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[00:00:05] Let's see. Yeah. So good morning. Good afternoon. Good evening to everybody. Welcome to this webinar on with the title of Overview of Multidisciplinary Amputee Rehabilitation. This webinar is organised by the International Society for Prosthetics and Orthotics, which is a multidisciplinary organisation bringing together physical therapists, occupational therapists, surgeons, rehab doctors, prosthetics, orthotics, etc. interested with the provision and rehabilitation of prosthetics and orthotics. So today we will have two speakers, uh, Laura Burgess from the UK. She's a clinical specialist physical therapist. She's a she has a lot of experience working with empathy, both in in the UK but also in the different, different contexts. We also have Jon Batzdorff from the US. Okay. Uh, who is a Prosthetist based. And he also, uh, have a lot of experience dealing with the management of people with amputation, both again in different contexts, and they are used to work together to provide training in different contexts around the world. So this is I think is a perfect team to start. So the the session, the presentation will be, uh, will last for about 30 to 35 minutes, 40 minutes. And then we'll open up for questions if there's any question at the end. So John, I'll give you the floor okay. And then you will see they will move to each other to one to another one to Laura to John, John to Laura. But for the moment, John is starting. John to you.

[00:02:07] Thank you very much. Um, so, um, I'm very happy to have been invited to make this presentation, and, um, Laura and I are, uh. And thank you, Claude, for the introduction. And as as Claude said, Laura and I, uh, have, uh, presented together before, and we've also worked in many different settings during this presentation. There'll be photographs, um, that illustrate what we're talking about. And many of these photographs are in, uh, different projects or from different projects we've worked on. And, uh, this particular photograph, the first one is in Guatemala, uh, where we're taking a little bit of a break so you can see, uh, B and Laura and see what your presenters look like today. Uh, a little bit about us. Uh, and I'll speak about myself first, and then Laura will speak. Uh, as Claude mentioned, I'm a prosthetist and I practice in California, in the US. I also, um, am founder of director of prosthetics. And, uh, we that's a NGO that does, uh, training, multidisciplinary training in prosthetic and orthotic, uh, uh, sector. I'm also board member and treasurer of Ispo. And, uh, I'm clinical prosthetist and trainer. Laura.

[00:03:44] Thank you very much. John and Claude, um, it's a pleasure to be with you today. So I'm Laura Burgess, I'm a clinical specialist physio working in amputee rehabilitation in London and the United Kingdom. Um, and this year will be my 30th year working in the industry. I'm a past board member of Ispo and currently, um, chair elect of the CPD committee. Um, and I work with John Um on various prosthetic projects all over the world as a physio and as a trainer.

[00:04:19] So what we'll be talking about, uh, today is a review of the patient needs, because the patient is the centre of rehabilitation. So we'll be talking about a review of the patient needs and rehabilitation priorities. We'll also talk about a timeline of from the time that the, uh, amputee has the amputation and, uh, how they proceed through the rehabilitation and prosthetic fitting process. Then we'll go through an overview of each phase of rehabilitation, and we will finally review the roles of the prosthetist and physiotherapist. In more details, you can see a little illustration that just shows all the pieces of the puzzle that go together.

[00:05:10] So just to introduce the topics that we're going to cover today, um, we'll talk a bit about the actual amputation in the post-operative care and wound healing. We'll talk a bit about some of the information that we give our patients, and the importance of setting realistic expectations for our prosthetic users of the future. Um, the importance of early independence, um, and really good, effective pain management. Um, early on in rehab, um, the fact that we want our patients to be moving early and not spending prolonged periods of time in bed rest and the return to independence, which of course, helps, um, with people's mental health and general well-being. Um, and then I'll just give an overview about the importance of improvement in cardiovascular fitness, muscle strength and range of movement at the joints and soft tissues, and how we then undertake pre prosthetic rehab before people are provided with a prosthetic limb.

