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Talking Technology QQA with Holly Franklin

This edition of amplified is focused on technology. We were delighted to interview Holly Franklin, the creator of the '1-Up, The one hand hair tie'. Holly is passionate about prosthetic advances for both cosmetic and functional outcomes.

What was the catalyst for your elective amputation?

I was born with Arterial Venous Malformation (AVM) in my left forearm. Put simply, AVM is a tangle of abnormal and poorly formed blood vessels (arteries and veins) which have a higher rate of bleeding and pain than normal vessels. The doctors contributed my AVM to the morning-sickness tablets that my mum was taking but, in fact, it could have been anything. My AVM wasn't discovered until I was six and a half years old.

AVM can appear in any part of the body. In the case of my arm, instead of one artery bringing blood down to the hand and another returning the blood back up, it doesn't, which means



that the blood doesn't flow freely. I refer to it as having 'spaghetti mess of veins'!

In some ways I am lucky that the AVM is in my limb, as other people can have it in their brain or face. Sometimes the AVM can be an extremely painful condition; making my heart work harder, thus giving me an enlarged.

Over the years I had many operations to reduce the 'spaghetti mess' in my arm. Unfortunately, however, after one too many operations my hand started dying. After eight months of hell, and numerous attempts to save it. I demanded they remove my arm from above the elbow. I wanted to be done with the mess that once was my hand, be free of pain and be rid of the AVM. I woke up from my amputation operation immediately feeling free of pain and a great sense of relief. Finally, I could breathe. However, I was disappointed to find that my arm was not amputated above the elbow, but below, and I still had the AVM. The doctors advised me that I would achieve a better prosthetic outcome if the amputation level was below my elbow,



rather than at an above elbow level. I live in hope that the AVM stays stable and that I don't require further amputation, but if it does happen I know I'll adapt.

Do you use a prosthetic arm?

I currently have a body powered split hook arm. I wear it occasionally for fiddly activities such as making my one hand hair ties. I find I'm quite capable 98 per cent of the time without using a prosthetic arm, partially because the prosthesis isn't as functional as I need it to be which is frustrating. I would love to try one of the new myoelectric prosthetic hands such as i-limb, bebionic or the Michelangelo robotic hand, but they're beyond my budget. I can drool over the expensive prosthetic toys and hope to win the lottery, but while I wait for that I like to get involved in projects (Super Prosthetics Project) that investigate what arm wear is available, cheaper alternatives such as 3D printing (E-Nable and Robohand) and talking with prosthetic designers about improving existing designs or creating new solutions.

How did you get involved with E-Nable?

I started seeing all these cool E-Nable 3D hands on my social media feeds, featuring so many happy kids! I was excited and a touch jealous. I realised the 3D revolution would lead to something I wanted to explore especially since participating in the Super Prosthetics Project; a project resulting in the creation of prostheses that are beautiful (like jewellery) and allowing me to have a range of hands in my wardrobe, in the same way that I have multiple shoes.

E-Nable is a global community of designers, engineers, medical professionals and everyday people who are using their 3D printers and design skills to create free 3D printed hands and arms for those who need them. As soon as I was signed up to work with Ryan (a local E-Nable 3D provider) I was very eager to get started. Rvan and I spent time talking about all we wanted to achieve. We played with ways to cast my residual limb and discussed options and functionality for hands and arms. Unfortunately, not long after Ryan got started he came across some problems. The Rochester Institute of Technology (RIT) Arm that he was going to print for me didn't resize from child to adult size as easily as we had hoped. Ryan spent a lot of time working with the RIT Arm designer to make it suit my measurements. However, when that was done, we faced a

hurdle when we discovered that his printer wasn't large enough to print some of the adult size parts my RIT Arm required.

I'm now chatting with others in the 3D world to see what we can do. I'll either need to find a bigger printer or work with designers to see if parts can be further segmented so that they will print and remain functional once assembled.

I know I will eventually have my pretty, sparkly, fabulous, awesome hand collection; just not as soon as I had hoped. After all, this is only the early days for 3D printing of limbs and there are still kinks to work out.

What excites you about the future of prosthetics?

