# Current Topics in Upper Limb Loss and Difference: Bilateral Upper Limb Loss

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Presenter: Shawn Swanson Johnson, OTR/L

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- [Fawn] Again, today's topic is "Current Topics in Upper Limb Loss & Difference: "Bilateral Upper Limb Loss." Our presenter today is Shawn Swanson Johnson. She is an independent consultant, and, in 2015, started her own company, specializing in upper limb loss rehabilitation. She has been a registered and licensed therapist for over 20 years. She was previously the National Director of Occupational Therapy for an upper limb prosthetics provider for three years, and prior to that, she was a clinical specialist in upper limb prosthetics with an international prosthetic manufacturer for six years. She also was employed in an outpatient rehabilitation setting in Houston, Texas, specializing in traumatic neurological rehabilitation. Her background includes clinical work, publishing chapters and articles, as well as teaching experience in upper limb rehabilitation, working with the rehab teams at Walter Reed and Brooke Army Medical Centers, presenting to ONP student programs, speaking at national and international conferences, upper limb prosthetic outcome measure work, and facilitating collaboration between prosthetists and therapists to improve outcomes for their patients. Since 2008, she has been involved in the planning and chairing of the Skills for Life events, which are workshops dedicated to individuals living with bilateral upper limb loss and absence. 2016, she started a 501c3 that supports the skills for live events, which provided scholarships to over 30 individuals in 2018. She is currently serving on the Amputee Coalition Scientific and Medical Advisory Committee and is a past member of the Upper Limb Loss Advisory Council. He is also a member of handsmart, an international group of therapists dedicated to educating healthcare professionals and individuals with limb loss about amputee rehabilitation. She previously served on the board of directors for the US National Member Society of the International Society for Prosthetists and Orthotists for over 12 years. Welcome, Shawn, we are so.

- [Shawn] Thank you, thank you very much. Welcome, good morning, everyone, or welcome, afternoon. Hope you are looking forward to another talk on upper limb loss

rehabilitation. So today's talk is going to be on bilateral upper limb loss rehabilitation. So I'll cover the learning outcomes for today first. We'll be able to describe the difference between unilateral and bilateral upper limb loss. We'll list the pre-prosthetic and post-prosthetic therapy needs, ideas, and resources for those living with bilateral upper limb loss, and we will describe information about adaptive equipment for activities of daily living. I'll also provide a brief overview of the topics we'll cover today. We're gonna, in this hour timeframe, discuss what considerations you need to take into account in the early stages before they get their prosthesis and then what to take into account once they've received their prosthesis and what type of prosthetic devices would be helpful for them, and collaborating with the prosthetist as well as prosthetic training. We'll cover self-care tasks as well as leisure activities and driving. We'll, at the end, look at talking about the difference between limb loss, limb difference, and acquiring it at an early age or being born without limbs versus an adult-onset experience, and then in general, what has working with individuals missing both arms or all four limbs taught us as occupational therapists.

So first wanted to mention the Skills for Life workshops. So because this is an hour-long conference, or webinar, we can't cover everything we need to in this hour when it comes to working with someone missing both arms. So there is a three-day conference dedicated to just this topic, and it is called Skills for Life. It's a bilateral upper limb loss workshop. We've had five installments of this event, and they tend to happen about every three years. The next one will be happening in 2021, and I'll talk about that more in a second. Past conference videos are available to purchase, and you can contact me about that and I can send you web information and web link ordering information. But just, again, to add that to your resource library. And then you can also go to enhancingskillsforlife.org, which is the non-profit that supports that workshop to learn about upcoming conferences and learn more about the non-profit that supports the workshop. So just an example of one of our workshops that happened in 2015, this is a group photo, but last event was held in 2018, October 2018

here in Houston, Texas. It was our fifth installment. It's a 3 1/2-day event. We had 275 attendees, various exhibitors, manufacturers that make prosthetic limbs or healthcare providers, and nine different countries were represented. So we had 71 individuals who were living without both of their arms, and of those 71 individuals, 40 of them were missing all four limbs at our last event. And so again, Skills for Life 6 is going to be held October 13th through the 16th in Houston, Texas. So save the date if this topic interests you and you wanna learn more about people missing both arms. And so, bilateral versus unilateral upper limb loss.