[00:06:17] Uh, when we talk about the prosthetic needs of the amputee, fairly universal for any amputation that the person using the prosthesis, the amputee requires five main characteristics of the prosthesis. They need to have comfort. You can have the most elaborate and the highest level of components on a prosthesis, but if it's not comfortable, it will not be able to be used. Uh, they also have to have function. Uh, that means that the socket has to work properly and all the components have to not only function, but they have to be in proper alignment. They, the, uh, patient has to feel

stability. They that means that they're not going to fall. Um, they have to feel the prosthesis is reliable, that they know that it's well made and will not break. And, uh, that the components are durable. And also it has to meet the cosmetic needs and expectations. That doesn't mean that it has to look exactly like a normal leg, but it has if, uh, the prosthesis, the amputee is okay with it looking, uh, where you see all the components, then that's okay. But if they like to have a cover on it and that's what they expect, then we finish it with a cover. So we help work with the amputee to set expectation. We meet that expectation. Uh, this is a general idea of the timeline. And you'll see at the top of the timeline. It says amputation then pre prosthetic training. That's the training they get before they receive the prosthesis. Then they get there's an assessment. And this is also uh multidisciplinary. And I also use the term interdisciplinary. It means that it's not just more than one discipline but that we work together. Um, and then we have the measuring and casting, then the fabrication and then the fitting and gait analysis, uh, training and prosthetic adjustments.

[00:08:30] This is all very much the physic and the prosthetist and the patient, uh, working together. And then follow up, you'll see underneath the timeline where it shows for each, uh, phase, who is involved. And in the very beginning, we have the doctors, the nurses and the hospital team during the amputation. Then the physiotherapist is involved. Then the prosthetist and physiotherapist. The prosthetist and then again the prosthetist and the physiotherapist. And you can see, uh, day one is amputation and, uh, the periprosthetic training. It really varies. Uh, I say, uh, it begins from day two to day 45. Um, but really, everything depends on the cause of amputation, how, uh, how quickly healing occurs and, um, what kind of facilities and, uh, care is given to the, the patient, but we've given just, uh, the typical timeline and, uh, the prosthetic assessment usually takes place about a month after the amputation and sometimes a little bit sooner. Sometimes it takes longer if healing is taking longer, for example, in a person that has vascular disease, then it could take longer. Um, measuring and casting then would take place on day 30. Fabrication uh, could take about two weeks. And uh, during that two weeks though, the all that training continues to take place. So we try to avoid the amputee just sitting on bed rest. So rehabilitation takes place even during the fabrication of the prosthesis. And then, uh, again for about ten days is, uh, this process of fitting, finishing the prosthesis and trying it, making adjustments on it. And then the follow up goes on from really for the the rest of the person's life, but more intensely right after the prosthesis is delivered and then whenever needed, later on.

[00:10:59] Um, I'm obviously not a surgeon. Um, but we have to start with the fact that we hope that the patients and we know that they do better if they are included in the decision, um, to have the amputation, they understand the reasons for the amputation and, you know, best practices, if you can, that the some of the rehab team have a discussion with people before their surgery to talk about the longer term, talk about the rehabilitation, uh, program and give some rough idea on sort of timescales. So what we really want is that our surgical colleagues are thinking about preparing a residual limb, which will be good for prosthetic use. Um, so while they need to remove that distal part of the limb, they're thinking about using a prosthesis. And these are just some of the things, um, which when we're assessing a residual and we can consider that for a transtibial level that we've got, the fibula is slightly shorter, because what we're trying to achieve is like a conical shape. We want that tibia to be, um, bevelled to about a 45 degree angle. So it's smooth, which makes it much easier when designing a socket and that the nerve ends are buried deep in the muscle tissue. Um, while they will all form a neuroma, those neuromas don't necessarily become painful. Um, and it tends to be if they're left very prominent in the tissues, that they might become painful and in the transfemoral level. Um, it's good to consider a myogenesis where we actually fix, um, the muscle into the end of the femur.

[00:12:33] Um, which which does make life easier for prosthetic colleagues. Think about length of residual limb. Normally, we aim to retain about two thirds of the femoral length, and you've got to consider a clearance of about 12cm Integrators for the prosthetic knee. Um. Pain management is really, really important. I'll come back to that a bit later on. Um, early on. And also that we get the good post-op care, um, so our patients get up and get moving. What we don't want to do is let patients lie in bed. They should be getting up day one after the surgery, out into a wheelchair and getting moving. Next slide please. Um, then we think about pre prosthetic training. So really um, first of all it's about realistic expectations. Um, and many patients want to know, you know, will I be walking. When will I be walking. Um, so, um, for some patients, it's easier to set expectations based on what we have to say is that we need to do a assessment as we go along. We go through rehab, uh, we see how they progress. Healing is very important. Um, so we want wound healing to happen as quickly as possible. Um, which again helps us to get into a socket. People don't have to be fully healed. Um, but it helps. So that can be things like, are they having a good diet? Are they, um, having

plenty of fluids? Um, and are they reducing the risk of infection? So that will be more around dressings and wound care. Trying to reduce oedema is very important because that helps to improve the shape of the residual limb before the prosthetics take the cast.