In the 10 years that I have been an amputee I've seen some amazing changes in prosthetics - from Osseointegration to 3D printed prosthetics, and cosmetic limb 'replacements' to 'out and proud' leg sheaths such as those designed by 'Unyq' and 'The Alleles'. With so many people working with various solutions such as 3D and laser printers, the robotics and genetics of the future looks very exciting. I do think that amputees will have many more options with our prosthetics in the future, in the same way now already have with our cars. Some of us want show and speed vehicles, like a sports car, while others will want the practicality that a Sports Utility Vehicle (SUV) offers.



As technology develops and becomes simpler, I think that many of us with limb differences will further become the masters of our own capabilities, turning into our own prosthetic technicians and building exactly what we want, with less limitations.

To learn more about Holly visit her website - www.ahandfulofindependence.com



You can now walk into any of 'The Athlete's Foot' stores and have each foot individually measured and fitted with two different sized shoes from our *ICFIT* range, or purchase either a left or right shoe at half the retail price, no waiting and no extra cost.







3D Printing

P&O application and the possibilities

Author Kaori Lockwood

Orthotist/Prosthetist, cOP-AOPA CPO in Japan and Australia, with clinical experience especially in prosthetics in both private/public settings in Melbourne and Sydney. She has been actively involved in ISPO committee activities for the last 3 years.

3D Printing. It's quite a buzz phrase at the moment, and it's not only tech geeks that are jumping up and down about this intriguing technology.

The Prosthetics & Orthotics (P&O) industry is no exception when it comes to becoming part of this trend, with some people are already making a progress using this technology. You may have seen some cool robot-like 3D printed arms⁽¹⁻³⁾ and highly artistic cosmetic leg covers for trans-tibial (below knee) prosthesis on various media outlets.

There are currently some private companies in the United States and Australia that produce foot orthoses (insoles) or prosthetic sockets using 3D printing technology.^(5,0) Researchers at the University of Toronto and Canadian NGO C.B.M collaborated to design and produce inexpensive prostheses to be worn in developing countries using 3D printers.⁽⁷⁾

In Turkey, a promising outcome was accomplished when a research project was conducted using a 3D printed fracture brace combined with ultrasonic technology, which proved to be more effective than a traditional cast[®] (see Figure 1).

Ok, now we start to understand that 3D printing is quite useful technology and has lots of potential for applications in our industry. But what is it exactly and how does it work?

3D printing is technically referred as Sintering and/ or Additive Manufacturing "AM", which is the process of producing a three dimensional object by using a computer-automated machine. So, it's basically a type of CAD/CAM (computer aided design/computer aided manufacturing).

This technology is not as new as many of us might think, as it was already being used during the 1980's.

Over the years, the 3D printing process has been mainly used in industrial applications,





such as prototyping and manufacturing metal parts for cars and aircraft. However, it has gained its popularity as an alternative to existing manufacturing procedures in many other industries in the last decade or so, thanks to the improved inexpensive small sized printers and greater range of innovative materials that are becoming readily available.

Grae Scheuber, from Robohand Australia, a developer and distributor of mechanical aid devices in Melbourne, explains "3D printing is like normal printing only our machines use plastic instead of ink, printing layers upon layers, gradually resulting in three dimensional objects". He prints out finger parts, hands and arms to make inexpensive upper limbs prostheses on a desktop size 3D printer in his studio. He describes the main benefit of 3D printing as "cheap and customisable". He adds "This is especially relevant when considering hands or arms for kids, as they grow so quickly it's not always economically

viable for them to have hands that fit properly. 3D printing removes this issue as parts can be quickly adjusted in software and manufactured at very little cost".

At the orthotic department in Sydney Children's Hospital, they recently introduced a CAD/CAM system for the manufacturing of Spinal braces and cranial helmets. This system involves the scanning of patient with a hand-held device, modification on the computer software and carving out the positive model for later manufacturing of the orthoses using traditional methods.

Although 3D printing technology is yet to be introduced, they are currently collaborating with the University of NSW to explore options for direct manufacturing to eliminate the carving stage after the modification.

Ruth Baker, clinical orthotist and manager of the department advises that although there was some down time to learn new technology and trial-anderror for manufacturing process, there have already been some benefits of using computer-aided system for their clinical process. "The casting process using traditional plaster cast technique was quite a traumatic experience for babies and their families who require cranial helmet, as well as young girls with sclerosis who are required to cast their upper body for braces. But, casting aided with the hand scanner is a huge improvement for patients' comfort for the process". She also points out that the manufacturing time had dropped significantly especially in cast modification, which means more time to see patients for clinicians and for patients, less time for waiting to receive the finished product.

