Nr 1 - 2018

Össur News

The Challenges of travelling

Mind-controlled prostheses

What's new in healthcare

Robotics

Erling Granström talks about enjoyable skiing



Lead an active life without limitations



The new Össur News

Welcome to Össur News. A new magazine with the purpose of providing enjoyable and interesting reading that inspires and hopefully leads to meaningful discussions.

ÖSSUR'S MOTTO IS "LIFE WITHOUT LIMITATIONS". It is this motto that forms the basis for our work when we develop, produce and supply orthopaedic aids and solutions. We are a values-based company, and the keywords Courage, Frugality, Honesty encompass the guidelines for how we work. It is also these values/keywords that steer our decisions in relation to everything from recruitment and our business partners to investment decisions and business strategies.

IF ONE LOOKS at our business operations, this approach seems to work very well. Össur now has over 3,000 employees at 35 different locations throughout the world. In addition to our head office in Iceland, we are also established in America, Asia and Australia, as well as throughout the majority of Europe. We have over 1,000 patents, and our product range covers everything from prosthetic knees to support collars and insoles.

ONE OF THE REASONS for the breadth of our operations is that, our majority shareholder - William Demant Invest - invests money back into the business and constantly reinvests the company's assets in the development of new products, for which we are extremely grateful.

2017 was a fantastic year for Össur. The *#MyWinningMoment* campaign was nominated for the Digital Communication Awards, the company grew organically, and in January Össur's portfolio expanded with the acquisition of Touch Bionics. We can now also provide high-tech and smart solutions for the upper extremities, something we look forward to developing.

FOR ÖSSUR NORDIC, 2018 signals the end of a period of transition. Having served us so well for such a long time, the office and warehouse in Uppsala were finally closed. We are now based in Stockholm, with deliveries coming from our logistics centre in Eindhoven. Change is not necessarily always something that people desire, but we have learnt that change can also entail a great deal that is good and positive, and that is a feeling we hope to also be able to share with others.

DURING THE COMING YEAR we will be initiating a number of new projects, developing new ideas and launching several new products, all with the aim of helping even more people to be able to live life without limitations, and all of us here at Össur Nordic are excited to tell you more about everything that is happening!
Pleasant reading!



Johanna Östergren
Managing Director Össur Nordic

Talk to us!

As you'd expect, Össur can also be found on social media, where you can follow the Össur team behind the scenes, see how our products are used in daily life on everything from athletics tracks to catwalks, check out tutorials about how to derive the maximum potential from our products – and, of course, talk to us.



@ossurcorp



facebook.com/ossur.no/



twitter.com/ossurcorp



youtube.com/user/OssurMedia

Contents

Nr 1 - 2018

New design









04. ON THE HORIZON
05. MIND-CONTROLLED PROSTHESES
06. BETTER HEALTH – A MATTER OF RESPECT
08. EFFECT OF TREATMENT PROTOCOLS
09. TRAVELLING WITH A PROSTHETIC AID
10. CHANGES IN HEALTHCARE
12. JOHAN HOLST – ABOUT THE IMPORTANCE OF HIGH GOALS
15. ROBOTICS IS HERE TO STAY
16. WHAT THE EXPERTS SAY
18. ENJOYABLE SKIING WITH THE RIGHT AID
20. VACUUM IN THE SERVICE OF MANKIND
22. A FORCE TO BE RECKONED WITH
24. PRO-FLEX – A FOOT WITH FINESSE

Össur News is produced by Glory Days on behalf of Össur Nordic.

Responsible Publisher & Project Manager: Johanna Östergren **Editor & Production Manager:** Pål Johansson **Art Director:** Love Eneroth **Layout-assistant:** Ronja Willners **Writers:** Anders Lindgren, Marie Eriksson, Fridah Jönsson **Photos (unless otherwise stated):** Össur Nordic **Illustrations:** Love Eneroth

The editorial team reserves the right to make changes and accepts no responsibility for any printing errors. Feel free to quote us, but please always state the source.

Our registered brand names are:
Rheo Knee®, Rebound®, Unity®, Pro-Flex®, Seal-In®-liners and Unloader One®

ÖSSUR®
LIFE WITHOUT LIMITATIONS

Össur Nordic, Box 770
191 27 Sollentuna, SWEDEN
info@ossur.com
Tel: +46 (0)18 18 22 00
Fax: +46 (0)18 18 22 18

Happening now



REBOUND POST-OP KNEE – OUR NEW KNEE BRACING SOLUTION

We are extremely proud to present Rebound Post-Op Knee, our brand new post-operative knee bracing solution!

Rebound Post-Op provides you, the user, with very simple guidance as to which parts of the brace you can adjust to easily put it on and take it off your leg. Blue is for You! For ease of use this brace is also very convenient – everything you need is provided in the product box. The brace is extremely easy to adjust to the individual user, so why not try it yourself and see just how much time you can save.



TOWARDS LEIPZIG!

OT World 2018 takes place in Leipzig, Germany on 15–18 May. This major international conference for orthopaedic solutions attracts people from all corners of the world and is one of the largest of its type. Össur Nordic will be represented, and together with our colleagues we will be providing an insight into future solutions while also discussing existing products.