So someone missing one arm versus missing both arms. First, I kind of wanna talk about someone missing an arm versus someone missing a leg. If you talk to prosthetists out in the field, this is anecdotal, but 90 to 99% of their business is typically prosthetic legs, and one to 10% of a typical prosthetic provider might be arms. So missing one arm is more rare than someone missing a leg. Missing both arms is even more rare and more unique compared to someone missing one arm. And there are prosthetic providers out there that do specialize in working with only arms, and that's all they do. And so unilateral limb loss individuals do have a remaining hand to help them complete their daily tasks as long as there's no other concomitant injuries or issues. So someone that's missing both arms, they're completely dependent for some period of time, and possibly forever in certain cases and depending on where they've lost their limbs. So when the early aspect of someone that's just been injured, they've been admitted to ICU and they're in the hospital. We're gonna look at, as occupational therapists, we look at them. We might only be involved in one part of their rehabilitation, but we look at, we're involved in their care from the time that they're admitted to a hospital right after their injury all the way to getting them back to their leisure activities after they've been discharged.

So what kind of things do occupational therapies need to consider early on and before they get a prosthesis? So there's a bullet point list here, and of the bullet points, the

non-highlighted, the gray ones, those are typically, that's typical protocol for people that have lost a limb. So we're looking at wound care and scar management, edema control, desensitization, range of motion, strengthening, addressing psychosocial issues. But for someone that's missing both arms, we really need to focus a lot on core strengthening, balance, and fall recovery, and lower extremity stretching in addition to the ones I just mentioned above. So here are some pictures of examples you might run into with the typical protocol, wound care, and scar massage for electrical burns, and edema management and shaping to help make sure that the limb is a good shape so that the socket fits, is easy for a prosthetist to build and so that it's easy to don for the patient. And then you wanna help with desensitization so they get used to wearing a prosthetic device, and then also with the range of motion and strengthening so that they're able to maximally and efficiently use a prosthesis and tolerate the additional weight of a prosthetic device. And so again, when it comes to someone that's missing both arms, focusing on those in addition to this other aspect of the protocol. We're gonna focus on stretching for someone missing both arms and we're gonna focus on balance.

So here's some examples of those different tasks that we'd work on. And then some core strengthening exercises. So here's just a bar someone is able to place their feet under and then do side sit-ups, forward sit-ups, just different examples of things you can do for core strengthening here. So utilizing a therapy ball against the wall, or sitting on the ball. I can't even sit on the ball without using my feet on the floor, and this gentleman has got some amazing core strength. That was after practice and build-up of those core muscles. It's still in the early phase of things. I just wanna share my anecdotal observation in working with these individuals that before they receive their prosthesis, maybe they're still inpatient, maybe they've already been discharged, but the top four priorities that I tend to hear from people that they wanna focus on is communication, so being able to access their smart phone, eating independently, toileting independently and privately and bathing. And so there are definitely more

activities to this list that might be a priority for someone else, but these tend to be the top four early on priorities. And so looking at those and addressing communication. Early on, I'll tend to recommend they get a Bluetooth hands-free headset, something that has A2DP capabilities so that they can make and receive calls as well as listen to music or podcasts or audio books. And then when it comes to their phone, if they're not aware of the different apps that are out there that help them either with voice control, whether it's an Android or an Apple device and they're using a voice to text or setting timers or making a phone call hands-free, even being able to take pictures hands-free with voice command, setting them up and showing them the different apps that exist out there. And then if a home computer has something that they're looking at for communication, Dragon naturally speaking or voice to text. One of the things that's come out in the past, not good with years, but maybe five plus years that's changed the game for a lot of people with smart phones and tablets is a charging mat so they don't have to plug a small little cable into a slot and in the right direction or position. So charging mats have been a huge help for people to be able to independently manage their tablets or smart phones. So one of the other early priorities was feeding or eating.

So here's an example of a simple adaptation for early independence, and this is a universal cuff with a right angle pocket, a utensil pocket. That utensil pocket could also hold a stylus, so this could be something they could do for feeding and communication, and this could be used on above elbow as well. So next was toileting. Here's a picture of some wet wipes and an example of how you might be able to, a family member might be able to set up some toilet paper. Really, the toilet paper should be over the bowl, the rim of the bowl instead of the lid. But someone could set up toilet paper ahead of time. The person could then go in and go to the bathroom and then use body English to wipe themselves on the toilet paper and then push the toilet paper into the bowl with their body parts so they can toilet in privacy and do toilet hygiene in privacy. Bidets are also early considerations, depending on insurance and financial considerations. They're extremely helpful, and I recommend the type that the

lid opens when you walk by it and the remote keypad that you can place next to the wall, and someone can access that with their residual limb or their mouth or a mouth stick. Here's an example of someone using their prosthetic device to access different features. Another example of a bidet.