Hiroshi Otani, a Prosthetist/ Orthotist at Women's and Children's Hospital, Adelaide, believes 3D printing enables clinicians to collaborate with professionals in different fields, such as product designers, enabling easier production of customised products for each patient. He is currently supporting to deliver a research subject for art/design students at the University of South Australia, to come up with new design ideas for a prosthesis and orthosis.

He says, "Even if it's bit more expensive, there would be a demand if the user loves the products, like some people buy expensive cars such as Ferrari even if the Tovota is said to be the safest and most reliable cars. Especially for children, if they don't like the given device, they wouldn't use it. I wouldn't sav 3D printing will change our daily clinical work dramatically, but it will give us an opportunity to think differently from the designing and prescribing process to make highly customised products for each user."

Although there are some hurdles to overcome and more discussion is needed for the clinical use of 3D printed products in the P&O industry, it seems an inevitability that we will embrace the advantage of this unique technology in our industry.

Like many of us, Grae Scheuber believes there is a bright future for 3D printing: "The future is exciting, 3D printers will print more accurately, more easily, much more quickly and more cheaply. On top of that new materials are coming out all the time, opening up more and more possibilities on what can be made".

Here are some of the advantages and disadvantages of the use of 3D printing technology when considering its application in the orthotic/prosthetic profession:

Advantages of 3D Printing

1. Accuracy - Combined with the use of a 3D scanner, more accurate measurements can be achieved when compared to traditional casting technique.

2. Time - It could potentially reduce production time significantly by clinics directly manufacturing devices themselves from scratch.

3. Cost - Depending on what it is and which material is to be used, production costs could be heavily reduced. In fact, the typical 3D printed arms that you might have seen cost only a few hundred dollars in materials to manufacture. Small P&O parts (i.e. orthotic joints) that are normally bought from a supplier might be printed at the individual facilities, which could reduce purchase costs. However, like with any new technologies, there is an element of investment risk particularly for smaller companies. Already, there is an Australian business, which offers central fabrication for 3D printed Foot Orthoses through their partnerships program.⁵⁵

4. Workspace Cleanliness -Obviously, there is no need to clean up your plaster after modification! Also, consider the reduction in dust from grinding or chemical fumes from laminating. Do note that most of 3D printers use melting plastic, so the room still should be well ventilated.

5. Data sharing - Easy to share and transfer digital data. An example of this is that it could be used for patients who can't attend the facility in remote areas or even overseas patients can have their cast taken by someone at one end by using a hand held 3D scanner and have the data sent for central manufacturing.

6. Easy customisation -Compared to the current methods of fabrication, as same as CAD/CAM, data can be easily modified by using software.

7. Potentially less training required - The shortage of P&O practitioners and technicians are a serious problem, especially in developing countries. 3D printing may potentially save training time compared to traditional production methods and facilitate access to products of consistent quality.

Disadvantages

1. Lack of evidence – We are still dealing with a very new technology in the P&O industry and very limited clinical research has been completed in regards to safety, comfort and performance in clinical applications.[®]

2. Strength – Further to the above, there is no clear evidence if the substances used in production offer sufficient strength to be applied in P&O clinical applications in the long term use.

3. Laws and regulations – There are no regulations or laws around the clinical use of 3D printed products in the P&O industry at this stage. Thus, potentially anyone can print parts and have them fitted to anyone, which could be dangerous to the users.

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Tips for Surviving Summer

Many amputees struggle with the heat during the summer months. Losing a limb impacts the ability to reduce body temperature. Amputees have less skin-surface to cool the body down and as a result can generally have warmer body temperatures. Using a prosthesis requires more energy and can generate an increased body temperature even with basic activities such as: walking. For this reason many amputees can have excessive perspiration and a lower level of health tolerance.

Here are some tips to help you survive the heat.

- Clean your stump and socket regularly with mild soap and warm water.
- Stump socks and liners should be changed and cleaned daily; more often if required
- Stay hydrated and drink plenty of fluids to replace what is lost through sweating
- Limit caffeine, juice and soft drinks.
- If you are venturing outside try to go in the cooler part of the day.
- Wear lightweight, loose, breathable clothing.
- Carry a spray bottle with water to use as a face or body mist.

Remember, some states and territories have energy concessions for individuals who have difficulty regulating their body temperatures. Speak to your doctor or state government authority for more information.