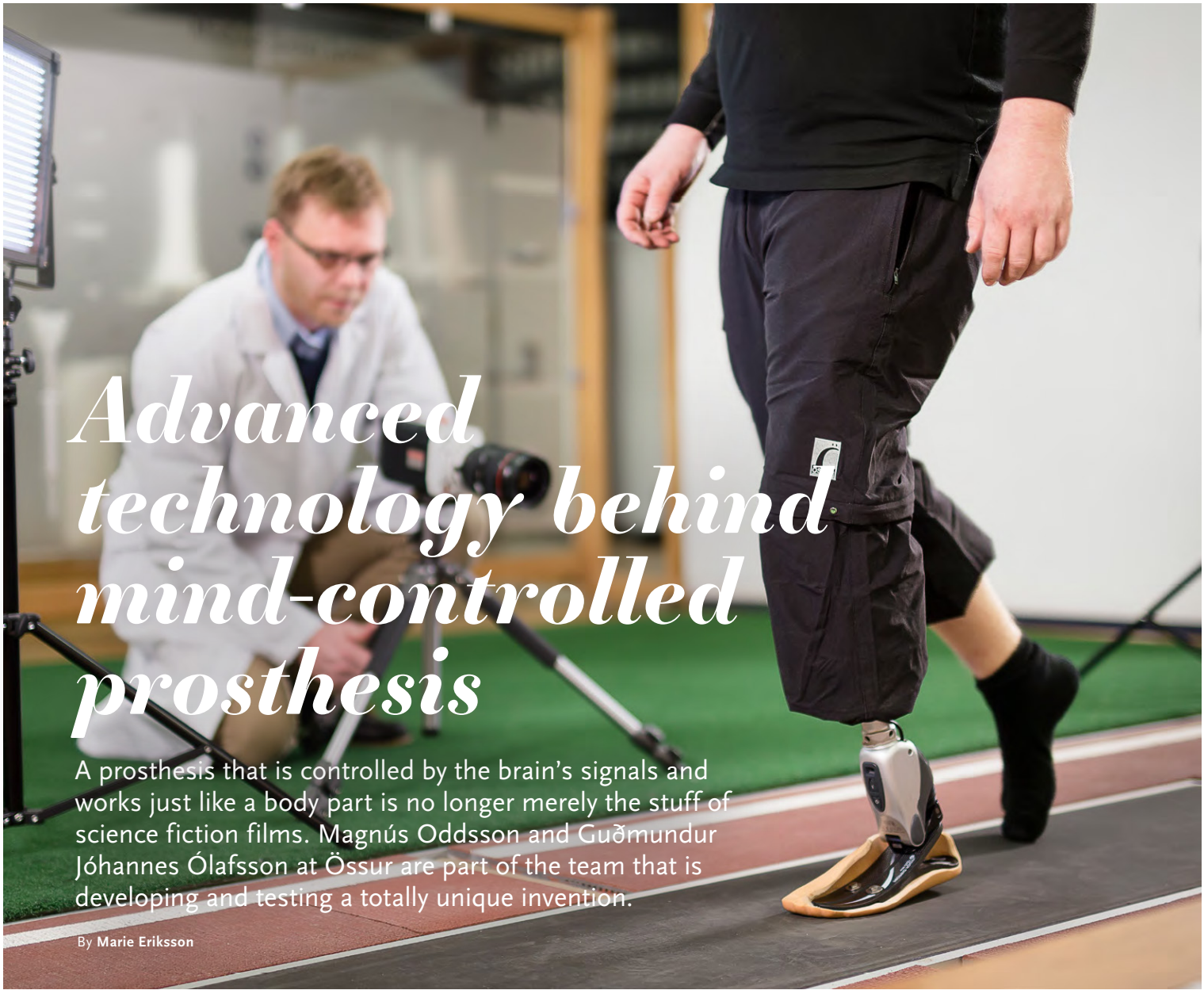
SILVER SPONSORS IN ICELAND

Orthopaedic surgeons also hold their Nordic meeting during the year. On 13–15 June, it is time for this year's Nordic Orthopaedic Conference, which is taking place in Iceland. Össur and Iceland go hand-in-hand, and we will be acting as silver sponsors for this year's meeting. Naturally we will also be on location to make new Nordic contacts and meet with our existing customers and partners.



NORDIC PROSTHETIST & ORTHOTIST CONFERENCE IN COPENHAGEN

In the autumn, Össur Nordic will be in Copenhagen to meet our customers at the Nordic Prosthetist & Orthotist Conference on 6–8 September. This time our Danish colleagues will be acting as hosts, and lectures/presentations will be held regarding prosthetics and orthotics and foot-related problems. We look forward to meeting our customers there and will be using the opportunity to demonstrate some completely new solutions.



Advanced technology behind mind-controlled prosthesis

A prosthesis that is controlled by the brain's signals and works just like a body part is no longer merely the stuff of science fiction films. Magnús Oddsson and Guðmundur Jóhannes Ólafsson at Össur are part of the team that is developing and testing a totally unique invention.

By **Marie Eriksson**

4 March 2014 is a date that is very special to Magnús Oddsson, a mechanical engineer and Össur's Deputy Director of Development.

"That was the day I saw a man wiggle his toes for the first time in 14 years."