[00:14:17] There's lots of different things that depends around the world where you are as to what's available. Some places only have bandages to use. Um, so bandaging is an option. Key thing is, it probably needs to be reapplied very frequently and really try and get even pressure throughout the bandage. Um, I'm fortunate that we use compression socks, which are specially designed, um, to be used with amputees. Um, some people might have something like this. What you see in the pictures, Tubifast, which is an elasticated white dressing. And the key thing there is to take it above the knee for the transtibial level. So you get a nice even shaping of the residual limb. And then things like elevation active exercise also help to reduce oedema. Pain management is really, really key. Um and that should be used early on. There's very, very few amputees who aren't going to need any type of analgesia. Um, and many of the drugs that we use are not addictive drugs. Um, and we need to think about both the pain in the residual limb from after the surgery and the phantom limb pain, and some of the medications that are very good for neuropathic pain. So do use, um, analgesia medicines to help reduce pain early on. Um, and for the first few months of rehabilitation to make sure that our patients are comfortable. Next slide please. Um, then these are key things in pre prosthetic training and physio that we're considering that we want for our prosthetics to be able to make the best type of prosthesis.

[00:16:00] They want full range um at the hip. That means that no fixed flexion at the hip flexors. Um, so this is Thomas distraction, um, which you can see which stretches the hip flexors. And there's different ways to do that. You can do that over the edge of the plinth like you see in the pictures. And later on we also get our patients to do that while they're wearing a prosthesis. So think about hip and knee full range, but also think about the spine. Um, if we're patients are spending a long time sitting in wheelchairs and not moving around not walking, um, it's good to teach them a range of different structures for the spine as well as hips and knees. Thank you. Next slide. Thank you. Muscle strength. So for our patients to be able to walk with a normal gait pattern as near normal as possible, they definitely need, um, good muscle strength. So they need to be able to exercise against resistance. And that might be in the lower limb. So it's good to get your hands on. And you work the muscle through range like you can see in the pictures on

the left. Um, and there's many, many different types of exercise that we can use using the body weight for resistance or indeed for using theraband, using different, um, uh, whatever equipment that you have. But, you know, you can just do resistance using the human body for our transfermoral uses. It's really important that they learn to sit to stand independently on their remaining leg, um, because the prosthetic limb will not actually help them get up from the chair.

[00:17:38] So that's a simple thing that everyone can practice. Next slide. And then, um, it's really key that we try and improve the cardiovascular fitness for patients up with trauma. They generally don't suffer too much um because they literally have the trauma and then they move straight on into rehab. Um, so they're they're already likely to be reasonably fit. Um, but walking with a prosthetic limb takes more energy and takes a higher level of fitness. So anything that we can do, and this might depend on what equipment, um, that you have available to you. Um, but even basic things like, you know, the ability standing on one leg, doing some squats, if you can do hopping with bars, parallel bars or with crutches or a frame. We're very fortunate in the United Kingdom that we have a range of these early walking aids, like the Pam aid, which, as you can see, um, with the frame, which has an inflatable bag, um, inside of it, um, and I've introduced that a couple of places where I've now travelled with John. Um, and it's an excellent early walking aid. Amputees can use that after surgery, maybe two weeks after surgery, and really helps to get rid of oedema and build their fitness. And they can walk around with crutches. Um, and then we've got the other aid, you see top left, which is called a walking aid for Transfemoral users. Next slide.