And then the fourth topic or priority was bathing. And so here's some examples, and I'll get more into bathing in a little bit, but this is just an adapted long-handled sponge and someone taking a knob and turning it into a lever and a sponge attached to a track on a suction cup. So I'll get more into some of these details later. But I guess I have a couple slides I wanted to make sure that, as occupational therapists, these are just takeaways in general that I feel are important to pass on when it comes to the early considerations for the prosthetic training piece of it. So the longer side is typically treated as the dominant side. The prosthetic training will begin, and should begin with the dominant side. It's helpful to learn independent use of each prosthesis before trying to bring them both together for a two-handed task. When they receive the prosthetic arms, teaching them how to put it on, then take it off, that process. It may be something pretty simple, may be something pretty complicated and involves a dressing tree, which we'll talk about later. It's gonna be unique to each person, and they may not be independent right away with this. And then once they receive their prosthesis, training should happen one component at a time, and add the components as tolerated, if this is possible. And then you really wanna begin training with a terminal device because it's gonna be the most used piece on the prosthesis, and we'll talk about terminal devices and wrist rotators and other components shortly.

But training, I could spend four hours on this one bullet point, but training should progress from controls training, which just means, how do they open and close a terminal device? How do they rotate a wrist? How do they bend and straighten an elbow? How do they lock their elbow in place? And are they able to follow commands, that Simon says or mirror image of a therapist? Once I see that piece of it is well

established or they have good control of that, then we move on to repetitive drills, which just take various objects and pick them up and drop them somewhere else. And once they've mastered repetitive drills, we can kind of move on to ADLs and two-handed functional skills training, such as taking a towel and folding that on a bench and then maybe progressing to harder activities after that. So a few more takeaways. I think a home evaluation is essential to evaluate what areas of the home may need modification in order for them to be independent with self-care or home management tasks. And I think adaptive equipment is mandatory or a must for someone with bilateral upper limb loss. It may be addressed before their prosthetic training begins or in conjunction with a prosthesis. It'll vary from person to person, depending on their level of limb loss, as well as their desires to be independent in their home. And we'll talk about adaptive equipment in more detail later, but I think that it's very helpful early on, and it may just be something to help bridge the gap until they learn how to do things without that adaptive equipment.

So a few more takeaways that, those individuals that are missing both arms or all four limbs should be shown different ways to accomplish basic self-care tasks, either with or without their prosthetic devices and including adaptive equipment. In the event they are without their future prosthetic arms for any period of time, it's essential in helping them maintain what level of independence they're used to. I think home modifications, if it's possible, if it's affordable, if it's something that can be done for them, especially in the kitchen and the bath, and then some easier tasks like changing out light switches and doorknobs as well as looking at smart home options. And then the last takeaway, I wanna mention something that wasn't as prevalent 20 years ago when I was first getting involved in this community is service animals. Definitely seeing a huge surge in individuals that are missing both arms using service animals because they are a huge help at home and in the community. So an example of smart home, what all can be done around the house. Since Google Home Assistant and Alexa have come around, that's been a huge help for environmental controls, being able to control lights,

appliances, TV, music, thermostat, setting alarms, and being able to unlock and lock a door, even opening doors, and video monitoring. And a lot of this stuff can be done through voice or through an app on your phone. So then after the early aspect of the rehabilitation piece, now it's time for the prosthetic piece to come in. As an occupational therapist, we work with them probably for longer stretches of time and over a longer period of time.

So a lot of the feedback we may be able to give a prosthetist can prove invaluable, so every patient's gonna be unique, and the prescription process is gonna vary from person to person. The things I find it's dependent on is the physician and the prosthetist's biases, their experience, and their knowledge base, and that also funding sources are a huge factor in the prescription process. So when looking at prosthetic design, so as an occupational therapist and working with someone in an outpatient basis, if we see them one hour each time, three times a week or two hours at a time, three times a week, and then talking to them about what's going on at home, there's a lot more that we might be able to talk about when it comes to the functional aspect of what they're going back to on a day to day basis. So I think our feedback is very important part of the team approach and talking with prosthetist about what works, what doesn't work, and then just kind of paying attention and learning from the prosthetist about all the different bells and whistles that can be done to the prosthetic arms. So here's just some examples of different setups.