Sensors that had been surgically inserted into the test subject's muscle tissue succeeded in picking up intuitive signals from the brain to move the prosthetic foot. The signals were transported via nerves to a small receiving computer, thus enabling the prosthetic foot to behave as the brain wanted in real time. It represented a sensational development.

"The sensors must pick up the right signals, and that is very complicated," explains Magnús Oddsson. "We need to be able to emulate the person's nervous system. And that is most difficult to do below the knee, because the signals there can take many different paths."

HE WORKS WITH bionics, a field that combines biology and electronics, medical science and the art of high-tech engineering. It is a field that also encompasses the term artificial intelligence, a system that is programmed to gather and process information in a useful manner.

THE ISLAND NATION OF ICELAND has developed into a society that is open to new solutions. The members of the team that is developing mind-controlled prostheses at Össur have competence and experience from different professional fields, with e.g. physicians working side-by-side with mechanical engineers.

Guðmundur Jóhannes Ólafsson is a product consultant at Össur, and for a number of years he has been testing a mind-controlled prosthetic ankle and foot:

"At the beginning I was shocked, in a positive way, at being able to control it with my mind. But now I sometimes forget that it is actually a prosthetic aid; it enables me to move in a more stable way and gives me better balance. And now I rarely have phantom pain, which in the past would often cause me to wake up during the night."

He continues:

"The only drawback for me is the need to have a few cords running from a point on the prosthesis to the small receiver I carry in my pocket. They are not visible under my trousers, but things would feel freer without them. Perhaps developments in the future will lead to a solution without the cords."

Better health

– a matter of respect?

Contact and communication can be improved by "seeing, respecting and listening" to the individual. But is it really enough to make more patients satisfied with their healthcare, and what do researchers have to say about it?

By **Marie Eriksson**



If the relationship between patient and doctor is good, the likelihood of better health for the patient increases. That is the conclusion of SKL, the Swedish Association of Local Authorities and Regions. In other words, the contact and the communication between patient and doctor plays a vital role in achieving effective healthcare.

But in practice the way patients experience and perceive their healthcare varies greatly, not least between men and women, according to Katarina Hamberg, chief physician and professor at the Department of Public Health and Clinical Medicine at Umeå University. She would like to see more research into what is being done differently and why, in order to gain a greater understanding of attitudes and the way in which different patients are treated.

IN ORDER TO UNDERSTAND how things can be better, it could be beneficial to take a closer look at what is not working well at present, something that Maja Wessel, a researcher at Karolinska Institutet, has done. In her thesis from 2013, she went through two years of complaints to the Patient Advisory Committee regarding poor treatment. In the reports, it was not uncommon for patients to talk about doctors who had acted in a nonchalant, disrespectful and arrogant manner. Maja Wessel's thesis also included a survey with responses from people on long-term sick leave. The results showed that younger patients and female patients were more often inclined to state that they had been subject to poor treatment, while men and people with psychiatric diagnoses more often said that they had been the recipients of offensive treatment. On the other hand, those who felt that they had received positive and respectful treatment also felt that they were able to return to work more quickly.

BUT WHY DO the results vary so much between the various groups? Good communication between healthcare professionals and patients should be promoted – it says so expressly in the Swedish Health and Medical Services Act. One of the explanatory models is based on the increasing level of stress within the healthcare system as a result of cutbacks.

Together with her colleague Andrea Eriksson, Professor Lotta Dellve at Gothenburg University has written a handbook for personnel at various levels within healthcare and social care: *Sustainable and health-promoting leadership in daily activities and change.* One of the tools they highlight as being important for a better work environment is a "cause and effect diagram". They claim that different parts and different levels within healthcare affect one another. If personnel are allowed to participate in the development of the work environment, including reasonable work terms and conditions, the quality of the interaction with the patient can also be improved.

"Culture eats strategy for breakfast." The legendary organisational consultant and author Peter Drucker is supposedly the father of this quote. He means that people behave according to what they think is right and proper. In other words, the key is to have insight into the prevailing culture at a workplace in order to be able to change it for the better. Otherwise, any positive strategies and ambitions do not stand a chance; at least not according to the person behind the quote.

How healthcare can be better – for everyone

The type of prosthetic aid you receive from your local healthcare authority, and how long you have to wait for such an aid, can vary greatly depending on where you live and which hospital you are treated at. With the help of a national register, this is something that Bengt Söderberg, orthopaedic engineer at Skåne University Hospital, hopes to change.

By **Marie Eriksson**

Ten years have passed since Bengt Söderberg, certified orthopaedic engineer at Skåne University Hospital, started the national amputation and prosthesis register, Swedeamp. Today it is the world's largest quality register of its type.

THE IDEA IS THAT different professional groups within the healthcare and rehab chain will report to the register about the date and type of treatment administered to their patient. In certain places, for example in Skåne, this reporting is now mandatory. The register will then work as a basis for ensuring that all patients receive the right to the same type of care.

"At present there is a lack of national guidelines for how care and rehab should be arranged," says Bengt Söderberg.