[00:19:10] These photos, by the way, are taken, uh, in some of the areas that we worked. And so we've introduced these, uh, early walking devices and provided them now in, uh, quite a few of them in Ukraine and in Latin America and trained, done trainings in how to do this early walking, uh, exercises and also the use of these devices that we've provided. So this can be used during the healing process. So it's not they don't have to be completely healed to begin using this, so it's really good to get them started before they receive the prosthesis. Uh, as, uh, at about one month after the amputation, we begin, uh, we meet to do a prosthetic assessment, and we do that as a team. First of all, we introduce ourselves and, uh, to the patient and to the patient's family, and we meet the patient. We find out the patient history, including the cause of amputation. Um, what type of activities they, uh, were engaged in, what type of work?

Uh, they did. We also want to find out, um, we do a physical examination of the residual limb. We do a physical examination of the entire body. We look at other injuries or comorbidities. So, uh, many people might be, uh, a bilateral amputee. They may have vision problems associated with the injury that they had. They could have cognitive issues.

[00:20:50] And so we want to consider all of that. Uh, we ask the patient what their goals are. And, um, we discuss the patient goals. We look at the family support to find out what kind of a, um, what kind of people will be able to help and also what kind of a living situation the amputee lives in. Uh, we determine if the patient is a candidate for a prosthesis. In some instances, uh, especially with, uh, upper extremity, uh, they they may not choose to wear a prosthesis once they find out the limitations of it. Or they may, uh, due to the length of, uh, the length of the residual limb or due to neurologic problems, they may not be a candidate for a prosthesis. And then we start looking at other ways that they can achieve optimal independence without the prosthesis. But we determine and discuss if they're a candidate. And we also start to get an idea of what the need for assistive devices. Will they use a crutch? Uh, crutches? And we do need to be flexible about this. So everything all the assumptions that we make, um, we do the best we can, but we also change the assumptions as we move along.

[00:22:18] And John, can I just add, I think it's really key that we think about how motivated people are to, um, use a prosthetic limb, their level of motivation, their are they going to participate in rehabilitation and physiotherapy, because if they're not prepared to actually participate in a rehab program, then there's no point to give them a prosthetic limb to walk, because they need to have the rehab alongside having the prosthetic limb. And again, it's really important for our transfemoral users that they physically can sit to stand through their only one remaining leg. Thanks, John.

[00:22:59] Uh, a little more detail about residual limb assessment. When we look at the residual limb, we want to see what the shape of the residual limb is. We also want to look and see if there are skin grafts, bony prominences, the length of the residual limb and the scarring in any sensitivity. And this is, uh, not necessarily to determine whether they are a candidate or not, but what type of components we're going to use, what type of a socket design, what kind of skin interface. And if we need some type of, uh, of

surgeon intervention to, uh, perhaps revise the, uh, residual limb to make them a better candidate. So you can see here that, uh, examples of all the different complications or challenges that we would have in fitting a, uh, abnormal residual limb. Then we have to design, uh, select the prosthetic design. So we consider the assessment that we just did. We also consider the patient wishes. Sometimes the patient have, uh, talked with other patients, or they've done research on the internet, or they just find out from what we've told them, we give them some different choices and options. So we look at what they want, and we have to consider the weight of the components. Uh, some of them that have more functions also weigh more. And we have to weigh the, the, uh, benefits versus the disadvantages of having that extra weight.

[00:24:40] We consider the function, the durability, and the reliability of each component. We also want to consider the patient's ability to receive long term use, care, and maintenance of the component. So if the patient lives very remotely and not near the rehab centre or the prosthetist, then they need something that requires less maintenance and less care. We have to consider the patient's ability to don, doff and maintain the prosthesis if it's a lower extremity patient, for example, and they have also upper extremity, uh, challenges either an amputation or some type of limited use of the upper extremity. Then we use a different type of prosthetic design or a different socket design. Then if the patient has full use of their upper extremity, we discuss the options with the patient and the family. And then finally, we come up with a prosthetic design. Um, I'll let me mention before that, though, we come up with a prosthetic design as we go through the process. If we find out that there have to be changes in the prosthetic design, we remain flexible and we make changes as we go along. And you can see here in the pictures on the left is a more basic prosthesis for a hip disarticulation. And there our goal is mainly to have the person independent and walking. And uh, then when you have somebody that has a bit lower level amputation where they have more residual limb, we could have, uh, prosthesis after they have a prosthesis for walking, we could make some that allow them to run.

