AUTUMN/WINTER 2021

Össur News



Increased security with MDR

Sustainability

The Rebound family

i-Digits

Life-changing design

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ÖSSUR®
LIFE WITHOUT LIMITATIONS



We hope you had a great summer and got off to a great start of the autumn. The special times we live in may have made you take the opportunity to explore your own country and local environment a little extra. Maybe on holiday trips or excursions to places you only seen on the map, but that you have now taken the time to experience. Many of us have spent more time outdoor, discovered new activities or started various forms of home projects. It has been a time when one's creativity has been put to the test.

Inventiveness and adaptability will be needed in other ways in the years to come. This is shown in the recent climate report from the UN's IPCC, which highlights the urgent situation for the world. Everyone, companies as well as individuals, will have to do our bit to reduce our environmental impact and live more sustainable lives. This include changing the way we think and act when it comes to everything from manufacturing, consumption and travel to energy consumption and the food we eat. Now is the time to decide which world we want our children and grandchildren to live in.

For Össur, the sustainability work has been going on for many years, and we are constantly striving to improve our environmental management. 2021 is not only the year when we celebrate our 50th anniversary, it is also the year when we became climate neutral. Read more about our sustainability work later in this magazine.

In this issue, you will also meet the talented triathlete Liisa Lilja and Europe's first professor of orthopedic technology, Nerrolyn Ramstrand. We also write about the new MDR regulation, show the technology behind a world record in long jump, and present a number of new products.

Staff news from Össur Nordic

As many of you probably know, Johanna Östergren, now CEO of TeamOlmed, has handed over the leadership to me, Nils Inngul. Nicklaes Bengtsen has taken over my previous position as Sales Manager B&S. In addition, Jouni Roivainen, former Customer Supprt, is now the new Area Manager Prosthetics in Finland, where Yngve Dahlström retired.

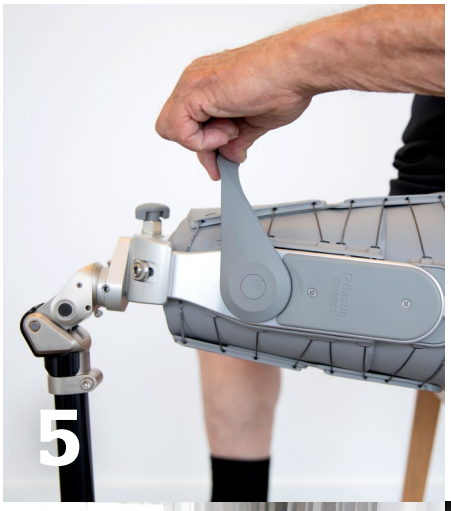
We are also pleased to introduce our new recruits Vibeke Musoke-Muwanga (Sales Manager Prosthetics), Simo Virtala (Area Manager B&S Finland) and Pia Arngrimsen (Area Manager B&S Denmark).

I am incredibly proud of our team and I am convinced that we will continue to bring great value to the industry's development.



Enjoy the magazine!

Nils Inngul
Sales Director, Össur Nordic









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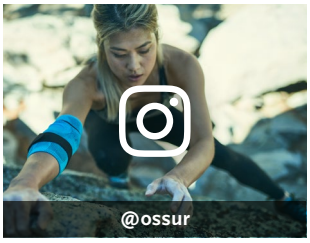







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Coming up



Miami J.
Same trusted products.
Fresh new look.

The Miami J name is synonymous with spinal care, providing the ultimate combination of comfort and control to achieve the best outcomes for your patients. In the coming months, you will notice some exciting changes to the Miami J family of products. Our fresh new look has been designed with patients and clinicians front of mind, incorporating “Blue -is-you” patient touchpoints, to simplify patient education and create a more intuitive experience, whilst continuing to deliver the clinical outcomes you have come to expect.



A new generation
of Power Knee

A new generation of the prosthetic knee Power Knee is coming up. The Product drew a lot of attention when it was introduced to the market in 2007. It is a powered, microprocessor-controlled prosthesis intended for those who are amputated above the knee. Power Knee is easy and intuitive to use. It provides improved symmetry in gait with active assistance designed to replace lost muscle function. This new version offers a new design and will be lighter than its predecessor. Moreover the new product will be able to utilize its battery capacity better. Power Knee enables users to walk longer distances with less effort compared to passive MPK’s and with better gait symmetry. The more symmetrical the gait is, the less is the risk of “wear and tear” on the body. By off-loading the sound side, users can maintain their long-term health.

Connect TF

New socket for easily putting on and removing prosthetics

Connect TF is an adjustable prosthetic socket for low-activity lower limb amputees. It is easy to put on and remove and, if Andrew Bache is to be believed, might lead to more people actually using their prostheses.

Text: Henrik Persson | **Photo:** Össur



While many amputees do use prostheses, most actually don't.

Many people get lost along the way to getting a prosthesis for various reasons, not least of all financial. Older people, in particular, are often left without prosthetics and instead end up in wheelchairs. According to Össur engineer Andrew Bache, the aim of Connect TF was to combat this.

"There's a lot that can stop an amputee from getting a prosthesis. Older people, for example, are often overlooked because, as crass as it may sound, they're seen as people with not much time left. Which is frustrating because a well-functioning prosthesis can not only improve quality of life, it can actually extend a person's life."

"With Connect TF, our aim was to ensure that at least a small percentage of those people who have been overlooked can get themselves a prosthesis. We also wanted it to be easy to use."

A normal prosthetic socket is often made from a mould of the stump and is difficult to adjust once it's been manufactured. In more than a few cases, it can also be quite difficult to put on and remove, not least of all for elderly patients. What makes Connect TF so ingenious is that it can be both opened and closed, and is designed to be extremely easy to attach and remove. A large handle, sensibly located, makes it incredibly easy for the amputee to both open and close the prosthetic socket themselves.

All this will hopefully make it easier for a low-activity patient to put on and remove their prosthesis.

"Most often, a prosthetic socket is made by taking a plaster cast of the stump, which can be quite a stressful process for elderly people. With Connect TF, it doesn't have to be. The orthopaedic engineer takes a few measurements, makes some adjustments and fits it in place. Everything is a lot easier. We had a guy who was missing both legs and an arm – even he was able to use our socket," says Andrew Bache.

A prosthesis that can be adjusted and fitted in place quickly can have financial benefits too, says Andrew. In terms of materials and, not least of all, time.

"It's hard to calculate what things cost since you often just get the costs for the materials. Also, the financing for everything differs from country to country. But anyone who has ever hired a contractor knows that more often than not it's the labour, not the materials, that costs the most in the end. Which is exactly where Connect TF has a clear advantage as it saves time for everyone involved."