So in this picture over here, this is a shoulder disartic on one side, above the elbow on the other. Sorry, bilateral shoulder disarticulation, excuse me, and then a shoulder disarticulation on this side and a transhumeral on this side. This is bilateral above elbow, but just using one prosthesis. And then here's an example of the first set of arms on this side, and then here's the second set of arms, which are much smaller. And so just can see that, over the course of time with someone that's bilateral, the first set of arms, it might be a little bit of trial and error and just a lot of communication with

the prosthetist to work on kinks and to make things more functional is a huge thing. So encourage your patients to be proactive in their care and to provide feedback because I see how independent people that are missing both arms can be, either with prosthetic limbs or without. But with prosthetic limbs, make sure to be proactive and have an open communication with the prosthetist to make changes as needed. When the prosthetic design considerations, I have seen a recent trend that the prosthetists lean towards fitting externally-powered, myoelectric arms for bilateral individuals, but body-powered based on the Skills for Life meeting that I chair, a lot of the attendees that come, the attendees are typically wearing their body-powered arms. That still seems to be a preference among most users, but there is a recent trend towards fitting externally-powered myoelectric prosthesis. And I think I mentioned this earlier, but bilaterals do require multiple sets of prosthetic devices or terminal devices for different tasks throughout the day and week.

So a Greifer or a electric hook might do something different than a myoelectric hand might do, a multi-articulating hand might do. So think of it as a tool in a toolbox. And so here's just a picture of all of the different devices. So we've got just some different myoelectric arms here, different backup arms, and then here are some different body-powered terminal devices. Now that they have their prosthesis, prosthetic devices, how do you teach them how to put it on and take it off? And here's a video that we'll share. This gentleman is a right transhumeral or a elbow disarticulation and a left below elbow. This gentleman's name is Art Hinsey, and he is an occupational therapist. He actually went into occupational therapy after his accident as a young child. So anyway, he is demonstrating how he is able to take his prosthetic arms off, lays them on the table. He is discussing his liners, or socks that he puts on to help protect his residual limbs using his teeth to help pull them on. And he has been doing this for many years, so he's making it look very easy, but this is very challenging and difficult the first couple times someone attempts this. Getting all of those straps and harnesses so they're not all crooked and trapped places, and then back to the next

slide. So Art was a bilateral body-powered demonstrating how he puts his arms on and takes them off, and the next slide is another video. This gentleman lost both arms in electrical accident at the shoulder level.

So we'll play this video. He is using something called a dressing tree, and that dressing tree is something that I'll go into a little bit more detail on the next slide, but the dressing tree in this scenario is something that stays put in his house. He stores his prosthetic arms on the hooks. You can just buy some wood, get some garage hooks at Lowe's or Home Depot. So he stores the arms on there at night, and then this is how he puts them on in the daytime or in the morning time. So he's using those hooks to help bring straps up to help keep the prosthesis on. It's just a unique socket design for a shoulder disartic. Okay, and the next slide. I believe it's another video. Okay, so this is a portable and adjustable dressing tree. This is just something you can build out of PVC pipe and, like I said, the work hooks at Home Depot or Lowe's. So just showing an example of a quick assembly. But that's something that someone can take home with them from the hospital. I would say a dressing tree is really appropriate for someone that's a bilateral above elbow or shoulder disarticulation. May not be as necessary, something of this extent might not be as necessary for someone that's a bilateral below elbow. You can maybe make something a little lower profile. Sorry for the ugly camera.

So what is happening, you can see that these horizontal bars can be placed onto the dressing tree and at whatever height or position the patient may need. The hooks can be... I guess I can't do that during a video. So the hooks can be placed at different heights and they can be placed on the vertical bars as well. So anyway, just showing you an example of what a dressing tree is, and then we'll go to the next slide. Dressing tree can be used for a lot of different tasks besides just don and doff of prosthetic arms. But we'll get into a little bit more detail of that in a second. So when it comes to the prosthetic training, someone that's a bilateral below elbow, bilateral transradial limb

loss, we are looking at a terminal device, whether it's a myoelectric hand or a multi-articulating hand or a body-powered hook or an electric hook. So that's our terminal device. Then we're also looking at possibly a wrist rotator and wrist flexion. For someone that is missing their arm above elbow, we are also gonna add an elbow component. So can they flex and extend their elbow and can they internally and externally rotate their humerus, the humeral section on their prosthesis? And then for a shoulder disarticulation or forequarter, we're gonna be adding a shoulder component. So the higher level, more complexity, more weight just gets more difficult. And so when it comes to, this is another video, when it comes to learning how to use a prosthesis, the first example is gonna show you someone using bilateral body-powered and demonstrating the various ways they can flex and extend their elbow in this picture.

So he's just basically using humeral, sorry, humeral flexion to kind of bring that arm forward so that he can flex and extend his elbow. When he relaxes, the elbow extends. And then he'll slowly move on to talking about how he locks and unlocks the elbow. So there is a piece in front here that, if you'd kind of do an elbow depression or, I would think of as a down, back, and behind you, horizontally or vertically behind you, that that motion will help lock and unlock the elbow. And there's a cable that's attached that supports that ability. So he's demonstrating how to lock and unlock his elbow. And he also, I think, I don't remember next if he is going to demonstrate how he rotates his wrist. Yup, there we go. So he'll demonstrate how he's opening and closing his terminal device. In this case, his elbow has to be locked into some degree of flexion or extension, and then once the elbow is locked, he can then do that same humeral flexion motion to operate his terminal device. So he raises it forward, and the terminal device opens. When he relaxes the shoulder, the terminal device closes.