[00:26:28] And, uh, this is from a project that we did in Ukraine, uh, with, uh, Veterans. And, uh, there they have already, uh, been walking and now they want it to be able to do some competitive running. So we did a project to help them achieve that goal. Uh, on day 30, we do the measuring and casting. And again, we want to do that specifically take the measurements and the cast as related, uh, to that prosthetic design. And we do all the necessary measurements and cast before we begin. Then we begin the fabrication. Uh, we fabricate according to the prosthetic design. And, uh, as we do the fabrication before we finish it, we do preliminary fittings and adjustments prior to finishing the prosthesis. Uh, sometimes, as we do that, preliminary fitting, depending on where we're at, we begin to work with the physio already. And, uh, in testing that prosthesis before we finish it, because at this point, we can decide whether we need to change the socket design or the component design. We want to ensure comfort and function and appropriateness of the appropriateness of the prosthetic design before we finish the prosthesis. Laura.

[00:28:04] So in early process of when the limbs fitted, there's key things to do. Um, and I think it's very important to start with teaching our patient to transfer weight over the prosthetic side right at the very beginning, and this helps to reduce gait faults later on. So first of all anterior posterior. So moving the weight forwards and backwards over the toes over the prosthetic heel. And they can be standing in parallel bars ideally daily for some people feel safe and then lateral weight transfer. So left to right, left to right. So you're teaching them to take load over the prosthetic side. Think about teaching our users standing posture. Stand straight forward. So level shoulders. Have they got level pelvis. The feet are hip width apart. So generally our amputees stand with their feet very far apart because that helps them to balance. And are they thinking about transferring their weight equally over both lower limbs left and right. So we teach them at any point when they're standing that nice level, upright posture. And in our early gait re-education where we're teaching them how to use their muscles, um, either within the socket or not in the socket to control their movement and posture. And when they're standing and when they're walking. So, for example, if they're a transfemoral amputee, they're coming into stance phase. They need to engage their glute muscles to stabilise into the back and to the outside of the socket, and that helps them to keep a much better posture and move their way over the prosthetic foot. Next slide.

[00:29:48] During this phase, we're working very closely together with the physio and the prosthetist because as soon as they find out that they can't perform some of these exercises, then we have to determine whether the cause is because they need more training or is the socket uncomfortable? Um, or for example, if they're not stable and the prosthesis is not holding them up, maybe we have to make changes in the alignment or select different components. So we're working very closely together during this early

gait training. Uh, we perform the socket fitting and alignment as I mentioned prior to finishing. We make sure that the leg length is equal and the weight bearing is in the correct place, that the socket fit is correct and the socket is comfortable. And again the physio begins the prosthetic training prior to finishing the prosthesis. In order to troubleshoot the prosthesis and the prosthetic, prosthetists can make necessary adjustments to the socket during this fitting and testing phase. We perform, uh. Well, this is this is kind of repetition of what we've already said here. So I'll skip this slide. When the prosthesis, the physio and the patient all agree that the prosthesis is comfortable and the alignment is acceptable, then we finally complete the prosthesis and the gait. Training and practice Discontinues after the prosthesis is complete. So we don't complete the prosthesis, and then that's the end and the patient goes home. We make sure that they know how to use the prosthesis, how to care for it, that they can apply it, that they know to contact us again, uh, if there are problems and that we have also planned the follow up.

[00:31:52] So in terms we generally start patients in parallel bars where they're safe. They can develop confidence walking. We can use mirrors. We put our hands on them. We use lots of verbal prompting. So we're always watching their posture, watching how they're using the prosthesis. We tend to progress people using walking aids. That might be two sticks or canes, it might be crutches, it might be a walking frame. And what we really ultimately, we'd like to think that our patients can walk independently without an aid. But if they need an aid that can help to keep them safe, it's important they should start wearing the socket for short periods, so I maybe would advise where your socket for an hour, hour and a half in the morning and then repeat that in the afternoon and keep checking the skin. And if the skin's fine, then you build up that time maybe by half an hour each day, so that eventually you are wearing that prosthesis all day. I tend to give analogy like new shoes. You wouldn't wear new leather shoes, you know, for eight hours, or you'd probably get blisters. So you want to start slow and build up because it's a bit of a strange environment for the skin. A comfortable socket is absolutely essential, and there's no way we can teach our patients to walk and to wait there on a socket if they have areas of discomfort.