Connect TF is part of Össur's larger concept known as "One Visit Prosthetics" where the aim is to produce and try out a prosthetic during the same visit. The goal is to make things easier for everyone, in particular the patient. Plus, a solution like Connect TF allows later adjustments to be made quickly:

"The point of "One Visit Prosthetics" is to make things easier. The major advantage of Connect TF is that it works like a ski boot. If a stump changes size or shape, you can quickly adjust the prosthetic socket to match. It's a really ingenious and streamlined solution," says Andrew Bache. ••

The Journey from Flex to Pro

Inventor Van Philips' ideas revolutionised foot prosthetics, and over the last 20 years Össur has taken this concept to the next level with the Pro Flex range of prosthetics. The future promises even more innovations – and a greater focus on the entire human body.

Text: Henrik Persson | **Photo:** Össur

Pro Flex is Össur's range of prosthetic feet, created to offer a high degree of comfort and a natural, flexible gait – from heel-strike to toe off.

The technology behind Pro Flex is based on a triple-blade design and after decades of development and innovation, the product range now includes six different prosthetic feet, each with their own special properties for adapting to different users and different needs.

Pro Flex is the result of over 20 years of work at Össur. And yet, it is essentially based on another product that already existed: the Flex Foot, created and manufactured by American inventor Van Philips.

Born in 1954, Van Philips was an athletic youngster with a huge interest in sports. At age 21, he was forced to undergo amputation of one of his legs below the knee, which prompted him to study orthopaedics. Not content with what prosthetics at the time had to offer, Van Philips began coming up with his own solutions using new materials and new technological solutions. Among other things, Van Philips was an early adopter of carbon fibres at a time when wood and steel still dominated the world of prosthetics.

"Flex Foot was revolutionary in its day, especially when it comes to the design and choice of materials. It made it possible for users to recover more energy compared to older designs," says Vala Dís Birgisdóttir, Global Product Manager for Össur's Pro Flex, the current incarnation of Flex Foot.

Van Philips founded his own company in 1984, calling it Flex Foot Inc. One of his earliest inventions was an artificial carbon fibre foot that was able to recover some of the user's energy with each step, sort of like a spring. The result was Cheetah, a foot designed according to the anatomy and gait of the big cat that is still the Number 1 choice for many Paralympians today.

After 16 years, the company was bought by Össur who continued to build on Van Philips' ideas. The team collaborated closely with both users and researchers.

These days, there is a heavy focus on the entire prosthesis and its symbiosis with the rest of the body. A lot has happened in the 20 or so years that Össur has been at the wheel.

"We've come a long way since we bought Flex Foot. When we took over, we only had one foot – today we have 35. While there is a clear timeline that you can follow, I see Pro Flex more as an entirely new platform rather than an offshoot of Flex Foot," says Vala Dís Birgisdóttir, praising her experienced colleagues who work together to push their development efforts forwards.

"It's really cool being a part of the process and watching what we're doing grow from the idea stage to a market-ready product. It's a long process that involves a lot of people."

The development of prosthetics is often seen as a heavy, technical field. Moving forwards, Vala Dís Birgisdóttir believes in a "lighter" development process, with a focus on the entire body.

"Instead of just focusing on a single product, we're thinking more and more about the body as a whole. What happens to the other leg? The joints? By helping people achieve a more even and symmetrical gait, for example, we can minimise their need to compensate," says Vala Dís Birgisdóttir.

"We are also continuing to develop the Pro Flex. We're learning a lot from the data we're collecting. I think a lot of interesting stuff is going to happen in the years to come.

"Right now, all we can do is to log the mountains of data we've collected about the human body. Which is exactly what we're doing. But it's also about what you do with your data. We're interpreting it in a highly sophisticated way, which is the key if you ask me." ••



THE PRO-FLEX FAMILY

Pro-Flex® Pivot
Innovative, multi-blade prosthetic foot with a pivot pin mechanism.

Pro-Flex® LP Align
Functionality, comfort and design to users to select shoes based on activities.

Pro-Flex® XC
Designed for active users who hike and jog/walk on flat surfaces.

Pro-Flex® LP
The mobility of a standard foot, adapted for users with longer amputation stumps.


Pro-Flex®
XC Torsion

Rebound

Functional Healing

Össur's Functional Healing quality seal facilitates a better and more comfortable healing process – and a chance to bounce back faster.

Text: Henrik Persson | **Photo:** Össur



Look up the word "rebound" in a dictionary and you'll find a definition somewhere along the lines of "return". In the world of sport, the word is used to describe a ball that the goalie punches back up the pitch, for example. But it's also used in a broader sense, that of "bouncing back" from something, like an injury.

This latter definition could be used to describe Össur's Rebound product range.

The Rebound range consists of a series of knee brace that have been given Össur's Functional Healing quality seal. As the name might suggest, Rebound knee braces are specially designed for a healing process that is functional. Put simply, these products are all about supporting and assisting anyone who has suffered, say, a knee injury that needs to heal but without robbing the patient of their ability to move.

In fact, the point of Rebound is to do the exact opposite: the support these products provide means that the joint can continue being used but without it being subjected to excess stresses and strains, which not only makes recovery easier, it actually speeds up the process. These products include patented technologies created specifically to complement existing treatment options.

"We often work with situations where someone has suffered an injury. Generally speaking, we help to immobilise the patient to ensure the best healing. With Functional Healing, however, our aim is to improve the result of the procedure while at the same time allowing people to be more active during the actual healing process," says Axel Schulz, Managing Director for Europe at Össur and, for eight years, a key figure in the development of the Functional Healing concept.

Functional healing, therefore, means a healing process that still allows you to be relatively mobile and functional throughout.

"If we have a patient with damaged knee cartilage, we're talking eight to twelve weeks of recovery after the surgical procedure, and then rehab. The prognosis isn't great. We looked at that and wondered how we could improve not just one specific problem, but the entire spectrum of treatment procedures," says Axel Schulz.

"The benefits that our protection offers are that you can use it even before the procedure and that it helps to soothe pain so that you can be more active during your rehab. The joint is usable but it's still protected.

Axel Schulz has been working on the Functional Healing concept for 8 years. A former orthopaedic surgeon, he was attracted by the idea of improving the clinical result and giving the rehab part of the healing process a shot in the arm.

"I liked the vision there was of helping to improve the healing process for injuries. That's what I worked on as a surgeon, only at a different stage as it were," says Schulz.

"A lot has happened in the field since I was a student. Back then, the process didn't even include rehab. It was just the surgical procedure. But today, we know that procedures only make up 50% of the healing process – the rest is rehab. If we can provide support there, and if it actually provides support rather than being a burden, well then that's pretty amazing.