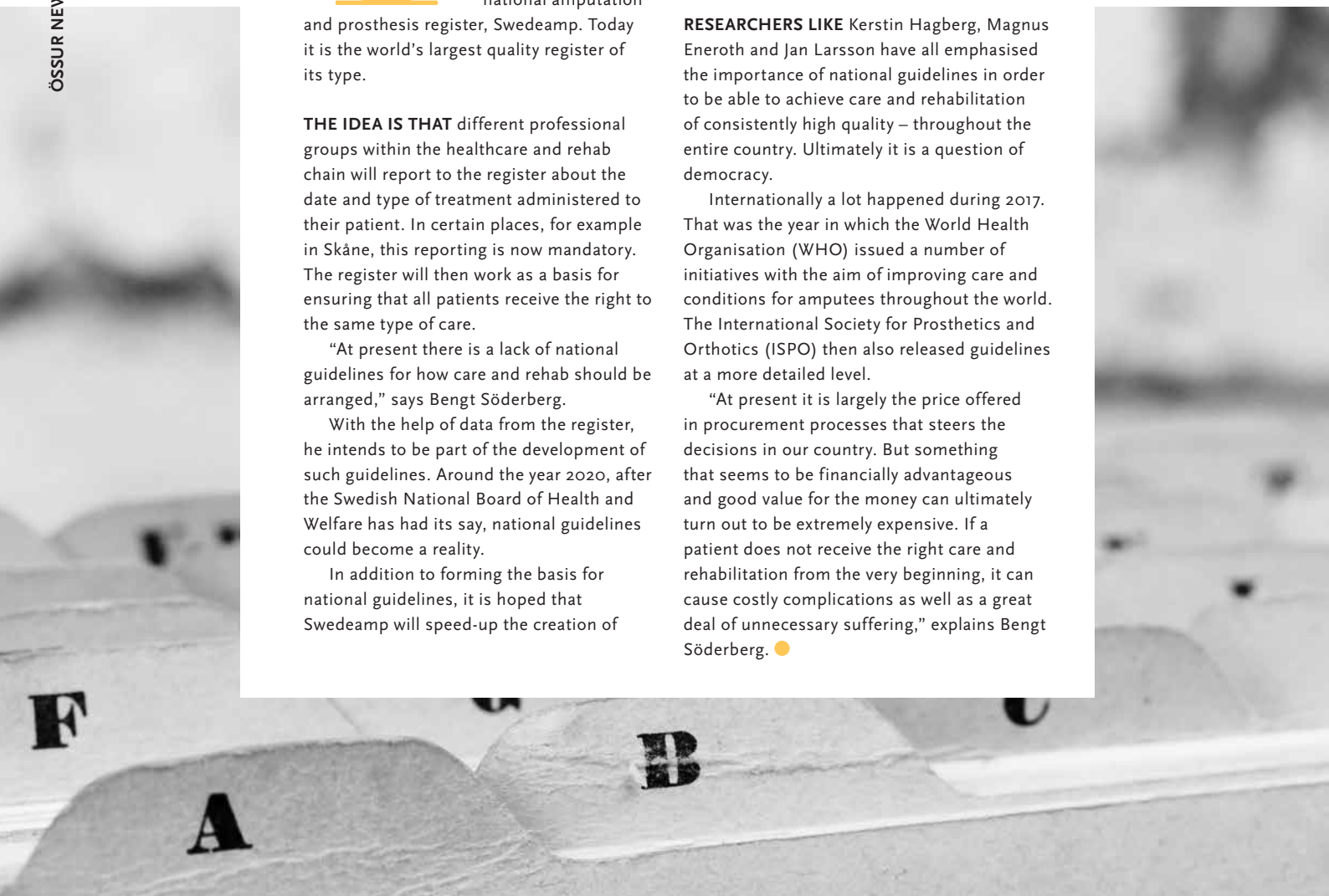
With the help of data from the register, he intends to be part of the development of such guidelines. Around the year 2020, after the Swedish National Board of Health and Welfare has had its say, national guidelines could become a reality.

In addition to forming the basis for national guidelines, it is hoped that Swedeamp will speed-up the creation of treatment records at a detailed level for each care and rehab unit, something that is currently lacking in many areas. Without such treatment records it is also more difficult to evaluate and develop care and rehab operations – since there is rarely any structure in place.

RESEARCHERS LIKE Kerstin Hagberg, Magnus Eneroth and Jan Larsson have all emphasised the importance of national guidelines in order to be able to achieve care and rehabilitation of consistently high quality – throughout the entire country. Ultimately it is a question of democracy.

Internationally a lot happened during 2017. That was the year in which the World Health Organisation (WHO) issued a number of initiatives with the aim of improving care and conditions for amputees throughout the world. The International Society for Prosthetics and Orthotics (ISPO) then also released guidelines at a more detailed level.

"At present it is largely the price offered in procurement processes that steers the decisions in our country. But something that seems to be financially advantageous and good value for the money can ultimately turn out to be extremely expensive. If a patient does not receive the right care and rehabilitation from the very beginning, it can cause costly complications as well as a great deal of unnecessary suffering," explains Bengt Söderberg.



Travelling with a prosthesis

What difficulties could by faced by someone who uses a prosthetic or orthotic aid when travelling? We spoke with Åsa Forsgren at Swedavia and Össur ambassador Johan Holst about the most common types of challenges.