And then, I believe he will show his wrist rotation after this is finished. And wrist rotation, he's making it look very simple, but this can be very complicated for some people to pick up, but it's basically squeezing his shoulder in, humeral adduction, and

then kind of moving his shoulder forward and backward, extension and flexion, in order to rotate it. And then after he brings his elbow out of adduction, the wrist will lock in place. And then, if we can go to the next video, I'll show a demonstration of someone doing myoelectric controls training. All right. So this video is impressive to me because this gentleman is a transhumeral on this side, and shoulder disartic on this side, and the way that his two arms are set up are completely different. And so the mental capacity that he requires to be able to follow and do exactly what the therapist is telling him to do that quickly, and switching sides and getting from terminal device to elbow to wrist rotator that quickly, this is very impressive, in my opinion, and something that may take months to get to, depending on, again, kind of the problem solving capability, the mental capacity. Some people might pick it up a little bit faster. All right, and we'll go to the next slide.

All right. So after we've addressed the controls training, and I haven't gone into a lot of detail on the repetitive drills piece of it, but looking at the activities of daily living. So we kind of talked about, we've touched on the four higher priorities for people, but now kind of looking into bathing, toileting, grooming, dressing, meal preparation, and then community reintegration and their leisure activities. So when it comes to bathing, I've just got a few bullet points here, and we'll get into a little bit more detail on this, but looking at maybe making modifications, if necessary, to a large shower stall, a non-slip floor or putting in a mat, a bath bench if necessary. Maybe adapting or modifying any of the knobs into levers. And then anything wall-mounted is helpful. And that dispenser could be motion-activated, it could be automatic, it could be a push button so they can press it with their residual limb or a different body part. And then one of the easy modifications or things that I'd recommend is for people to go get those large shampoo or conditioner bottles that have the pump dispenser because, again, they can manipulate that with their residual limbs if they're long enough.

Here is an example, and you can't see the floor, but think of when surgeons are scrubbing in for surgeries, they have the foot pedals at the base. So these are foot pedal dispensers, and these can be mounted in a shower as well so that, if they have feet, they can use their feet to dispense shampoo or soap onto their head or body parts. This is another example of some creativity, is just putting little brushes around the wall. I've seen those mats that you wipe your feet when you come in the back door, I've seen those mounted on shower walls. Even the suction cup scrub brushes, putting those all over the shower at different heights and levels, and then you can rub your body onto those to scrub different parts of your leg, back, arms. And then poof sponges to help, and that's basically placed onto a non-skid stepstool that you could place in the shower and kind of sit down if you wanna kind of rub your bottom back and forth to clean that area as needed. And again, here is the levers, modifying any kind of shower from a knob to a lever so they can be either accessed with their legs or turning it on with their prosthetic devices before they get in the shower.

So here are some more examples. This is being able to turn the water on, see, there's the green, turn the water on with this component here. And then being able to change or control the hot and cold, and they can do this with their feet, again, if they have feet if this is placed at the base of the shower. And then this setup is really amazing to me as well. This thing in the corner here is called a Tornado Body Dryer, so once they're done showering, instead of having to try to grab a towel somehow or manipulate that on their body, they can dry off with this body dryer. Then, here's that foot pedal mount that you saw earlier. And then here are some wall-mounted dispensers, and if you see this kind of elaborate tubing system, it's connected to the soap or the shampoo or the conditioner then travels down these tubes and into the sponges that are placed at strategic heights and levels so that patients can rub their arms or heads on them to get themselves clean. And then here's a unique situation I've seen. Basically, plastic liners from inside old prosthetic arms adapted and fit with something from Texas Assistive Devices, which is called an enabler unit, and you can attach a little poof sponge onto

the end of it. And so this allows someone to shower and reach their back and then even with some wrist flexion built into this enabler device so they can reach the back of their neck. So just some creative things out there.