One of the main goals behind the Rebound products is the simple yet far from obvious philosophy that knee braces should produce a better outcome rather than none at all. According to Axel Schulz, a key feature of the Rebound products is also that the patient themselves gets an insight into and is more involved in the healing process.

"We're trying to make it easier to use the products. Patients can adjust them themselves and get involved with the process. They can see what a normal level of stress should look like, but ultimately they're the ones in control."

Axel Schulz is enormously proud of the work he and the entire Össur team have put into the Functional Healing concept and all the different Rebound products. Not least of all because they have researched heavily and worked with the longer term in mind.

"What you need to understand is that it takes time to develop products like these. It's not easy and you have to have discussions with experts. We had a large conference with experts from around the world where we agreed on a few recommendations. Then we carried out clinical tests. This sort of stuff isn't usually published for a good five years. So it takes a huge amount of commitment to pull this off – which is exactly what we've done," says Axel Schulz. ••

"The benefits that our protection offers are that you can use it even before the procedure and that it helps to soothe pain so that you can be more active during your rehab."



Rebound® ACL
A dynamic knee brace designed to minimise the strain on the anterior cruciate ligament.



Rebound® PCL
Created for rehabilitating injuries to the posterior cruciate ligament.



Rebound® Cartilage
Protects healing tissue from being over-exerted during pre-rehab and during rehab for cartilage damage and meniscus lesions.



Rebound® Dual
A knee brace that provide functional support in case of ligament instability either separately or in combination with a knee arthrosis.

Össur achieves Climate goals 2021

50-year-old and carbon neutral – Össur has double the reason to celebrate this year. Our goal to become carbon neutral during 2021 has been a particularly big challenge that has finally resulted in success.

Text: Niklas Simonsson | **Photo:** Unsplash

"We are hugely proud of the fact that we have managed to achieve such an enormous undertaking"

Bergþóra Hlíðkvist Skúladóttir, Global Sustainability & EHS Manager at Össur.

Sustainability goals have been an integral part of Össur's operations for several years. Every tiny carbon footprint a company leaves behind becomes part of a gigantic puzzle. Actively working to reduce your own carbon footprint means mapping out the entire puzzle to get a clearer view of the overall picture. This has involved hard work that is conscious of its goals.

"There are always difficulties when it comes to achieving climate goals, especially when you set your goals as high as we have at Össur. "That's why it's a truly wonderful feeling to have finally managed to achieve what we set out to do all those years ago. It's a real milestone for the entire company," says Bergþóra Hlíðkvist Skúladóttir.

Part of this work involved becoming a member of United Nations Global Compact, the UN's global sustainable development goals. The 17 goals include actively combating hunger and poverty, as well as working towards equality and responsible consumption, and supporting the ecosystem and biodiversity. Össur has committed itself to four UN SDGs: Good Health and Well-Being, Gender Equality, Responsible Consumption and Production, and Climate Action.

"The UN SDGs are a vision of a better world. Össur has signed up to UN Global Compact, the UN's largest sustainability initiative for companies. Equality is an important factor, alongside the environmental goals. By signing up and getting involved, our company is committing to working on important issues such as human rights and anti-corruption. Our successful development report on this work is available to read on our website," says Bergþóra.

Össur's approach to and vision of environmental work is all about maintaining a balance between the environmental impact, society and the economy. This way, everyone who gets actively involved is contributing to a better world for our children and our children's children. Having aligned these factors, Össur has also been successful in its environmental work and is proud to be carbon-neutral as of this year.

"We've spent a decade improving our environmental management systems and now have ISO 14001 system certification for our biggest manufacturing and distribution facilities. We take our responsibility very seriously and have continued to improve our awareness throughout the start of 2021 to give ourselves an even clearer picture of the carbon footprints we leave behind," says Bergþóra.

5

TIPS FOR BEING ECO-SMART

1. Choose an electric car next time you buy a new vehicle.
2. Shop second hand.
3. Eat local.
4. Think about your travel.
5. Recycle.

Large companies are doing their part, but what can individuals do to change the environment? Bergþóra believes there are loads of little things that every single one of us can do to make a change for the positive. The internet is a great resource for quickly finding loads of different tips and tricks on reducing your carbon footprint.

"I think what's really helpful is remembering three important points: energy, food and consumption. Switch to green energy and see if you can't upgrade to an electric car. Avoid throwing out food and if you eat meat, try to reduce the amount you eat. The biggest issue is still consumption, meaning what you buy and how. Try investing in items that last longer, especially older items from second-hand shops. And try to think a bit more about the way you travel. You can enjoy life while also being conscientious. Everyone can do something that will make a difference in the long run," says Bergþóra.

Going for the world record step-by-step

Össur Ambassador, Markus Rehm, is the holder of the Paralympic world record for long jump. Overcoming the challenges faced in elite-level athletics takes more than just natural talent, it takes specially designed products. Here, he explains the scientific process behind competing in the long jump wearing the Cheetah Xpanse carbon fibre foot.

Text: Jacqueline Byrlén

CURRENT LONG JUMP WORLD RECORDS

8,95 metres – Mike Powell (USA)
7,52 metres – Galina Chistayakova (URS)
8,62 metres – Markus Rehm (GER), Paralympics (F64)



Jumping over a long distance also means being able to take off quickly. That's why it's important in the long jump that the jumper reaches the fastest speed they can in order to maximise the length of the jump. The greater the vertical speed, the higher and longer the jump. This requires a combination of speed, strength and skill.

Beyond natural talent, achieving a Paralympic world record in the long jump is also all about basic physics. With the help of Össur's Cheetah Xpanse prosthetic foot, elite athlete and world record holder Markus Rehm has managed to maximise both his vertical and his horizontal speed. Össur's carbon fibre running feet allow amputees to regain their functional ability to jump, and also give athletes what they need to maximise their performance.

JUMP

When Markus' foot hits the ground, his blade compresses and stores the potential energy that is built up during his run-up. The carbon fibre foot allows Markus to achieve speeds of up to 35 kph (roughly 22 mph).

The blade is designed in such a way that it bounces back after being compressed, propelling the athlete forwards. The Cheetah Xpanse is estimated to be a third as powerful as a human ankle and when Markus takes off, 90% of the energy generated by the step is recovered. This allows him to challenge himself and to push himself further – and to jump even faster.

TAKE OFF

The dynamic shape of the blade allows the foot to bend and create a powerful kick of energy. This power provides the vertical lift in the jump.

The long, flat toe part of the foot intensifies this power at the point of take-off, while the curved design of the foot pushes the movement forwards.

The shape of the blade means that when Markus reaches the take-off board, the blade is pushed down with such force that the carbon fibre foot is compressed. When this happens, the horizontal force generated during the run up is converted into a vertical force. This vertical force is equivalent to seven times his body weight and has been measured at up to 5kN.