By: **Fridah Jönsson & Anders Lindgren**



Åsa Forsgren is Unit Manager at Swedavia's security department. She says that a traveller with a prosthetic aid should always inform airport personnel of the situation.

"If you have a prosthetic aid that you know will set off the alarm in the metal detector, the best thing to do is to tell the personnel on site before you go through the detector. It is also absolutely fine to contact us prior to your trip and tell us that you have a prosthetic aid that could set off the alarm."

JOHAN HOLST IS an experienced traveller, and over the last few years he has undertaken a number of adventurous trips throughout the world. He agrees that going through the security checkpoint is the thing that can take a bit longer than normal.

"In 99 of 100 cases you will set off the alarm at the security checkpoint, so just get used to it. It's a smooth process in Sweden, and there are no particular problems within the EU, but in the USA the security personnel performed a full body search. When they finally realised it was just the prosthetic aid that was setting off the alarm, they called over a supervisor, and he gave them one hell of a telling-off."

ÅSA FORSGREN ADDS that personnel at Swedish airports are trained in how to deal with similar situations discretely.

> *"In 99 of 100 cases you will set off the alarm at the security checkpoint, so just get used to it.*

"If a situation arises whereby we need to carry out a check, you are always entitled to say that you would prefer to be taken to one side so that the check can be performed in more privacy. Even though we are focused on security in our work, we always consider the needs of the traveller."

ACCORDING TO JOHAN it is also possible to encounter challenges during your stay, that you may not have thought about beforehand.

"Taking a shower entails a significant risk of slipping over. At home it is easy to have a stool nearby, but showering can be a challenge if you are staying at a hotel. No one likes to be "difficult" by having to ask for extra things, such as a water-resistant stool to sit on in the shower, or extra towels because you sweat a lot around your prosthetic aid in a hot country. But these days it is more accepted that people do in fact have disabilities, so there is absolutely no reason to feel awkward about asking for such things."

Access to digital doctors and smart technology

Not all symptoms and problems require a physical examination. Digital contact with a doctor via a mobile device or computer is a growing market. Could new technology shorten queues and improve healthcare?

By **Marie Eriksson** Illustrations: **Love Eneroth**

Gone are the days of hour-long telephone queues in order to get in touch with the healthcare system. These days you are only a few pushes of a button away from contact with your doctor via video link – despite the concerns from medical experts that prescriptions for antibiotics would increase significantly if the doctor did not get to meet the patient in the flesh. The thinking behind such concerns was that many doctors in this situation would tend towards a "better safe than sorry" approach, with more negative side effects as a result.

Sweden's first digital medical centre, Kry, was started in 2015. Today it generates profits in the millions, and the plan is to expand into the European market. There are now a number of competitors for patients to choose from, and most of the solutions promise a maximum waiting time of three minutes after authentication via BankID and payment.

This type of contact with a doctor usually costs the same as a personal visit to a standard medical centre, although there are also free-of-charge alternatives available, such as the digital clinic doktor.se. The latter is financed at county council level and provides its services free-of-charge, regardless of where in the country the patient lives.

When coming into contact with a digital on-duty doctor, it is possible, for example, to show the doctor a rash, ask questions and establish eye contact with the help of a video service. This is very practical, not least for people who live in rural areas and have a long way to travel to the nearest doctor, provided that the patient's condition does not require physical attention.

The concerns regarding the anticipated increase in prescriptions for antibiotics have turned out to be incorrect – statistics show that the digital doctors actually prescribe fewer antibiotics than other doctors.

THE NUMBER OF USERS of a digital healthcare contact continues to increase, so even though the service can never completely replace physical visits to a doctor, the current trend suggests that it works well as a complement.

Not only can digital doctors relieve the burden on medical centres and hospitals, these types of solutions are also a socioeconomic bargain compared to the subsidisation of traditional healthcare: about four times cheaper for Sweden's taxpayers.

The Institute for Future Studies has published the report "Beyond IT – About health in a digital age". With the help of technology that can keep track of most things and can perform various actions in conjunction with, for example, cleaning and toilet needs, the burden on personnel can be reduced and they can allocate more of their time to things such as patient contact. Waiting times within healthcare are shortened by the availability of more digital doctors, and healthcare is made more accessible – for everyone.

Sweden's healthcare and social care systems receive criticism from researchers for their old-fashioned and stagnant structures. But digital development is a transformative force that is moving at high speed and in a forward direction.

