. So I'd like to show you a brief video of the concept of conformity.

So Caitlyn, if you could pull that video, that first video up for me, that would be great. And as this video pulls up, I want to remind each of you, splinting can be a daunting process. But the other thing to think about is, you don't need to have a $2,000 splint pan, and 50 different types of thermoplastics to get the job done. In fact, currently with our COVID-19 situation, our facility is not allowing any type of visitors, or anything outside of the actual therapists doing the actual therapy isn't allowed. So I actually wasn't able to get into my facility to be able to take the videos for this webinar. So what you're going to see is a pan of water on top of the stove, any stove, any pan, and it does the same thing. So your ideal temperature for splinting, this is something else you'll probably want to know. Your ideal splinting. Yeah, teapot and aluminum tray. You're exactly right, Pamela, she just typed that's... And as a therapist, you have to be creative. You have to be able to make it work. So if you are intimidated by thinking, well I don't have that really pretty split pan that I see on the advertisements. You don't need it. You need to pan and water, just like you're going to see here in this video. So ideally, your water temperature would be around 160 degrees. So you can see I've got a thermometer in there. It hits around 160. And this is going to be the first of three short videos.

So what you're going to see here are four types of splint options. The first of which is Aquaplast, the second of which is TailorSplint, followed by CuraDrape that has a 1% perforation. And we have Ezeform as the fourth one. So for the demonstration on conformity, I'm going to select CuraDrape. Now you'll see that there is perforation. We'll touch on what this perforation means here shortly. So you will see that I paused the video here for a second to save us some time to allow for the the heating of the material. So when CuraDrape is heated, it's going to conform very distinctly and very easily to the client's anatomy. The slight perforation that you see there, that's a 1% perforation is also going to allow a little bit more stretch, and a little bit more conformity as compared to some other materials as well. So when we put the CuraDrape on the individual's hand, you'll see those knuckles pop up very quickly and easily. And you can see how it very easily conforms, okay? So the concept of conformity, and Caitlyn, you can take us back to the PowerPoint, if you would.

Here's a test question for you. The concept of conformity involves how easily the material contours to the patient's anatomy. So if you have a highly conformable split material, typically that's going to be used when you want a very intimate feel. Another concept that's out there is the concept of memory, and Caitlyn you can go ahead and pull up the memory video if you would, for me. Now memory is a very helpful characteristic of some thermoplastics. So again, we have Aquaplast on the far left side, as you see in the video. We're going to put that in the water. Now with Aquaplast, here's the great thing about Aquaplast. As that warms up, can you see how it gets clear? It starts as kind of a white opaque color, and now it's going to turn totally clear. You can see around the edges that it's starting to clear up. And when that is thoroughly heated, and it's ready to go, you will see because you can see all of the cloudiness disappear, and it now becomes a very thin sheet of thermoplastic. So Aquaplast itself has a very, very strong degree of memory. Memory means it's going to return to its original shape when you reheat it. So not all split materials have memory. In fact, many of them do not, okay? But Aquaplast does.

So what's nice about this, is that I have my client, okay? So you can see, now this is gonna be a very poorly constructed initiation of a finger splint. So pay no attention to the method being employed here. But just, I'm just trying to demonstrate the fact of the Aquaplast being a good product for memory. So what memory means is after I have the splint completed, after it's totally cooled, okay? So we did a split shot there. You can see where it's cooled back down because it is now again, a white color. It's hard and you can see there where it's hard, it's rigid again. Memory consists of being able to take that material, put it back into the water, and it will regain its original shape. So had I taken that Aquaplast and pulled it apart like this, or twisted it, or put it over my knuckles, and then I took that splint piece and put it back in the water, through the matter of a few seconds back at the heat, you'll find that it's going to return to its normal shape.

Now this can be a blessing and a curse because if you have someone who is a little bit of a therapist who's in a hurry, and they take that Aquaplast and they put it on the client, and they don't let it set up all the way, they don't make sure it's perfectly cool before they take it off of the client, you may find I apologize. Our video is a little glitchy there. You may find that the Aquaplast will actually start to recoil a little bit if you take it off of the client too soon and it's still warm. So I apologize. I'm seeing a little bit of a glitch on my end, but hopefully you're able to see. So we put the Aquaplast back in the water, and what you will find is that it is now returned back to its normal shape. I can peel the two edge, the two sides apart, and it will go back to the original image, or the original shape and consistency that it started with, okay? So if you are using Aquaplast for the first time with a client, please be sure... Please make sure to be careful, and that it's totally cool. Deborah is asking how often can you reheat the material? Every time you reheat Aquaplast, you're going to lose a very little bit of integrity and strength. So I wouldn't recommend doing this 20 times prior to fabrication with the client. But if you're able, if you need to do it a couple of times, that's fine. I would say up to four or five times easily, you're not gonna have any problems with that, okay? So, Aquaplast comes in, I believe both coated, and uncoated, as well. Pamela is asking about a coated option. So I believe that I believe there's an Aquaplast and an Aquaplast-T, and I believe one option is coded and one is not. But Pamela, if you want I can check on that for you, okay? So let's look at, Caitlyn you can take us back to our slideshow.