AUTUMN Next EDITION Health and Wellbeing

- Recognising your emotional health
- Planning physical activity
- Nutritional guidance

If you would like to share your story for a future edition of amplified we would love to hear from you.

Contact: info@limbs4life.org.au or call 1300 78 2231



Össur recently hosted Australia's first 'Mobility Clinic' for amputees. Held in Brisbane in September, this event combined a mix of presentations and physical activities as well as opportunities for participants to connect with other amputees of all ages and abilities.

This successful event attracted 77 amputees of all ages who enjoyed the chance to build overall mobility skills under the guidance of the world's leading expert in amputee rehabilitation, Professor Bob Gailey from the University of Miami. Professor Gailey is a physiotherapist, author, researcher and lecturer with a passion for assisting amputees develop their mobility confidence and skills.

Professor Gailey, known as Bob, was a passionate motivator who took the time to get to know each participant and provide them with personal advice and encouragement. Hearing Bob say "you can do it", "don't be afraid to try" and "well done, I knew you would achieve that" to participants illustrated not only Bob's interest in each amputee but also highlighted the intimacy of the event.

The Mobility Clinic also included the involvement of physiotherapists and prosthetists who had the opportunity to build upon their own knowledge and work one-on-one with amputees and children with limb differences. Over the course of the two-day event improvements in mobility, balance, speed and confidence was evident amongst all participants. As one therapist said "I feel so privileged to have been part of this event, support amputees, meet new people and learn some new tips I can use when working with my clients too".

Individual videos were taken of each participant enabling Bob to personally evaluate each individual's gait patterns. Bob then provided each person with tips and drills aimed at enhancing their mobility, walking, balance and/or running skills. When reviewing the videos of children, Bob was overawed and enthused by what he witnessed. Bob remarked that "my American counterparts should be nervous about the future Australian Paralympian Team, as there are many children and young people here who already possess the skills to become Paralympic champions of the future". The oldest participant was in his seventies and the youngest was six.

Harvey Blackney, Regional Director of Össur Australia, said "It was an absolutely wonderful two days, seeing some people achieve things they never though they could. It was also tremendous to have people from around Australia come and enjoy the day with Bob, improve their performance and ultimately live life without limitations." Limbs 4 Life would like to thank Össur for hosting the Mobility Clinic and allowing us to be an event partner. In addition, we are extremely grateful to Össur for the very generous donation made to Limbs 4 Life; a donation that will allow us to continue to support Australian amputees and people with limb differences.



"What an amazing time I had. It was such an incredible experience to meet so many wonderful and inspiring people, young and otherwise. Attending the Clinic has turned many things around for me in my daily life and sporting activities. I am still glowing and making positive changes daily since being there. I want to thank Bob Gailey for his positive encouragement and the entire crew for putting on such an amazing event". (James, below knee amputee NSW)



ÖSSUR MOBILITY CLINIC

For the latest details regarding Össur Mobility Clinics 2016 head over to the Facebook group **ÖSSUR MOBILITY CLINICS AUSTRALIA**. Photos and videos from the 2015 event can also be found here. Thank you again to everyone who joined, we look forward to seeing you in 2016!

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The Össur Team



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There are a lot of activities out there that you as a prosthetic user shouldn't feel limited in doing, just because your prosthetic limb doesn't allow it.

Did you know that we as prosthetists can design and manufacture limbs especially for you to take part in these activities? Gone are the days where you have to sit back and miss out on all the fun! Some of the activities when having a specialised prosthesis would be useful include:

GOING TO THE BEACH

Some people avoid the beach all together, because in the past sand and sea water haven't gone well with prosthetic limbs, but now days there are a lot of components that have been rated as waterproof, and can make walking to/from the beach and enjoying the water with friends and family possible.

CAMPING/SHOWERING WITHOUT DISABLED BATHROOM FACILITIES

Clients have commented that having a waterproof prosthesis opens up a lot of opportunities when traveling or camping, when you don't have to be restricted to hotel rooms or cabins with disable shower facilities. Having a prosthetic leg that you can wear in the shower makes this so much easier.

Making a **Splash** with your Prosthetic Limbs Monique Van den Boom BP&0 (Hons)

SPECIALISED RECREATIONAL PROSTHESES

SWIMMING

If you want to improve your fitness in the pool, a specialised swimming arm or leg can help you build strength and technique while you swim laps.