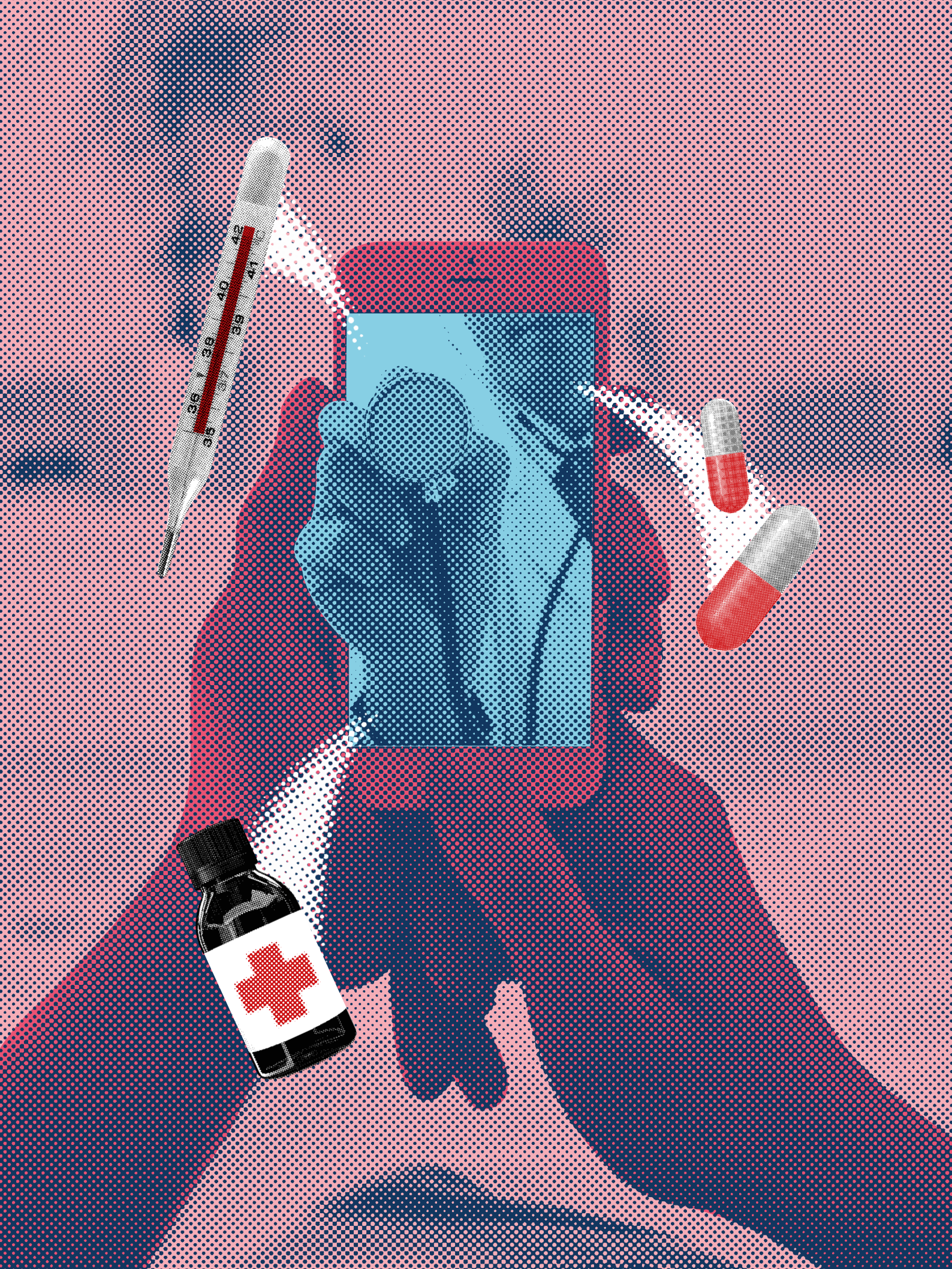
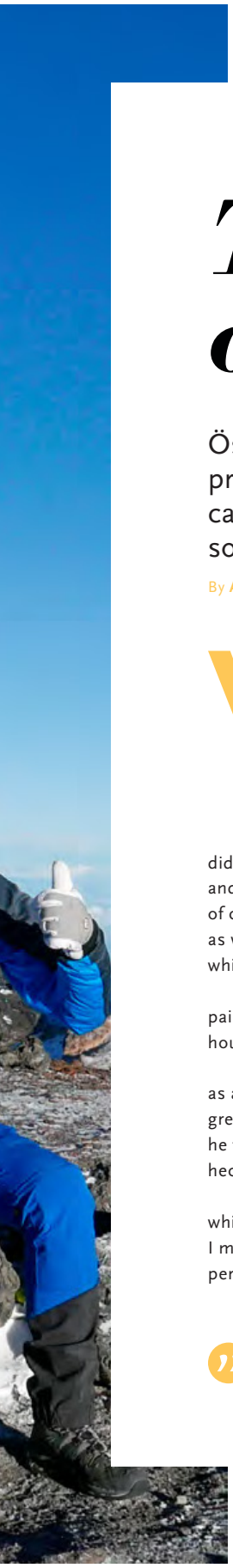

35
36
37
38
39
40
41
42

Photo: Salimu Mpemba



Kilimanjaro - Nov 2017 Marcus Ronnemar, Micke Kanon and Johan Holst



The importance of setting goals

Össur ambassador Johan Holst has set lofty goals, quite literally, in order to prove that most things are possible with a prosthetic aid. In this article you can read about the importance of setting goals and the importance of having something to strive for.

By **Anders Lindgren**

When Johan Holst was 17 he suffered an injury during a football match. He collided with an opponent so badly that all the joints in his right metatarsus were disconnected.

This led to severe pain in his right foot, and surgery did not help. The doctors felt that it was rheumatism, and Johan received an aggressive treatment in the form of chemotherapy and other anti-inflammatory medicine, as well as painkillers. He took 50 tablets a day, half of which were morphine tablets.

”Despite the heavy medication I was on, I had terrible pain in my foot and was only able to sleep for the odd hour or so at night,” says Johan.