Okay, and then we have a video on the next activity of daily living, which is toileting. So, again, this is Art Hinsey, and you can watch here how he manipulates the toilet paper and how he gets it ready and then how he positions his hook and how he uses his left side because it's the longer side. Folds it up, flexes his wrist, and that allows him to get closer to midline for tasks such as wiping. And then the next slide. I'll mention that the bidets are extremely helpful early on, but they're not gonna be out in the community. So I know that several of the patient I've worked with have said the bidets have given them the confidence to try out doing things at home so that once they do get out in the community, they have the confidence to be able to be independent out at something in public, friend's house or a restaurant or whatever have you. So just wanting to show some pictures of some brushing teeth or grooming. So here's an example of someone doing the activity without any prosthetic devices using their residual limb. Let's see, there we go. Using their residual limb. I've seen people place this inside of a tube on end of a gooseneck clamp, and they just move their mouth back and forth on it, and then others may be able to use a prosthetic arm to brush their teeth. And then grooming, other aspects of grooming. So we've got some suction cups that can be adapted to fit a hair dryer or deodorant, and then a gooseneck clamp attached to some wall, bathroom, bedroom, and then this is an electric razor so he's able to shave his face independently without necessarily having to use his prosthetic arms. And so on grooming, more ideas. This is a hairbrush that someone adapted and mounted to a wall, so then the person can then bend down, stand up to brush their hair. And then I think I have a video next. Sorry, not next, it'll be in a few seconds.

So just wanted to mention before I get to that video is that there are gonna be some unique things that you run into when working with females opposed to a male that is missing both arms. So the women tend to be more flexible than males. Hair, being able to style their hair, do their hair is a consideration. Being able to put on makeup independently, being able to manage bras either with their feet or with prosthetic arms or using a dressing tree or pulling over a sports bra, something with Velcro, whatever adaptations might need to happen. This is an adaptation made to a tweezer that fits onto a prosthetic myoelectric hand to be able to tweeze. And then the monthly cycle. So there are adaptations for inserting tampons or there's special underwear out there, and then many just will have a physician write prescriptions for birth control so that they don't have to have a cycle. So here's a video of one of my friends putting her hair up in a ponytail. She's missing all four of her limbs, and just showing you that it's possible. She's attached this thing called the 1-UP Hair Tie, I believe it's called, and she's attached it to a doorknob. And she's using her residual limbs, pulls it over her hair, and she's got a great hair type for this. There's no way this would ever work on my hair. But to be able to do that is such a big victory. She was very pleased.

All right, and the next slide. So we're gonna talk about dressing, and so back to the dressing tree, just other examples. So here's smaller PVC pipe with smaller hooks, and this gentleman is gonna show how he puts on his shirt using a dressing tree. So having to bend down and then get himself and his prosthetic arms into the sleeves, using those hooks to help and his mouth to help, and then using a button hook to be able to button his shirt independently. And then here is another video. This is the same gentleman we watched earlier using the dressing tree for him to be able to take his shirt off. Again, this gentleman makes this look very easy. I can't tell you, I've spent 20 minutes with someone getting a T-shirt stuck on their head, so it's trial and error. Don't think it's gonna be smooth and perfect the first time. We'll move on to the next slide. So when it comes to dressing, the preferences are huge. So is it going to be elastic? Is it going to be slip-on shoes? Is it going to still be tight-fitting Levis or Wranglers? Is it

gonna be high heels? It all kind of, what are the priorities and how much effort do they wanna put into getting dressed everyday? And so it's all a personal preference.

So just showing you some examples of slip-on shoes and elastic pants. And then I have two back-to-back videos. Sorry, Caitlin, I'm making you work. So this is a really cool little contraption, and you could build this into a dressing tree. Maybe not the rail that it's on, but this work clamp device. So you can stick the sock on there using your feet, again, if they have feet. If they don't have feet, they'll be on their prosthetic limbs, but he's able to put on his sock utilizing this little device. Again, it doesn't have to be on this rail, but his friend made this, very inventive and creative. And so imagine now trying to get the other sock on. So we'll play the next video. So now this is an example. It's just a lot harder when your toes, that you're used to doing everything, are now encapsulated in a sock and trying to help get the sock onto the other foot. But again, he makes it look very easy. He's been doing this his whole life. This is an example of someone that lost their limbs at an early age. All right, and then we'll go back to the slides. So all these are aspects of dressing and the dressing tree or different adaptive pieces of equipment. And so here is an example of maybe a shoe that's retrofitted. So this is a lace-up shoe, but this person has taken it to a place to get it retrofitted with a zipper. And let me get my little green arrow so I can show it a little bit more clearly. So they've retrofitted the boot with a zipper as well as put a magnet so that it's easy, maybe a hook or a dressing tree on the base of a dressing tree helps him pull that ring up and then place it on the magnet.