IN THE AIR

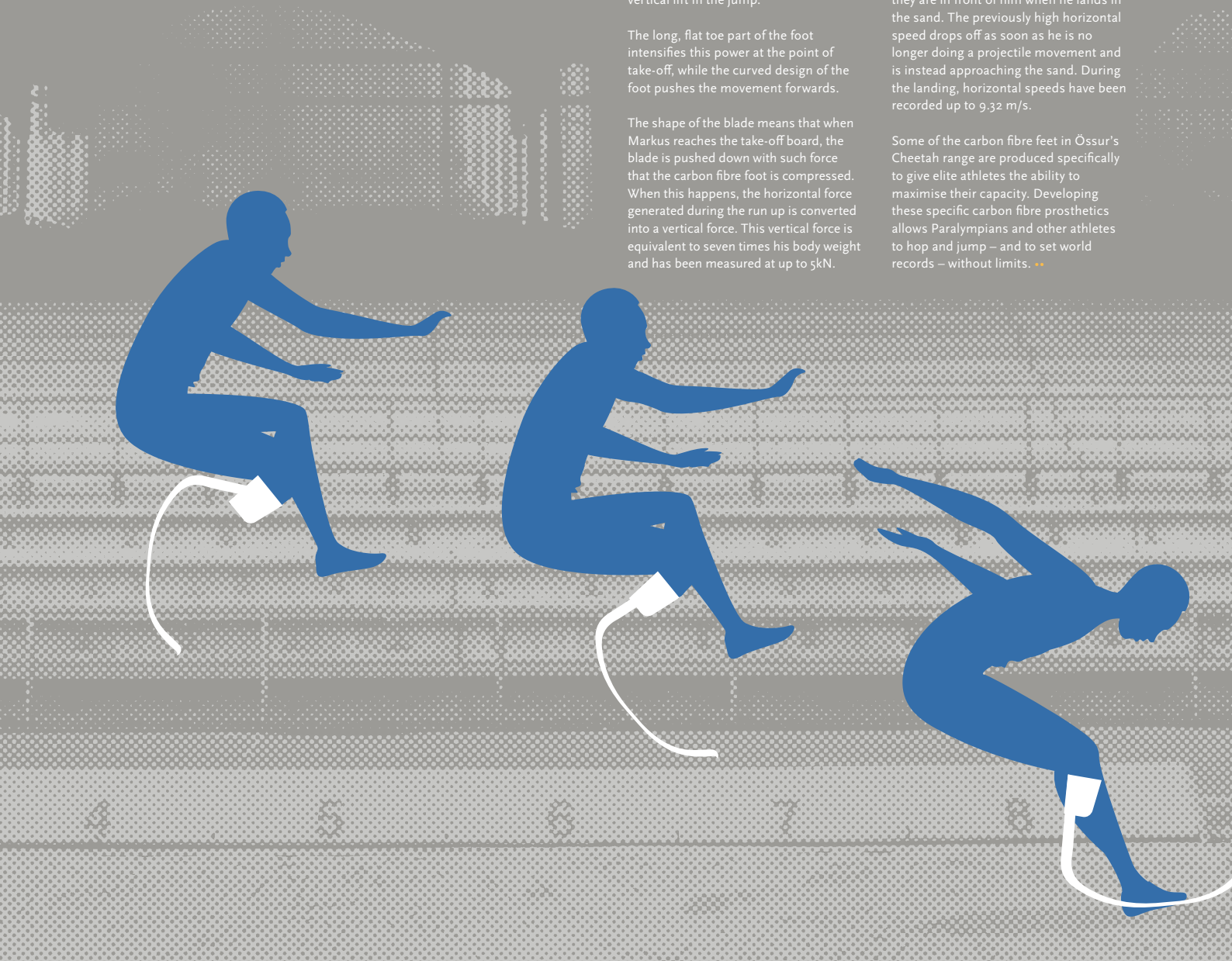
With a projectile motion, Markus can achieve an optimum angle of 60 degrees, reaching a height of 1.6 metres during the jump. He hangs in the air for almost a full second before landing in the sand – eight metres later. During the jump, his horizontal force is around 1.2 kN.

How long Markus spends in the air depends on the speed he is able to achieve between the starting line and the take off board. The faster he takes off, the higher he can jump and the longer his hang time in the air is. The shape of the blade has been developed to ensure the best take off possible in order to allow for the maximum length jump.

LANDING

To perfect the jump even further, Markus throws his legs forwards so that they are in front of him when he lands in the sand. The previously high horizontal speed drops off as soon as he is no longer doing a projectile movement and is instead approaching the sand. During the landing, horizontal speeds have been recorded up to 9.32 m/s.

Some of the carbon fibre feet in Össur's Cheetah range are produced specifically to give elite athletes the ability to maximise their capacity. Developing these specific carbon fibre prosthetics allows Paralympians and other athletes to hop and jump – and to set world records – without limits. ••



i-Digits changing lives

A partial hand prosthetic designed to allow you to do the little everyday things. We talked to two users whose lives were changed for the better after getting i-Digits.

Text: Henrik Persson | **Photo:** Össur

i-Digits is a myoelectric partial hand prosthetic from Össur for people missing between one and five fingers. Currently, two versions are available: the i-Digits Quantum and the i-Digits Access.

With the ability to quickly change to pre-programmed grips – such as for driving a car – this prosthetic allows you to adapt to everyday situations fast. Suddenly, you can do all of those finicky little everyday things again, like tying your shoes or buttoning up a shirt.

We spoke to two users of i-Digits with completely different experiences and backgrounds when it comes to their actual neurodiversity.

Gary McKeown worked at a plastic factory for over ten years when business started to dry up. Machine maintenance was overlooked. One day, he was working under a large mixer when tragedy struck. His hand got sucked in.

"I had ten operations and became something of a guinea pig. I obviously wanted to find something that could give me my hand back, as it were, but on the NHS I got passive prosthetics that didn't do the job. The first electric prosthetic I tested was longer than what was left of my hand; that didn't work either," says Gary.

After receiving compensation for his injury, he got the opportunity to visit Touch Bionics and try out his first i-Digits, with a fixed thumb. After that, he essentially tested every new release, as he puts it.

"I was the first to get an i-Digits. I then became a Touch Bionics ambassador and travelled the world. Different batteries, different thumbs, you name it. Now I work as an ambassador for Össur."

"I was the first to get an i-Digits. I then became a Touch Bionics ambassador and travelled the world."

Gary's experience with i-Digits is extensive, and he knows what he likes.

"I like i-Digits because they allow my wrist to rotate fully. Which means I compensate less. I haven't had any neck pain and so on for years. It will never exactly be a replacement for my real hand, I see it more as a tool. A tool that is currently unmatched."