Regardless, he still mustered the endurance to work as a DJ and run a nightclub in Nynäshamn, where he grew up. But in 2007, ten years after the football injury, he felt that he was in need of something new. He left the hectic nightclub lifestyle and moved to Borås.

”I could have moved anywhere, to be honest. For a while I thought about moving overseas, but in the end I moved to Borås. The Swedish town with the highest percentage of girls,” he says with a laugh.

After the move Johan began working as a media producer for large advertising signs, and as a DJ. He also came into contact with a new doctor, and after many examinations and much soul-searching he underwent an amputation of his foot, at Skene Hospital in April 2012. After the amputation, some fifteen years after sustaining the injury, the pain disappeared and there was no trace of rheumatism. But coming off the medication step-by-step took eight weeks and had unexpected consequences for Johan’s emotions.

”I hadn’t felt any joy, sorrow or longing for 15 years, and suddenly regaining my emotions at the age of 32 was a shock. I thought that I was sick, when in fact I was just feeling longing for the first time in ages,” he explains.

SHORTLY AFTER THE OPERATION, Johan began to set goals for what he wanted to achieve. He has always been an active person, and before the injury he played in a floorball team that was on the way towards elite level. He also went skiing and cycled a lot. But with his damaged foot, and being on such heavy medication, it was not possible to undertake such activities any more.

”I wanted to make up for lost time, for everything I had missed out on during those 15 years, so I started

> *”I hadn’t felt any joy, sorrow or longing for 15 years.*

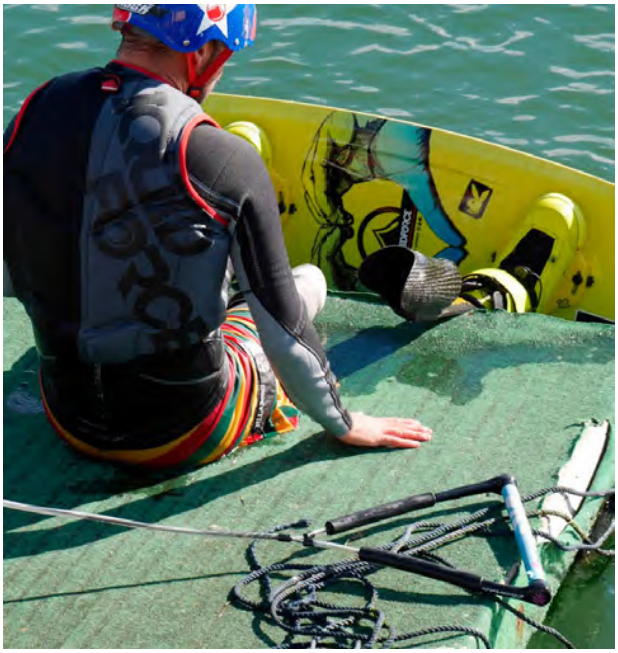


Photo: Daniel Jobark



Tjörn Triathlon - Aug 2017

Photo: Marcus Ronnemar



Santa Monica - July 2015

Photo: Marcus Ronnemar

looking into what was possible with a prosthetic foot. My managers spurred me on by giving me a goal – namely to run the Göteborgsvarvet half marathon within three years. But it didn't take me three years – I did it in two." "However, before I could run 21 km, I had to actually get myself out of bed and stand on my own two legs. Then I had to learn to walk with the prosthetic foot; first 10 metres, then 25, then 50, and so on."

"Looking back, I think that I can safely say that it was actually too great a goal to set straight after the operation, to run a half marathon. It was only three weeks before the race that I was able to run more than four kilometres. It bled and hurt a hell of a lot in the stump when I ran, and some people thought that I should withdraw from the race. At the same time, it was a fantastic feeling when I was cheered over the finish line by the crowd at Slottsskogsvallen, and I felt that, if I can do this, I should be able to achieve even more goals."

OVER THE YEARS Johan has run more races and he has also climbed Kebnekaise, as well as the world's highest stand-alone mountain, Kilimanjaro, which rises to some 5,892 metres above sea level. His greatest driving force is his tenacity. His philosophy is that you can do something if you have the willpower, and he feels that most things are down to the mental aspect and depend on how you view yourself and how others view a person's disability.

"I wanted to prove to myself that I could actually do these things. And in doing so, I have also proven my abilities to others. At the same time, it is important to remember that everyone has a different situation and different possibilities, so you can't just say that everyone can do everything. But my sincere advice to everyone who uses a prosthetic aid is to set goals with realistic sub-goals and then go about achieving them one small step at a time, at an appropriate rate. If you are used to walking, you could start by running one kilometre per day for a week. Then, after a week or two, you can increase to two kilometres. Eventually you will achieve a good level at your own pace. It is also important to stop and consider where you are after a few months, and to see how far you have come from when you started, and to give yourself a pat on the back for everything you've achieved to date," he says.

BUT IT IS not just races and arduous journeys that represent challenges. A major challenge is the planning of everyday life, the logistics at home. Even just going to bed requires forethought and preparation. For example, it is hopeless having to get up to fetch a glass of water if you are hopping on one leg; because slipping on ice when you are wearing a prosthetic aid is not much fun. An example of another small thing that can be problematic is finding new shoes. If you change the height of the heel of your shoes, it changes all the settings for the prosthetic aid.