I'm just being mindful of our time here because we're getting little close on time. So another concept that we wanna think about is the resistance to stretch, or the rigidity. This is a nice chart. It shows you the relationship between conformability and resistance. So the more conformable something is, the greater ability of stress you're going to have. So in addition to the above characteristics, resistance to stretch, otherwise known as rigidity can also be valuable when fabricating. So when you're incorporating larger orthotics, or focusing on larger aspects of one's anatomy, Caitlyn if you wanna go ahead and start that video for sake of time here, oftentimes you don't want to have a lot of stretch capability. So, if you do have a lot of stretch, typically you have a lot of conformity, 'cause you can stretch that thermoplastic over the anatomical structures. If you don't have a lot of stretch, typically you have less conform ability. So this time, we are going to look at TailorSplint on the left, and Ezeform on the right. Both of these are the same thickness. They're being placed in the water at the same time. 160 degrees for that water typically. And you'll see when the Ezeform is removed. So the Ezeform's on the right, the TailorSplint T-A-I-L-O-R splint is on the left. You'll see one of them has a great deal more stretch than the other. So we're gonna go ahead and pull the TailorSplint out. And here comes the Ezesplint right next to it. so Tailor on the left, Ezesplint on the right. Or I'm sorry, Ezeform on the right. And when we take TailorSplint, I think that's the one I select first, lemme see. Nope, I lied to you, Ezeform.

So what you're looking at there is Ezeform. With a gentle pull, you can see Ezeform is pretty resistive to stretch. If I were to take the TailorSplint, incorporate the same degree of pull, you can see how that is much more stretchable. So of those two, the one that's gonna be more conforming and going to be better at addressing those anatomical landmarks, is going to be the TailorSplints. So resistance to stretch, Caitlyn, you can take us back to our couple of final slides here. So resistance to stretch does have a very close relationship to conformity because the greater degree of stretch you have, the greater degree of conformity you're going to acquire. So higher degree of stretch, higher degree of conformity. And finally perforation. So perforation is basically what it sounds like. We've taken and added a lot of little holes inside of these thermoplastics. So you can order several different types of splint options with different degrees of perforation. So if you were to picture one square of this material, okay?

So here is one square. And if you were to picture 100 little dots within this square, dot, dot, dot, dot, dot, 100 dots, the perforation percentage that you see is how many dots are perforated within that area of 100. So for example, this would be a 1% perf. And this would be more of oh, I don't know, maybe a 15% perf for something without counting offhand. So the good news about perforation is it allows better breathe ability, it allows Better airflow, it reduces skin maceration because you do have some airflow in there, and it's going to be lighter. The downside though, is that naturally, if you poke holes in something, it's going to be a little bit weaker than its solid counterparts. So be a little bit mindful of that. In the burn unit, oftentimes, we will use this for cervical splints, for areas that have a lot of drainage and maceration, and a lot of, if your burn injury, and you have a lot of dressing changes, that type of thing. Also we oftentimes use this highly perforated material for your finger splints, so very light, very easy to use, and you'll see more about that on our upcoming webinars as well. So in closing, so putting it all together, here's some additional information on your solid versus your perforated, your different perforation options, and some suggestions for user perforation. But to put it all together, we need to think about in terms of material selection, where are we splinting? What's the objective? Are we trying to protect? Are we trying to immobilize? What's the goal? And what qualities do we want? Do we want our materials to be drapable? Do we want them to be perforated to allow better airflow? Are we splinting a very large, a big elbow or a knee or something and we want that rigidity? And we need to take those qualities that we're looking at and identify which thermoplastic it is that we may want to use.

So again, it's a lot of information in a very short time. If you want additional information on any of this, or if you're thinking, I really wish I could just get, if I could just get Kirsten Davin to do a Zoom with me, and send me some materials, and play with these materials on a live feed, we're able to do that. So my contact information, I believe, is on here, yep, right there. So feel free to email me, call me, reach out to me via LinkedIn, whatever it is you want to do, whatever your preferred method of communication is, and I will be happy to help. Are there any questions? I know we're close on time, but anybody have any questions? All right, well I will hand it back to you Fawn, Or Caitlyn, I guess, whomever would like to take the reins back here.

- [Fawn] Thank you so much, Kirsten for a great talk today. I don't see any questions coming in. So please note her email there. She would be more than happy to help you. So I appreciate your time today.

- Yep.

- [Fawn] Hope everyone has a great rest of the day, and you join us again for our next part two of this series, as well as more courses on occupationaltherapy.com. Thanks everyone.

- Thank you.