In the future, Gary hopes that the technology will be refined a little bit, not least of all to give it a better thumb and a more compact design.

"Anyone who knows me knows what I want: a motorised thumb that can move in all directions. The one I have currently doesn't do that, not for my level of amputation. I know they're working on it.

"Getting the size down is important too: I'm very confident that soon the batteries will be built into the system with the same or even better battery life. That would be amazing." >>


Gary
McKeown



Sabine Vranckx works as a maths teacher for other aspiring teachers and professionals who want to improve their skills.

Sabine was born without one of her hands. She has a wrist but no fingers, so she is unable to grab anything with it.

"When I was little, I couldn't have a prosthetic. I was teased a lot so I started hiding my hand. When I grew up I tried out a strictly aesthetic hand but it wasn't very well made. Then I looked at myoelectric hand prosthetics but I still had my wrist so I didn't have enough space.

A few years later, Sabine heard about the i-Digit partial hand prosthetic and had a sort of "Eureka!" moment.

"Honestly, I didn't like how it looked. But I was getting back pain and shoulder pain and I didn't want to get any more health issues than I already had. So, I grabbed a brochure and that was that. I got my first i-Digits in 2017."

Sabine believes that she gets a lot of use out of her hand, and it's when doing small, everyday things in particular that she notices this.

"At work, it helps me write on the board and so on. But I can also shake hands with students, grab a coffee from the vending machine myself, tie my shoes. Above all, I have less pain now. My body is more balanced."

You work with a lot of young people, how have they reacted to your i-Digits?

"The first time they see it they'll say I've got a robot hand. Kids and young people are a lot more vocal in that way, while adults mostly just stare. I've got a Facebook page, too, where I write about living with i-Digits and answer questions and so on."

Sabine has come a long way from the nervous girl who hid her hand, and now prefers her i-Digits to her aesthetic prosthetic.

"It's a part of me now, I always pick it over the aesthetic one if I'm going out to a party or something.

It's a bit odd but, I used to dream of having two hands and when I finally did, it felt surprisingly strange," says Sabine, chuckling. ••

The Professor's journey through the world of

orthopaedic technology

In July 2020, Nerrolyn Ramstrand became Europe's first Professor of Orthopaedic Technology. This was the end of a journey that had taken her from a youth spent in Australia all the way to Jönköping. And she is looking forward to many more exciting challenges in the future.

Text: Niklas Simonsson | **Photo:** Private

Nerrolyn's journey in orthopaedic technology began in 1993 when she moved from the old gold mining town of Ballarat to Melbourne to attend university. She completed her education as a prosthetist before obtaining her doctoral degree in 2000. Since orthopaedic technology was a very limited field in Australia, Nerrolyn chose instead to relocate to Canada to continue her work.

"I mostly worked in education in Canada, which didn't leave much time for research. But it was still an incredibly valuable experience. During my time, I met the then Head of Education at the School of Health and Welfare in Jönköping. So, in 2003, I decided to move here," says Nerrolyn.



She has held many different titles and positions in her time at the School of Health and Welfare in Jönköping. Lecturer, reader, deputy head of research and acting vice chair of the School of Health and Welfare – though she has always been connected to the orthopaedic engineering programme one way or another. Today, she spends 50% of her time working on the programme and 50% as advisor to the Vice Chancellor. Together with her colleagues, she has helped to continuously push research and development in orthopaedic technology forwards.

"It's exciting getting to take this research further now. That we launch research in the academic world and then link it back to industry and business, developing all the time. Collaborating with researchers in other fields is also hugely important. As well as maintaining a dialogue with all the relevant stakeholders. If we produce a great product that doesn't meet the patient's needs, well then that work was pointless," says Nerrolyn.

It's a little-known fact that Sweden has the most qualified prosthetist per capita in the world. This enormous pool of knowledge has value both nationally and internationally, according to Nerrolyn. However, there is still a great deal of potential for improving how all this knowledge is highlighted to the wider public.

"We're working a lot on presenting our progress to business and politicians properly. There's a lot of work left to do. We have to increase understanding of the enormous benefit orthopaedic technology can have for people even more," says Nerrolyn.

Joyfulness
– the key to motivation

Triathlete and para-athlete Liisa Lilja is driven by the joy of movement and her love of sport. She has overcome hurdles that most of us could never even have imagined. And she has taken the changes to her training routines imposed by the coronavirus pandemic in her stride.

Text: Moa Långbergs | **Photo:** Private

Liisa Lilja was an active child who loved running, skiing and other endurance sports. A bone cancer diagnosis at the age of nine put a stop to her activities temporarily. Her next few years were shaped by constant hospital appointments, and she eventually had her right leg amputated above the knee. Today, however, Liisa Lilja is back competing and already has European Championship and World Championship golds under her belt.

"I've always been sporty and I enjoy exercising. After my illness, I initially started swimming as part of my rehab. In 2014, I got the opportunity to start running again and now, in the triathlon, I've found a form of competition that suits me," says Liisa Lilja.

Liisa Lilja was called up to Team Finland as a 15-year-old and has been competing in para-triathlons around the world since 2014. Two of her greatest achievements are her gold medals in the Para-Triathlon World Championships 2017 and the Para-Triathlon World Cup 2019.

Normally, Lilja spends half the year training overseas. This past year, however, has been different. The coronavirus pandemic has forced her to stay in Finland and her training schedule has been forced indoors because of the Finnish winter that



makes training outdoors impossible for Liisa. Swimming pools were also closed for some time, meaning her training routine has been different to other years. Now that the situation is beginning to stabilise, Liisa has found her way to the Netherlands where she is training with the Dutch national team. Liisa believes that training with others is an important ingredient when it comes to being able to constantly develop yourself and taking inspiration from how others are performing.

"The spring has been really good and I'm looking forward to competing this summer. I train around 25 hours a week and have a really strong internal drive, so my motivation has been at an all-time high despite the restrictions imposed by the pandemic," says Liisa Lilja.

As a para-athlete, Liisa Lilja has been through challenges that others could never even imagine. Hospital visits as a child, and then being forced to have her leg amputated at the age of 12 are experiences that have contributed to a strong internal desire to be active and to make the most of the possibilities that others take for granted.

One of the toughest challenges Liisa Lilja has faced during her sporting career was in 2018 when she suffered a fracture in her shin after pushing it too hard. This forced her to give up running and competing for nearly a year. For an endurance athlete, being able to rack up a big number of training hours without injuring yourself is crucial. There's a delicate balance that can be hard to achieve in practice.

"Getting to the very top doesn't happen in a day. It takes years of hard graft. You have to be patient and focused on your goals. Having a long-term perspective is the key to success. This is also a lesson I've taken from sport and applied to my life outside," says Liisa Lilja.