RUNNING

Perhaps running is more your way of keeping up your cardio fitness, so a specially design running leg can be made, purely made for running and running and running!



CYCLING

Historically, prosthetic legs have used shoes with cleat attachments in them, on their prosthetic foot, however direct attachment of the cleat to the prosthetic leg has been preferred by some cyclists, as it allows a more direct transfer of power when peddling.

And for prosthetic arms, there are ways to attach directly to the handle bars, to help control the bike when riding, but with a quick release function, in the case of the rider coming off the bike.







GYM

There are plenty of terminal devices for prosthetic arms that can be used for working out at the gym, which help hold on to weights and bars like this type of attachment.

I Am Adaptive is an organisation that has a facebook page that posts pictures and videos of prosthetic users of all shapes and sizes coming up with creative ways of working out. There are some amazing ways to achieve results from people out there, so it is well worth a look.

www.facebook.com/IAMADAPTIVE

PROSTHETIC DESIGN

The way your prosthesis looks is up to you. There are endless ways to make your sockets colourful, as well as covers for your limb to help tie in your individual image of yourself with your limb. These days, we as Prosthetists can incorporate pretty much any design into your socket and limb, so if you have an idea of how you want your prosthetic limb to look, share them with your Prosthetist.





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The Latest in **Prosthetic Technology**

Earlier this year Limbs 4 Life ask you, our readers what topics you would like to read about. Many of you said that you wanted to learn more about the latest in prosthetic technology. Here we showcase a number of new feet on the market along with a new suspension system.

Do you feel confident on challenging terrains?

At **oapl**[™] we understand that every person desires certain functionality from their prosthetic device and want it to feel as natural as possible. We also understand that you will encounter various terrains and environments and need to feel stable and confident navigating all of them.

That's why we offer a full range of hydraulic ankle/feet. These revolutionary feet are designed to allow the user to perform daily routines that include negotiating uneven terrain, slopes and ramps, all with less effort, increased stability and greater confidence.



The Endolite élan foot is one of the revolutionary new prosthetic foot/ankle system with a microprocessor controlled speed and terrain response. Sensors continuously monitor environmental feedback and modify the foot characteristic to offer the safest, most comfortable and energy efficient response, whether you're on the flat, descending or ascending ramps and stairs. The hydraulic ankle control ensures silent operation and sinuous movement that biomechanically matches the user's body and walking style.



The RUSH foot by Ability Dynamics

A few years ago new prosthetic foot manufacturer, Ability Dynamics in Arizona decided to embark on an ambitious project to manufacture a prosthetic foot to improve on the function and reliability of current prosthetic foot design. Part of this design criterion was to manufacture a foot that required virtually no maintenance and could be worn in any conditions for any activity for many years.

The end result was the launch of the RUSH foot three years ago. Since then the Rush foot has been worn by thousands of amputees worldwide for their daily activities.

The RUSH foot is manufactured from a new composite material Flexeon, originally developed for aerospace applications and re-engineered by Ability Dynamics for prosthetic feet

Flexion composite material is more flexible and much more durable than the current industry

standard carbon composite material which has been used in prosthetic feet manufacture for the past 30 years.

The features and benefits of the RUSH foot are:

- One foot for all your activities
- No limitations on activities, walking, running, sports and extreme activities
- Can be used in both fresh water and salt water
- Can we worn without foot cover
- Virtually indestructible
- More flexible for walking on uneven terrain
- Excellent shock absorption so less stump soreness
- Very smooth roll off from heel strike to toeoff, no dead spots
- Maintenance free
- 3 year warranty

For more information about the RUSH foot go to www.rush.com or contact Paul Coleman at **pcoleman@opchealth.com.au**

Introducing the Ottobock Meridium Foot Reclaim your way

Traditional non-computer controlled prosthetic feet are made from many different materials. More recently we have seen the emergence of carbon fibre and composite materials chosen for their bounce, flexibility and so called



"energy storing" capabilities. Whilst these feet are a big improvement on the old wooden styles of years gone by, they still have many of the same disadvantages. These non-computer controlled feet are really only designed to allow amputees to walk at one fixed speed, over flat level ground, in a straight line and are set-up to work with only one set of shoes.