[00:33:15] So that's where we work closely with the Prosthetists. They will need repeat appointments to go back, to have things adjusted to make sure that that. And as they progress through gait and they load the socket more, they put more weight through the

prosthetic side. You discover that they need adjustments to the socket or maybe to the alignment, because they suddenly now really shifting their weight over the prosthetic side. And then we have to teach them how to adjust socket. So how to add socks, how to use colour socks, what to do with the socks. The volumes are going to change literally hour by hour if they're wearing a prosthetic limb to start with. And all of the time we're looking at gait, gait, pattern where we see gait faults, we have to establish is that something due to the actual amputee? Is that something or is that something with the prosthetics so that our patients do not develop gait faults early on, as we all want to try and achieve as near normal gait pattern as possible. Next slide.

[00:34:27] This is a a very involved process, is checking for gait faults and working together on that. And we actually have a whole nother presentation that we do where we go through all the different phases of gait and the walking patterns, and how you determine which kind of problems, uh, relate to training and which are prosthetic problems. So this is takes, uh, skill, observation and experience in order to optimise that prosthesis and to know, uh, what the correction is for any of these problems.

[00:35:09] Beyond walking, you know, what our patients need to be taught is how to keep strengthening. Um, because it takes longer than just the, maybe a short prosthetic rehab phase. Um, and we want to encourage our patients to continue to build strength, which all of us need to do as we get older. Everybody should be doing some form of strength training. Um, and a prosthesis does not limit that. There's loads of different exercise and, um, activities that our users can do to keep their muscles strong, and to think about continuing a stretching program. May that be for lower limb, may that be for your spine. Um, we can do some modified different yoga positions. Um, so here is just some examples of, um, some stretching and some strengthening work that our users should be encouraged to do as part of the rehab phase. Next slide.

[00:36:08] And I just want to mention at this point, I notice in the middle lower slide we have an upper extremity stretch. Um, we talked in the title about uh interdisciplinary. Application here and in rehabilitation, and we're all talking about lower extremity. But this I will mention here that all this occurs with upper extremity also. And, uh, we could do a future presentation on, uh, how the occupational therapist or whichever therapist is working with the upper extremity. But usually in our team, it's an occupational therapist.

And the process, how we work together in upper limb. But right now we're concentrating in this presentation on lower limb.

[00:36:55] As well as strength training, we need to think about some of the everyday things that we all do so that our amputees will fall over at some point, pretty hundred percent guaranteed they're going to fall down. So we need to teach them proactively how to get on and off the floor. And it might be that they want to do activities that involve them getting down on the floor. It could be gardening, you know, it could be doing some cleaning at home. It could be doing yoga. So we teach them different ways to get on and off the floor safely. Um, and ideally ultimately without using beds or different aides. But that depends on their physical ability. Um, walking up and down stairs, um, often with a ray, a rail for a bit of support. Um, and also how to walk outside, up and down, um, slopes, up and down kerbs onto the pavement or sidewalk and down, um, so we take our patients outside and try and do as much as we can in a more real life environment, not just the rehab gym. Um, and I'd always encourage that in amputee rehab where possible. And a massive part of our role is to think about education, uh, which, again, we could run another whole webinar on in terms of skin care, looking after the skin. You know how to look after the socks, make sure they wear clean socks every day. Socks that are damaged are thrown away. Um, think about sweating. Um, a lot of our amputees suffer with problems with sweating Deflecting and some different ways to combat the effects of sweating to avoid skin rashes, because maintaining healthy skin is important, and also to consider the sound foot, um, particularly in our diabetic population, where that becomes a very at risk foot. So looking after that foot is very, very important for amputees. Next slide please.

[00:38:47] Uh, let me just mention that these pictures show a very nice rehabilitation centre that these goals and these, uh, tasks that we're doing, they don't require a rehab centre. So if you're in a setting where you don't have these facilities, then you can adapt using just the natural, um, facilities or outside in the environment, uh, in order to accomplish these goals. So getting up and down off the floor, uh, the stairs, slopes and the education, all that can occur. And regardless of the facilities that you have.