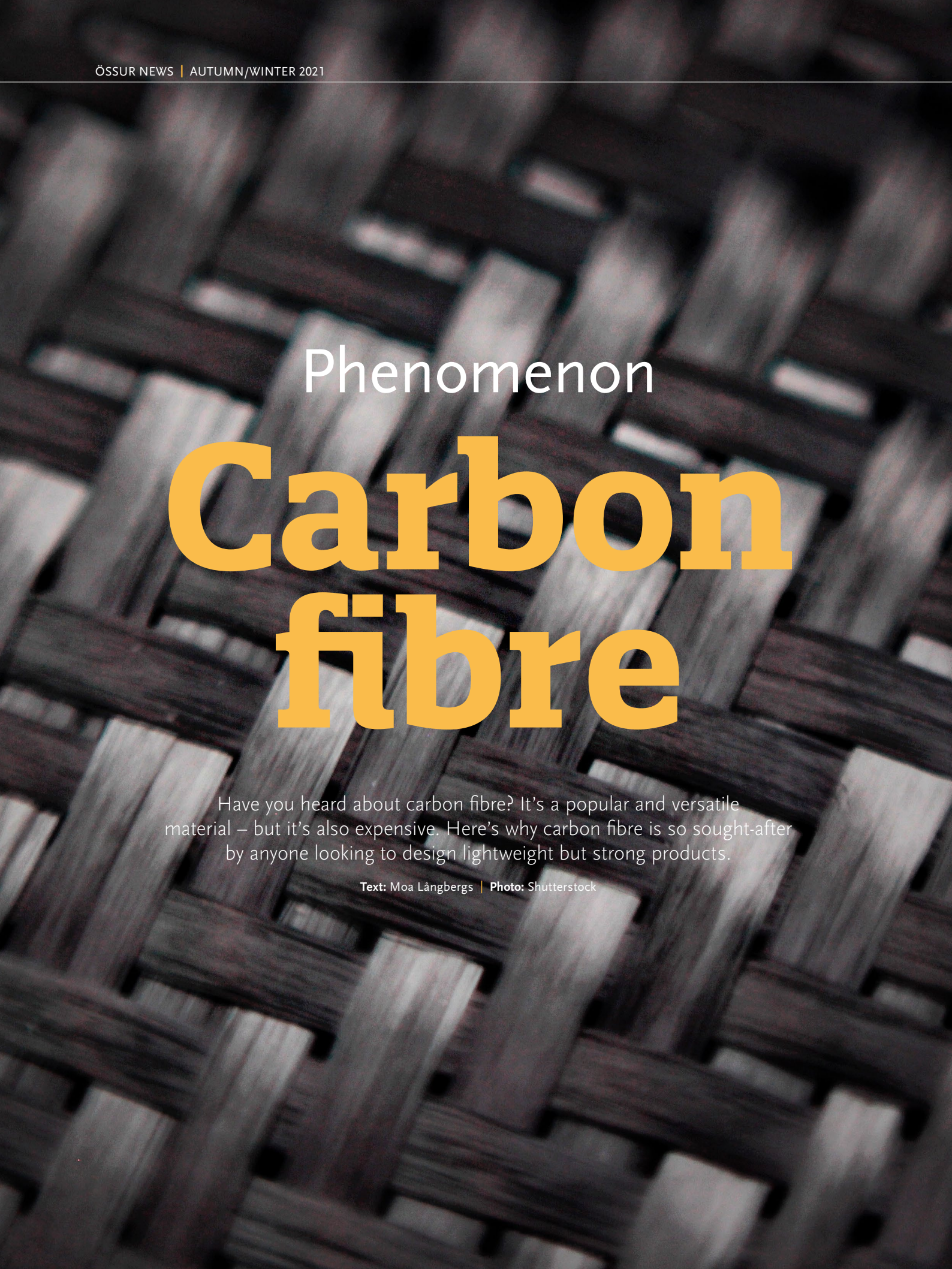
For Liisa Lilja, it wasn't dreams of becoming an elite athlete that got her into sports as a youngster. She just did what felt fun, and what suited her as a person.

"I never dreamt of becoming an elite athlete. I just started doing what I enjoyed and whenever I'm active I feel like I'm in my element. If you're doing what makes you happy and brings you joy, the success is just an added bonus," says Liisa Lilja.



LIISA LILJA

Age: 29 years old
Nationality: Finnish
Sport: Para-triathlon
Best memory from competing:
Paralympics in Rio 2016
Other activities:
University studies



Phenomenon Carbon fibre

Have you heard about carbon fibre? It's a popular and versatile material – but it's also expensive. Here's why carbon fibre is so sought-after by anyone looking to design lightweight but strong products.

Text: Moa Långbergs | **Photo:** Shutterstock

Lightweight, strong and durable. Carbon fibre is a material that offers many benefits. It's also a material that is of great interest to a range of different industries. Bikes, cars, boats, helmets and skis are all made using carbon fibre. Carbon fibre is also well suited for use in electrical devices like USB devices and watches.

The history of carbon fibre dates back to much earlier than you would imagine. It was first used in the 1800s, and in the 1960s, someone came up with a method for making carbon fibre that was more durable. Use of the material then began to grow. Today, carbon fibre is manufactured using thin filaments of carbon that are woven or twisted into mats, fabrics or tows. This produces a material that is both lightweight and strong. In fact, if you compare the same mass of carbon fibres to steel, the carbo fibres have four times the strength of the steel.

Manufacturing carbon fibre is a complicated process. Different types of plastics are mixed and put into a catalytic converter to react, where they form a substance known as polyacrylonitrile, or PAN. Once ready, the plastic is spun into fibres that are washed and stretched to the required diameter. You can change the carbon fibres to achieve a more even surface by heating and then oxidising them. The end product is then woven into mats that are used to manufacture the actual carbon fibre composites.

Carbon fibre is a relatively expensive material, but it is still popular because of the benefits it offers. Costs are also falling as the manufacturing process is further developed and streamlined. The advantage carbon fibre has over metal is that it doesn't rust. This benefit has led to carbon fibre being increasingly used for strengthening load-bearing structures such as walls, pillars and bridges.

A lot of people are very curious about the use of carbon fibre for building lightweight cars or aeroplanes. Airbus planes include carbon fibre components. And when making their plastic cars, Ferrari use a mixture of carbon fibres that gives their vehicles a lightweight yet crash-resistant body. Building lightweight products is also beneficial to the environment. Keeping the weight down means less energy is used up.