So moving on to feeding and meal preparation, just some examples of maybe helpful adaptive equipment. So we've got, in the middle top here with the green arrow, these are scoop bowls. You could use plate guards, but just something to help keep the food on the plate. And then Dycem down here to help keep the plate stable. It could be used for so many different things, but I'm just taking about feeding here. This one-touch can opener here is easy to press with a residual limb, and it basically then

just moves itself around the can. And then this electric jar opener, so helpful for people that wanna be independent in the kitchen. This is probably a go-to for every person I've ever worked with. It's just a suction cup cutting board, adapted cutting board, so it's got a lip over on this side to be able to spread something onto a piece of bread, then it's got some stainless steel nails here that you could place fruit or vegetables to be able to cut. And then down here is a rocking knife. Maybe the rocking knife is suitable once they get their prosthetic limbs. There's some other ulu knives or large pizza cutters that are used as well that are helpful. Just, again, giving you some examples that are happening in the kitchen.

Okay, we've got another video of someone cracking an egg with their myoelectric prosthetic devices. So he's got a Greifer on his left side and a myoelectric hand on his right side. Again, just showing you it's possible. He makes it look easy. With the actions that he's doing and the way he's gripping devices, it doesn't come so natural to people right off the bat. This is something that kind of has to be learned and picked up, so if he's picking up something from the tabletop, if he's picking up a Coke can, his wrist has to be in a neutral position. If he's picking up a pen from a countertop, his forearm has to be in a pronated position. So a lot of this stuff is not natural. Again, he's making it look very easy, but one of the things, as occupational therapists, we look at is making sure that they're not using contorted body movements to grab activities and that they're utilizing the device instead of bending their body in awkward ways. And then we can go to the next slide. When it comes to eating, here I just wanna talk about how essential this is. This gentleman is a shoulder disartic on his right side and a transhumeral on his left side, and how essential a wrist rotator is for someone that is missing both arms. And if prosthetists try to talk someone out of this, I always try to chime on and say no, we need the wrist rotator on at least one side, the dominant side.

And we can move to the next slide. All right, let's see. So I'll quickly kind of go through some adaptations around the house when it comes to feeding, but there's swivel

utensils that can be used, right angle aspects that can just fit directly into the end of your prosthesis, into that Texas Assistive Device enabler process system. These devices have been specifically made and welded for someone. Here's what that looks like inside the prosthesis. And I've seen people take a regular butter knife from home and create a little welded pocket on the outside of it so it first directly into the end of a terminal device. Easy access at home is imperative, so making sure someone, don't get a screw lid bar of mustard, get something that's a flip cap. It's easy for them to manipulate with their mouths or their prosthetic device. Large mouth containers. Instead of keeping chips or crackers in a bag or a box, put them in these devices so they're easy access. Pull out drawers, sliding drawers underneath a cabinet makes life so much easier than trying to get something and digging around underneath a cabinet. And then easy access when it comes to tea or water. So it's a flip dispenser that they can get their, dispense their drink into their cup. And then, for privacy concerns, if doors are a huge hassle, you can do something that are just these swing doors and, again, turning knobs into levers. Quick and easy ways of doing that. And making sure light switches around the house are potentially changed out to rocker switches, just a little bit easier to control or push on with residual limbs or prosthetic arms.

Wanna show a few things about leisure activities. This is one of the things that, if I'm able to, I like to start with leisure activities just because it's something that's motivating to them and it's what they wanna do and get back to. I know that they really wanna get back to cleaning the house and folding laundry, but I think that the things that they do outside of the house is what gives them joy, and so these might be the things I put a higher priority on. So this is an example of someone, a bilateral above elbow fishing. And then gardening, this is a really cool little thing that he built for his feet, a little shovel on the end of that device that goes over his foot, that boot. And then being able to mow the lawn and using his feet to steer. So I'm not gonna play the next video, Caitlin, just 'cause I wanna get to other driving things. Oh, and then working out here. Being able to get back in the gym was a high priority for Scott, so his insurance was

great and was able to provide workout arms. So community reintegration is something I like to address as well, getting back out and being able to pump gas and pay at the station with a credit card. Going into the grocery store, being able to do counter service restaurants, ordering and paying, and going through a drive-thru even. And so, in this situation, just show you kind of a slideshow of someone going through the grocery store and getting items from the shelf with his myoelectric arms, paying, and then a funny thing that happened at the end when his prosthetic myoelectric hand got stuck on the grocery cart. So had to figure out how to get that off. So things happen, trial and error. A