[00:39:29] Just some other ideas of how we might to squat a really, um, a useful exercise, um, for both transtibial and transfemoral amputees. And if we stand our patients on uneven surfaces and in a gimbal behind the back, that makes them a bit

more unstable. Um, and as John mentioned, we're very fortunate that we've got equipment like the Bosu ball to stand on, which is pretty dynamic. Um, but as it says, you don't need all of that equipment, especially just got to make do. Um, and when we're travelling away, we don't necessarily have access to all of this equipment. We just make do with with our surroundings. Okay. Next slide please. Um, balance and confidence using a prosthesis is really important. So, um, I always try and encourage use of lots of throwing and catching a ball. Or for example, we've got hitting of badminton using a badminton racket. Um, squats with the with the gym ball against the wall and a theraband so resisted. Walking forwards and sideways is very useful. And that's just a rubber piece of rubber band. Um, fairly basic, but it's really good to do. Some resisted walking. Patients really have to engage the muscles around the hip and knee and their core and ongoing strength training. Um, this is a great exercise at the lower part of the slide, um, for the glutes where your knees are flexed and you're raising that knee up off the sound side. Next slide please.

[00:41:12] Then, uh, at some point, of course, the, the, uh, the patient is interested in going home with the prosthesis. And the follow up is very, very important because this is not something, uh, like a medical problem where you do a surgery or you have a medication and then the patient's fixed. But as we know, in amputee, an amputee is always an amputee. And a prosthesis, uh, wears out the residual limb changes. They will always need, uh, adjustments, repairs and replacements. So follow up. Very important after prosthesis is delivered. Uh, the first follow up is in one week or even less. So when I fit a prosthesis, if the patient can come back 2 or 3 days later, it's very important because this is when they can really try it in their own home environment and see how it is. And I tell them, even if they notice the next day that they I ask them to contact me if there's a problem the next day. But I make sure to do a follow up very soon. And then gradually we can extend that to once a week or every two weeks. And according to the convenience of the patient to be able to come in. Uh, we determine what that follow up schedule is, but it really never ends. Uh, eventually, when they really are, uh, accommodated to the prosthesis and they're a mature and experienced amputee, we generally see them just once a year to come in or as needed.

[00:42:58] And how do we really know whether this is successful rehabilitation? Um, and there's a whole range of different aspects to consider. I think, um, much beyond whether our patients can walk. Um, and again, today was really an overview. So there's

many areas here where we could where we could look more detail. We are just giving you an overview, but I would say, um, and discuss this with John, that optimal use of the prosthesis. And is it a comfortable fitting prosthesis so important for our users that they are going to want to wear it for multiple hours a day and that it does actually become their lower limb? Um, have they got the fitness to, to use a prosthetic limb and to maintain that, that fitness? Um, and it's about independence. So have our patients achieved independence, um, in their life? Have they become reintegrated back into their family, in their own community? Um, and actually, can they participate fully in life? Um, I think that's really, really key because that's that's really why we go through all this rehabilitation, exactly how much people want to be able to walk or run or go up and down a slope, um, is very, very individual. Um, and at the end of the day, what we all want is a good quality of life and being able to participate in life. Um, so I think lots of those things are how we might measure whether our patients, um, have been successful. Um, one of these photos or two of these photos are taken at Kilimanjaro, where I went in 2010 with a group of amputees. Um, so the four chaps are all amputees, and that was a a really good, um, example of them participating in life. Thank you.

[00:44:53] So in summary, uh, this presentation, uh, I hope it was informative for you. And what we wanted to communicate is that multidisciplinary is interdisciplinary. So we don't just work, uh, in a environment where we're all involved, but we're involved together, so we all work together. That means the prosthetists, the nurses, the physio and the patient and the patient's family. Everyone is a part of the team and we can't do it, uh, if we work completely separately. The timeline I give you an example of a timeline, but it does vary according to the patient, according to the type of amputation and the cause of the amputation and the motivation. We always have to be willing to alter plans as needed. Nothing is fixed. You can't make a plan and then stick to it exactly at the beginning. Training is critical and follow up is critical and the follow up never ends. So thank you very much for listening to our presentation. Again, as uh, Claude mentioned, uh, the presentation is presented by Espo. And I want to, uh, mention Espo. International Society of Prosthetics and Orthotics and Mobility. Actually. And again, very important that this the Po doesn't mean prosthetists and orthotists.