As carbon fiber is an expensive and fossil-based product, several interesting research projects are currently underway to produce a bio-based equivalent with similar properties. An example is the LightFibre project, where the Research Institutes of Sweden (RISE), developed a carbon fiber made from lignin and cellulose from trees. In the manufacturing process, cellulose is converted to viscose which is mixed with lignin to form a liquid. This liquid is spun into fiber, which is converted to carbon fiber by heating. ••

Carbon fibre

The Össur approach

For Össur, carbon fibre is part of the recipe behind our success with knee orthoses, products used by athletes and much more. Carbon fibre improves the ability to move and exert yourself, but at the same time is so light you can't even feel it.

Text: Moa Långbergs | **Photo:** Össur/Shutterstock

Carbon fibre is an important part of Össur's success and is a material that has been with us from day one. In fact, the C in our CTi knee protector stands for "carbon". It's the combination of strength and its light weight that makes carbon fibre such an excellent choice for products that people are going to be wearing every day all year round.

"Most users are impressed by how light our carbon fibre products are. In fact, the light weight is also the reason why so many athletes choose to use carbon fibre products. It allows them to compete with minimal interference from the prosthetic or protection. Most of them will tell you that they get so used to the product, they don't even remember they're wearing it," says John Kendrick, Technical Sales Support Manager at Össur Americas.

A unique property of carbon fibre is that it recycles energy. One example is AFO orthoses for people with foot drop, a condition that can affect people who have suffered a stroke, MS or other damage to the nervous system. When the orthosis hits the ground, the energy is pushed back into the foot, helping to lift it up off the ground. This means that the orthosis helps patients with foot drop not to drag their foot along the ground. The same carbon fibre technology is used in the Flex Foot product, and carbon fibre in particular provides more support than traditional foot orthoses.

"The material needs different levels of stiffness depending on the patient's needs, which is something that can be adjusted in Össur's AFO range, for example. A very stiff version is suitable for people who need a lot of support, while the same product is available in a less stiff version for people who don't need as much support," says Jón Ragnar Hafþórsson, Global Product Manager at Össur.

Carbon fibre has been part of the team at Össur since the company was founded back in 1971. The Flex Foot range was the first product range made using carbon fibre. A popular product even today, it is used by a growing number of patients across the world. This technology was then transferred to our AFO products that were released in 2002 and were the first orthosis products from Össur.

It's an expensive material so a lot of companies look for alternative materials or production methods. At Össur, too, we're evaluating production processes all the time. In the not-too-distant future, we can expect to see a new, innovative solution in the AFO range that will improve the ability to adapt products to individual patients.

"I don't think carbon fibre will disappear, but we might see an increase in the mixing of carbon fibre with other materials as a way of reducing costs. But there's no doubt that carbon fibre is a fantastic material to work with. The only limit to the possibilities of carbon fibre applications is your imagination. Using the material in 3D printers, for example, is something I believe we will see more of in future," says Jón Ragnar Hafþórsson.

Will we be able to reuse carbon fibre in future?

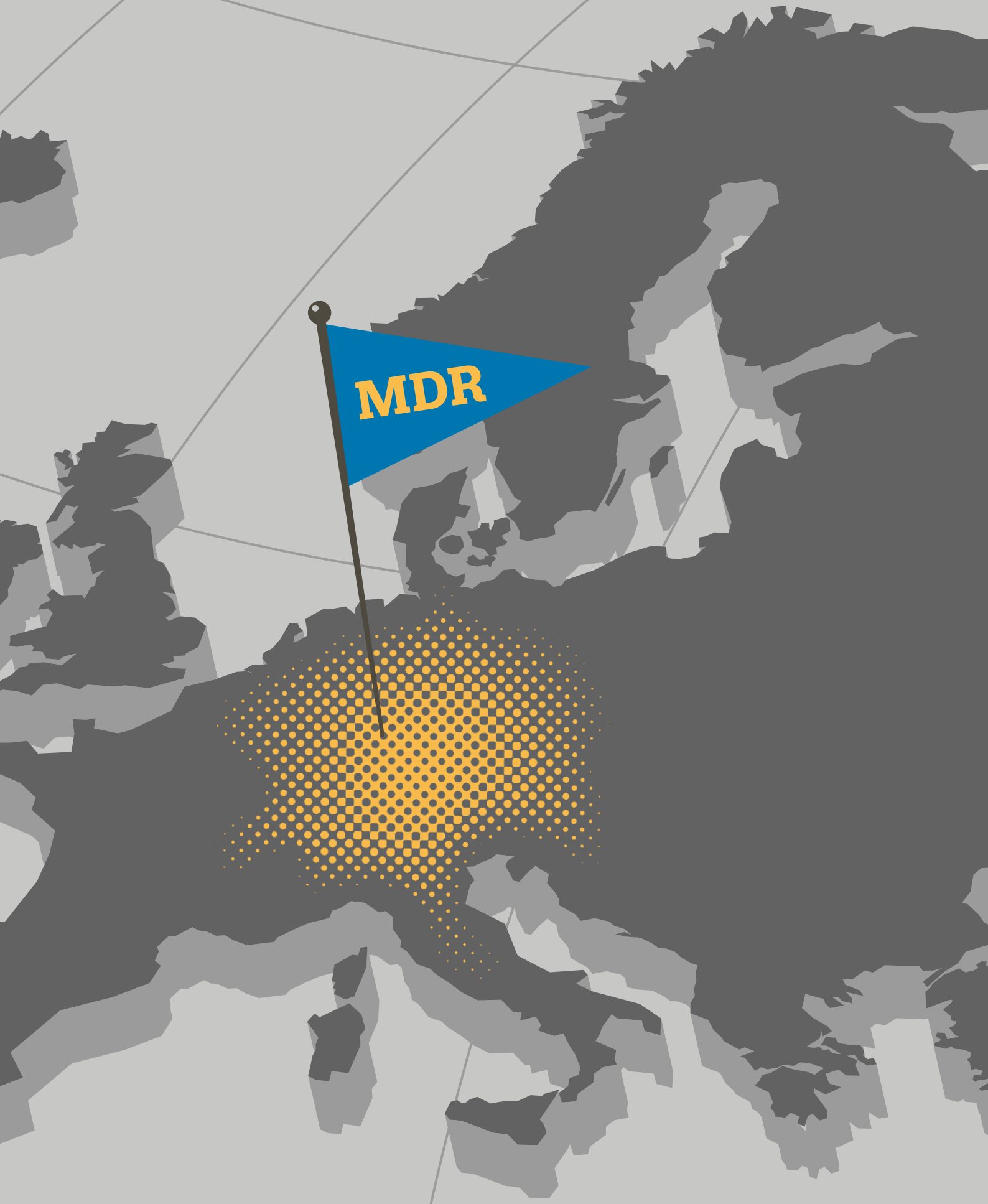
Carbon fibre can't just be thrown away like ordinary waste, it needs to be handled according to the laws and regulations applicable in each individual country. The most important thing right now is that methods are being developed for recycling and reusing carbon fiber.