The reality however, is that this is not what walking REALLY looks like. Most of us don't walk for long periods of time on flat level ground, straight ahead and at a fixed speed. Most of us walk up and down hills, up and down stairs, we sit down and stand up, we walk a few steps in one direction and then stop or turn around. And ideally, we would like to do this wearing many different shoes. Not just the daggy running shoes that prosthetists love. Non computer controlled feet are not designed to do this as easily as we need them too.

The Meridium foot from Ottobock is the world's first truly computer controlled foot that is capable of predicting the way you walk, and it has the ability to adjust for the type of walking you are doing before you have even put your prosthetic foot on the ground.

The Meridium allows the toe to lift up while walking for more toe clearance which reduces the number of stumbles, and therefore increases your safety. It recognises if you're walking up or down a hill on your first step, allowing the ankle to move like a natural one which reduces the effort required to walk, and it automatically adjusts to changes in footwear. You don't even have to press a button when you change from your sandals to your stilettos.

The Meridium uses a patented set of sensors to see where the foot is moving, and how fast, and it can even differentiate between the unique pattern of walking down a hill, as compared to walking down stairs, and it will react differently depending on which one it encounters.

The Meridium foot is recommended for below and above knee amputees, and is the worlds most advanced computer controlled foot. Speak to your prosthetist today to see if this foot is suitable for you.

www.ottobock.com

Youtube - search "Ottobock Meridium"

Unity Elevated Vacuum System

The most advanced **Seal-In**® liner designs by **Össur** (**Seal-In**® V & X) enhance volume stability with addition of elevated vacuum with a simple and efficient pump integrated into a Flex-Foot (**Unity**® Sleeveless Vacuum System).

The Unity® system sustains comfort and optimal socket fit throughout the day with limited need to add socks. Elevated vacuum has been clinically proven in a number of studies to assist in stabilizing socket volume (1,2,3), assist in wound healing (5,6,7,8), promote skin health (9), and to improve safety and mobility (4,9). The system is available for above and below knee amputees. For below knee amputees, knee flexion range and comfort is improved by eliminating use of the suspension sleeve itself. This also reduces maintenance and costs related to sleeve replacement. At 130g, the Unity® pump provides a light weight, discrete and fully integrated pump solution with foot options to meet the mobility demands of every individual.



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Season's Greetings from Limbs 4 Life

On behalf of all the Limbs 4 Life staff and Board members we wish you and your family a very happy, relaxing and safe Christmas and New Year. The Limbs 4 Life office will be closed from the 23 December - 11 January 2016.



ArtLimb.com Sharing Knowledge and Information

Artlimb.com is a non-profit, independent project dedicated to sharing knowledge and discussing information about artificial limbs.

This web resource has been live since June 2015 and provides a source of free information for amputees, their families and support networks. ArtLimb looks at the ideas, processes and philosophies followed when designing and making prosthetic limbs.

The authors believe that information must be free, easily accessible, understandable and relevant. By cutting back on the jargon and presenting information with photos, ArtLimb is a resource for those who want to know more about prosthetics.

Following the philosophy of free and accessible information, our magazine will look at publishing ArtLimb articles for those who do not have internet access.

Prosthetic process for lower limb

Preparation for a Prosthetic Limb Whether you are a new amputee or have walked with a prosthetic limb for a while, it's worth taking time to assess what you want to achieve in a new prosthetic limb.

There are many factors that affect how comfortable and functional your new prosthesis will be. Some are related to the construction of the limb, while others come down to what your current health and mobility is like.

For amputees who are receiving their first limb, it is very important to consult their doctor and physiotherapist to improve their general health as well as train to improve their balance, endurance and strength.

For experienced amputees it can be beneficial

to seek additional help to correct existing gait deviations (bad walking habits). Just because a person has walked on a certain style of leg before does not necessarily mean this is the most appropriate design for them at that point in time. The technology behind prosthetics is constantly evolving and improving, giving us more possibilities to solve past problems. Sometimes over several years inappropriate gait patterns can develop which requires correction. During the prosthetic process the prosthetist identifies prosthetic gait issues. briefly corrects and teaches the patient the basics. If they identify a situation that requires further or in-depth training it is usually recommended to visit a physiotherapist.

Socket design

The socket is the part of the prosthetic limb that is in contact with your stump. This part of the leg is probably the most important, because it's where your body weight is transferred to the prosthetic limb.

One of the major goals of the prosthetist is to choose the appropriate socket design suitable to the individuals situation and stump. The reason prosthetists spend so much time on this part is to make sure the weight is distributed safely and comfortably to protect your stump and joints.