[00:46:33] Uh, but it means prosthetics and orthotics. So it is also multidisciplinary and interdisciplinary. So I invite and encourage all of you to join Espo, um, and you can find

out more information by contacting me or on the website. Our World Congress, uh, is happening this year, this time in Stockholm, Sweden. It's in a different country every two years. And I'll say personally, it was going to one of the World Congresses that made me so excited and interested and convinced that I wanted to be a part of Espo and a part of the world rehabilitation community. So, uh, join Espo for sure. And if you have the opportunity, uh, come to Stockholm and I'll see you there at the World Congress. Thank you very much. Uh, this is the email address for, uh, my email address and Laura's. If you have questions or want to contact us, or if you're working with patients and have some questions, you can contact either one of us. Uh, and at this point, I'm going to, uh, give the floor back to Claude. Thank you.

[00:47:47] Thank you John. Thank you. Laura. Uh, I think it was a good overview of, uh, of the different elements, but I have maybe one question for you. When you're looking at the different elements, what what is the most what could be the main 3 or 4 elements that could ensure a positive outcome of the rehabilitation? Because you talk about different things? Uh, exercise. But do you think that the fitting is a precondition that that will give a good base for prosthetic rehabilitation? You know, for you as a prosthesis or a physical therapist, what are the main or the key elements that, um, if you have this in place, you we we could potentially think about positive outcome of prosthetic rehabilitation. I can.

[00:48:47] Uh, yeah. So maybe one thing I can say is examples where I work, even here in California where we don't we have really difficult having a good outcome because we didn't have some of these elements. And one of the examples is, um, when this system is not working, the patient receives an amputation and then is sent home immediately while they're healing and they have no rehabilitation. And then I see them, and typically they'll come in and they'll have a flexion contracture where the knee does not extend all the way. And if they have if they've been sitting in a wheelchair, they'll have a flexion contracture and a hip flexion contracture and a knee. And um, sometimes they've also reinjured the leg because they didn't have good balance and they'd fallen down and open the, the amputation. And the first they had a very nice skin situation. Now they have a big scar. So they come in to see me and either I can't fit them at all or they have a very limited outcome because with a a flexion contracture, their outcome is very limited what they can do. So that early rehabilitation to maintain range of motion, strength and good body fitness sometimes makes the difference as to whether they will be independent and whether they will be able to use a prosthesis. So that's one example. So.

[00:50:18] So for you will be the early the early touch between the patient and the clinical team. So as early as possible not to get immobilisation training, good position of the stump etc. etc. that will facilitate that will give the good base for a positive outcome of the rehabilitation process. Laura.

[00:50:42] I would say that first of all, specialist rehabilitation. So basically everything John has just said, but I think having that specialist rehab by therapists that are used to working with amputees in prosthetic rehab makes a big difference, um, rather than generic rehab. I think the support network of the amputee. So we, we tend to know that people do better if they've got a good social support network around them. You know, if they've got people around them and it might be a network of friends, but they've got support, they tend to do better. I think we should consider people's mental health, um, and their mood and their level of motivation at wanting to achieve. In my experience, people who haven't done so well often are, you know, those who are lower in mood and who are not very motivated to achieve. Um, and I think it's critical. I think there's more success if we can do joined up working with the prosthetic team. So I think where it's disparate, very separate, that's hard, you know. Oh, you can go back and see the prosthetics, but you've got to wait four weeks to get an appointment to go and get a little tweak done. I'm very blessed where I work that the prosthetics are downstairs and they can have that adjustment done on the day, which I think makes for a more successful rehab. There are just a few of the things I would say.

[00:52:11] Thank you Laura. So I don't think there's any question. So I would like to thank you all again. Okay. Laura and John, uh, for this good, very good and comprehensive presentation and webinar. Uh, in the presentation, I think the last slide, or maybe the one before you have, uh, Laura and John, uh, email address in case you have questions, you can always reach them. Um, and also we may look at the possibility to discuss with the organiser of such webinar or maybe having some more detail on the, the, uh, the general information that were provided by John and Laura. But I think the requests have to come from the professional that may need it, and then we see if we can handle it. So thank you, John. Thank you, Laura, and thank you all for listening. Ciao ciao ciao.

[00:53:07] Thank you.