"It's too early to say what the outcome will be, but the attempts to find a way of reusing carbon fibre look promising", says Jón Ragnar Hafþórsson. ••



"In fact, the C in our CTi knee protector stands for "carbon"."

CTi®
Custom


MDR

Better safety and better oversight with MDR

After several years of preparation, the first phase of the new MDR regulation has finally come into force for Össur and all stakeholders in the medical device sector across the EU.

Text: Eva-Lotta Sigurdh

MDR stands for "Medical Device Regulation" and is a new set of rules for the manufacture, distribution and after-sales activities of medical technology products. The Regulation, which is binding for all EU countries, came about predominantly as a way to free the market from rogue actors and thus increase trust in the industry – and above all to increase safety and security for patients and other end users.

"Europe has been rocked by several tragic scandals, especially in the beauty industry, where incorrectly performed breast implants have lead to huge medical tragedies, for example," says Simon Howe, Össur's Quality & Regulatory Manager, explaining how the idea behind the MDR was first conceived 20 odd years ago.

The Regulation includes an expanded set of control measures that stretch all the way from the manufacture of all products and devices, to how these are distributed and brought onto the market – with a huge emphasis on the transparency and traceability of data along the entire chain, and the need for feedback at all stages regarding difficulties using new products, for example.

More specifically, the Regulation establishes an obligation to, on the one hand, prepare and maintain all the technical documentation that is released into the market, and on the other, to ensure that the necessary EU markings are taken care of.

"What this means is more admin and more documentation, but since we've been preparing for this for so long and have managed to integrate this additional work into our daily routines, I don't believe there will be any noticeable impact on our employees' workload," said Simon Howe in an interview just before the MDR came into force.

For Össur as a company, MDR not only gives us a quality seal with respect to the market that indicates that we are still a serious actor, it also boosts our ability to remain at the cutting edge of technology.

"The requirements contained in the Regulation regarding transparency and constant dialogue around new products and their applications with both suppliers and distributors will naturally lead to a desire to continue to grow and improve," believes Simon Howe.

When it comes to customers, Simon believes that the new, tougher rules will help increase security thanks to the tightening up of quality assurance – a benefit that will also be passed on to end users.

However, the MDR also includes several obligations for customers, such as systematically monitoring and documenting how new products are being received and how they work – or don't – and why.

The MDR will be implemented in three phases, the first of which was just recently introduced on 26 May. From a broader perspective, however, even this "low-risk" phase has affected the entire production process at Össur, since nearly all of the company's products and devices belong to this category – meaning, non-conductive products and non-implants.

Could you give us a quick summary of what the most significant benefit of the MDR is?

"The increase in patient safety. The Regulation guarantees that we only work with partners and suppliers who share our vision, meaning other MDR companies along the entire chain."

What are the positive effects you think MDR will bring in the long run?

"I hope that the Regulation will push us and others to continue growing and improving in line with the increase in opportunities that the MDR offers. At the same time, I feel it will lead to a natural diminishing of rogue companies from the market.

"At Össur, we're welcoming the new Regulation with open arms and look forward to the benefits that all stakeholders will be able to enjoy – from us as a manufacturer, to our clients, and above all to the end users of our products." ••

Combining science with customer relations

With their solid knowledge and experience, our four clinical specialists at the Össur Academy contribute both practically and theoretically to expanding knowledge and developing products within Össur and our clinical operations.

Text: Eva-Lotta Sigurdh | **Photo:** Patrik Svedberg



This last year has been a tough one for our clinical specialists at Össur Academy. Instead of the usual 120-140 days spent visiting customers, nearly all of their work has been done digitally.

"It's worked well though," confirms Sven Johansson, one of the four specialists at Össur Academy, all of whom are trained orthotists with years of solid experience under their belts.

Most of our clinical specialists have previously held a number of different roles and plenty of teaching positions, both nationally and internationally. Lots of our prosthetic lecturers work with our clinical specialists to teach students about Össur's products and concepts, such as on the Orthopaedics Engineering course at the high school in Jönköping and Salford University – just two of several teaching locations across the Nordic region and the UK.

"I think the fact that we are used to working both flexibly and independently has been instrumental in how we have managed this transition. And while we of course want to get back out and meet clients face-to-face again, the transition to more digital communication has taught us how to meet and work in across even more channels. Which is great!"

This has been especially true for our prosthetists colleagues in the technical department who not only teach, but also provide support in day-to-day operations wherever they are needed. This could be anything from advising on more complex patent issues, to assisting on the development and application of new products and concepts, such as testing a prosthetic hand or knee joint.

But these experts aren't just there "in case of emergency", they also keep themselves, their colleagues and other staff constantly up-to-date on the latest developments within prosthetic and orthotics products and research at Össur.

What would you say is the difference that the Össur Academy makes to Össur?

"Since our primary role is to both launch products and educate people on Össur's solutions, concepts and technologies on the market, I would say that the Össur Academy makes a huge contribution to patient safety and to Össur always being at the cutting edge as a company."

TIPS FOR VISITORS TO JÖNKÖPING



Photo: Shutterstock

Gränna & Visingsö
Visit some of the many "Polkagris" sweet shops, learn about the André expedition, or take the ferry over to the beautiful island of Visingsö for a hike, a bike or a horse and carriage ride.
Read more: visitsmaland.se

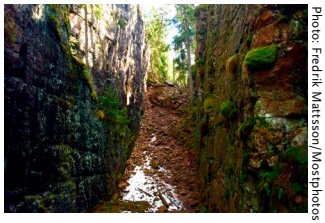


Photo: Fredrik Mattsson/Mostphotos

Skurugata & Skuruhatt nature reserve
Hike through one of Southern Sweden's most imposing natural phenomena, the 800-metre long Skurugatan fault line, and take in the views of the surrounding area from one of the highest points in Småland.
Read more: visiteksjo.se



Photo: Shutterstock

Taberg mine
Take a guided tour through Taberg's hidden mining tunnels and learn about the exciting history that stretches all the way back to the 15th century. With a bit of luck, you might even spot the Lady of the Mine.
Read more: tabergsgruvan.se



Photo: Husqvarna Museum

Husqvarna Fabriksmuseum
Enjoy Sweden's industrial history in an old Husqvarna AB facility. Take in the extensive collections of products, from the 17th-century King's rifles to successful modern-day exports.
Read more: husqvarnamuseum.se



Since 2014, Markus Rehm has been competing with able-bodied athletes in European and German championships. His personal best of 8.62 meters would have earned him a gold medal in the Rio games.

Markus Rehm
4x Paralympian and CPO

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