Casting

In order to build a prosthetic socket an impression of the stump is required. A cast needs to contain as much information as possible to build an appropriate prosthetic socket. It is not just a copy of how the stump looks, but is pre-shaped to highlight structures of importance beneath the skin. There are a lot of different techniques of casting to reach the correct result. The prosthetist selects the most appropriate casting technique for each individual from hand casting to using special equipment.



Check Socket

A check socket is the result of modifying the cast that was taken of your limb. It is a diagnostic tool made from a see through plastic that is used as an intermediate stage between the cast and final socket. Because the plastic is very easy to adjust, a prosthetist can tailor the socket to very small anatomical features and get a more accurate and comfortable fit.





Check Walk

Walking on a check prosthesis with adjustable components has several main benefits. During this stage the aim is to make sure the check socket is comfortable to walk on. As well as this, prosthetists assess the function of all components, adjust them if needed and educate the amputee on how to get the most out of the artificial limb.



Fixation Methods

There are many different ways to hold a prosthetic limb to your stump. It is important to discuss these options with your prosthetist as each method has its pros and cons. Ultimately it will depend on your circumstances and abilities. The main goals are; to keep it simple (make it easy to put on and take off), make it physiologically correct, make it reliable to keep you safe and allow you to control the leg while you walk. Currently modern methods involve prosthetic liners in combination with locks, valves or lanyards. However, conventional methods including straps and belts are still in use.

Cosmesis

Once a new prosthetic limb has been manufactured there is a trial period of several weeks to ensure everything is comfortable and functional. After this trial, the limb can be cosmetically finished to the users preference. This can be done either with different coloured sockets, removable fairings or life like cosmetic covers. We believe that amputees must be informed of the possibilities and limitations of modern prosthetics. By understanding the process, a knowledgeable patient can become an active participant of the prosthetic procedure and achieve the best results during the recovery process.

If you are interested in reading more information, please visit ArtLimb online at **www.artlimb.com**

During the holiday season sometimes people can 'feel down.' If you feel sad or lonely you may want speak to someone. Consider calling a confidential support service: Lifeline 13 11 14

Men's Line 1300 78 99 78 Veterans Line 1800 011 046

Kiribati once again has a leg to stand on

Kiribati is an island republic in the Central Pacific comprised of 33 coral atolls stretching along the equator. Kiribati has a population of 102,000 and ranks #5 in the world for rates of type 2 diabetes. Kiribati has one of the lowest GDPs in the Pacific region and is ranked 102nd overall in the UN Human Development Index. The International Society for Prosthetics & Orthotics (ISPO) Australian National Member Society (ANMS) a long history of in-put into Kiribati and established the first prosthetic and orthotic service there in 2004, along with supporting training, resource development and ongoing monitoring of the region. Tragically in 2012 the orthotic and prosthetic workshop in Kiribati was completely destroyed in a fire.

It is with great joy and exuberance that ISPO ANMS joins with the Tungaru Rehabilitation Service team in celebrating the opening of a new facility in Kiribati. The Tungaru Rehabilitation Service officially opened the doors to the new purpose-built facility, complete with a fully equipped prosthetics & orthotics workshop at an opening ceremony held on the 28th of August. Attendees to the ceremony included members of the local disability and health service community, as well key stakeholders from the Australian High Commission and Ministry of Health and Medical Services. An I-Kiribati dance group treated the crowd to a spectacular show of traditional song and dance.

The Australian High Commissioner to Kiribati, together with a representative from the Kiribati

Ministry of Health and Medical Service cut the ribbon to officially open the new rehabilitation facility.

ISPO representative Andrew Jolly, who visited Kiribati to provide technical assistance to the setup of the prosthetics & orthotics workshop, addressed the crowd on behalf of ISPO ANMS, informing all who attended of the many people back home in Australia joining in the celebrations with Kiribati on that day.

The rehabilitation team provided an official tour of the newly equipped facility to all who attended. A highlight of the tour was the fantastic prosthetics & orthotics workshop, complete with brightly coloured tool boards, sparkling plaster area (it hadn't been used yet!) and recently installed machinery and equipment delivered from Germany.



Afterwards, attendees enjoyed a banquet lunch whilst the microphone was passed around to those wanting to contribute a message of congratulations. Members of the I-Kiribati Disabled People's Organisation Te Toa Matoa (A Strong Giant) delivered a moving speech, informing the crowd of the important role that assistive devices play in helping people with disabilities to participate in everyday life.