nd so here, in driving, I'm just gonna show this picture as a setup of a gentleman. This is really old school, this is probably from the '80s, but technology hasn't changed that much in this situation because you can see right here, he's still able to manipulate kind of reverse, drive positions with his body-powered hook, and then he's steering with his foot with his plate down on the floor. So he's using his right foot to do gas and brake and his left foot to steer. And then just some adaptations you can put into the levers and the handles on the doors. Little loop there to be able to use a residual limb maybe to pull on it to open it. Some easy plastic adaptations you can put on to be able to manipulate things with feet or prosthetic limbs that don't require expensive trips to car dealerships. Magnets in your foot, now this is kind of staples in cars these days that allow you, as long as your fob is near your car, that you can put your foot or something underneath the car, it'll open up a door or a hatch. And so just some funny anecdotes, being able to use his head in an emergency situation if needed for honking. Using a mouth stick in certain situations for different controls in his car, but in this situation I wanted to show this. It's cool because he's got a headrest that has controls built into it that allow him to manipulate blinkers or temperature or wipers or horns or lights. So I just thought that was fascinating. And again, he's kind of got a similar, the foot steering ability down here.

All right, and I'll fast forward through those. I wanna show this video. Hopefully it doesn't take up too much time. Congenital born without all four limbs, but being able to buckle herself in, start the car up, and basically press buttons on a touch screen and use her residual limb on a steering wheel to drive independently. So you'll get a view here in a second of her touch screen. So it shows you left signal, right signal, temperature, air control, light switches, and then she's manipulating to get to her ramp so that she can get out of her car. And we can go on to the next slide. All of these things I show, I'm really just trying to make sure you see what's possible, and that's one of the big things I try to pass on to individuals in this situation. So I mentioned at the beginning, talking about someone that may have been born without their limbs or lost them at an early age versus losing them as an adult. So many times children are taught how to use their feet, and adults can be taught how to use their feet as well, as long as they're flexible enough, strong enough, don't have any other issues that would prohibit them from doing that, but in this particular picture, you can see, this woman is so adept. She's actually an occupational therapist, too, but she is using her toes to light a match. She can take a picture. She can drink from a Coke can. She can drive her car, go through a drive-thru. Anyway, she's very impressive, and comb her hair. Most anything you could do with your arms, hands, she can do with her toes. The use of mouth, other body parts such as shoulders, knees, are fine. Teeth are not good in the long term because of them having the potential to break, and then whether they're gonna use prosthetic arms or no prosthetic arms. But over time, someone that uses their feet, they might have hip issues that'll need to be addressed later in life. And then what have we learned?

We've learned that individuals who have lost both arms are very inventive. This gentleman is lighting a cigarette on a candle that just kind of constantly stays lit in his garage. They're motivated by things that make them happy, such as maybe race car driving in this situation. A strong support system is very important, and the need for multiple prosthetic arms and terminal devices is mandatory. That attendant care is

necessary, either for short term or long term, and that money or good insurance is going to help a lot. And so I think the final thing I wanna mention because I feel so strongly about the Skills for Life meetings. It impacted me so much at my first meeting in 2002 to see what that face to face interaction was like and the learning that took place that couldn't happen by phone call and couldn't happen by email. And Facebook is great these days, and Skype and FaceTiming. All of that stuff is great, but the face to face is so important and it makes a world of difference. And so I think that peer mentoring, when it can happen, is by far and away, more helpful than anything I could ever teach someone. And so this is a gentleman that's lost his arms 15 years ago, teaching someone that lost his arms within the year maybe how do something at at dinner and then taking him out in his adapted truck and letting this guy drive and show him what adaptations he might need for his future vehicles. Anyway, that wraps it up. So if you have questions, please feel free to email me or call anytime. And then Caitlin or Fawn, let me know what to do next.

- [Fawn] Hi, Shawn, we have a couple questions coming in. So let's pull those up. Let's see, where would you take shoes or boots, et cetera, to get them retrofitted like the ones with the zipper and the magnet?

- [Shawn] I would make sure to find those shoe hospitals to talk to them, since they are the ones that tend to rebuild shoes or make shoes. It's kind of a dying art at this point, but someone that has machinery that can work with leather.

- [Fawn] I don't see any other questions coming in, so we will wrap for today. A reminder of a couple things. One, the handout is provided as a Google Drive link. You can see it there in the box under her picture. So go ahead and access that. You'll be able to see it, you just won't be able to download it. Also, she's provided her email, so please feel free to reach out to her should you have questions at a later point, which I'm sure many of you might. And then lastly, just a reminder, tomorrow, we have the

Electronic Multi-Articulating Hands and Digits, Toe-to-Hand Transfers, and Hand Transplantations. So I hope you can join us again, and if you missed any of this virtual conference this week, the recording should be in the library shortly. So I will go ahead and wrap. Thank you so much, Shawn, for a great presentation.

- [Shawn] Thank you so much, Fawn. Thanks, everybody.

- [Fawn] Have a great day, everyone. Hope you join us again on continued and occupationaltherapy.com. Bye.