The Tungaru Rehabilitation Service delivers physiotherapy, prosthetics & orthotics, wheelchair and walking-aid services to the people of Kiribati. The team is made up of a multidisciplinary team of three physiotherapists, a prosthetist/orthotist and two rehabilitation assistants, whom work together to deliver a high-quality service. The prosthetist and the other allied health personnel regularly visit outer islands and delivery weekly community based rehabilitation services.



The local prosthetist has now resumed fabrication of artificial limbs, working through the long waiting list of amputees. The team looks forward to the return of three I-Kiribati graduates from the Cambodian School of Prosthetics as they return from studies over the coming years to provide an increased capacity to deliver ongoing high quality orthotic and prosthetic services to the I-Kiribati.

ISPO ANMS plans to continue their support to the Tungaru Rehabilitation Service as the service continues to grow. The situation in Kiribati for people in need of prosthetics or orthotics People in Kiribati face many challenges in accessing health services, which means significantly poorer health outcomes when compared to other parts of the world. Small populations on outer islands face a significant geographical obstacle in accessing essential health services that are located on the nation's capital of South Tarawa. Many I-Kiribati have moved from outer islands to the capital for employment and access to amenities, subsequently the population has a density equivalent to that of London. This is amplified significantly considering there are no major multilevel buildings!

South Tarawa, the nation's capital, a thin strip of land separating ocean and lagoon (the light blue buildings in the foreground is the Tungaru Central Hospital, site of the Tungaru Rehabilitation Service)

Further to this, Kiribati's coral atolls are only a few meters above sea level, land is under threat from rising sea levels. As a result, Tarawa's very thin strip of land separating ocean and lagoon has very little available space for local production of food. Therefore, nutrition is also a contributing factor to the burden of disease and disability.

Many people at risk of diabetic foot complications end up with foot sepsis and subsequently amputation. A whopping 300 names had been collected on a wait list for a prosthesis since the destruction of the previous prosthetics workshop.

In light of these challenges, a recent Australian Aid funded mapping project identified the Tungaru Rehabilitation Service as one of the best prosthetics services in the pacific. Since the resumption of services, I-Kiribati that are in need of prosthetic and orthotic devices can receive high-quality, locally made devices at a subsidised price, as well as training in the use and care of the device. Devices are made by an I-Kiribati prosthetist, who trained at the Cambodian School of Prosthetics and Orthotics.

ISPO ANMS Outreach Committee looks forward to continuing their support to the excellent service, and again share congratulations to the Tungaru Rehabilitation team for this outstanding achievement.

To find out more or to be involved, please email outreach@ispo.org.au.

For a full report on the technical assistance provided to Tungaru Rehabilitation Service, go to **www.ispo.org.au**



Australian Orthotic Prosthetic Association **Celebrating** 40 Years

The Australian Orthotic Prosthetic Association (AOPA) is the peak professional body that represents Orthotist/Prosthetists in Australia. On December 6th 2015 AOPA will turn 40. It is a wonderful milestone that gives us an opportunity to reflect on the pathway the Association has taken to reach this point today.

AOPA was initially founded as the Australian Orthotic Association in 1975, however the membership voted just 3 years later to change the Associations' name to the Australian Orthotic Prosthetic Association to reflect the dual stream nature of the profession and the service accessed by our clients. Over the last 40 years AOPA's membership has grown exponentially and we now represent over 400 Australian Orthotist/Prosthetists.

The main function of AOPA is to self-regulate the Orthotic/Prosthetic profession and to set the standards and codes which our members must uphold. So what does this mean for you as a client? When you attend an appointment with your Orthotist or Prosthetist you should enquire if they're an AOPA Member. If their response is "Yes" then you can rest assured that your clinician works hard to maintain a high standard of practice by keeping their clinical knowledge up to date, attends regular educational events and meets AOPA's expected levels of competency.

Join us in celebrating 40 years of the Orthotic/ Prosthetic profession, discover where we have come from and who we are now by viewing our 40 year anniversary video on YouTube youtu.be/Gr-7QkXKfyE

You can also find out more about AOPA by visiting the website **www.aopa.org.au**

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YOU CAN HELP MAKE A DIFFERENCE

For more information and to register your interest phone 1300 78 2231 or email peersupport@limbs4life.org.au

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