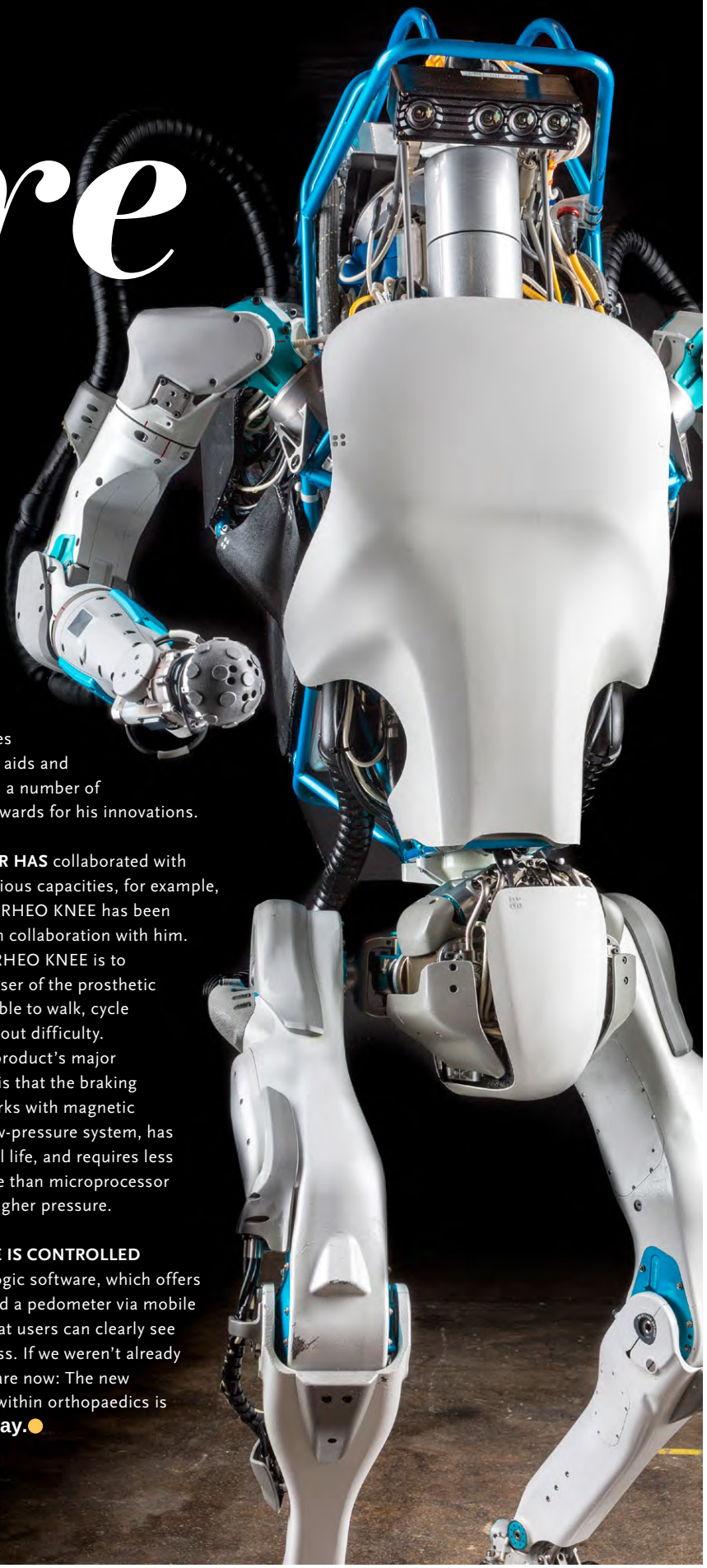
JOHAN WORKS OUT FIVE days a week at the gym and also goes running, in order to be able to achieve new goals in life. During the coming year he will continue with cycling, skiing, running and golf. If you are curious about his specific goals and achievements, we recommend that you check out his blog at johanholst.com, where he talks about his challenges and motivates others to strive to achieve goals that are appropriate for them. He is also active on social media, and he gives lectures on motivation and inspiration throughout Sweden.

"My strength lies in my ability to inspire and explain things in a simple way. It gives people that "aha" feeling and strengthens them in their everyday lives, and contributes to their ability to create something that they can look forward to, and to see that there are enormous opportunities for development as long as you take suitably sized steps along the way and progress at your own pace, so that you eventually achieve your goals and at the same time feel good along the way," says Johan in conclusion.

Robotics is here to stay

The expression “stiff as a robot” is now a thing of the past. Entrepreneur Hugh Herr’s company Boston Dynamics uses new and advanced technology to make robots in the form of dogs, cats and – gymnasts.

By **Fridah Jönsson**
Photo: **Atlas Robot image courtesy of Boston Dynamics**



Boston Dynamics developed the first robots with the same ways of moving as animals. With dog-like and cat-like products such as BigDog (which can even climb up a 35 degree gradient) and WildCat (which can run at 32 km/h), they have repeatedly taken robotics to a new level, and now they are aiming at even greater heights.

IN THE AUTUMN OF 2017 a video of Boston Dynamics’ latest robot Atlas was released, and this time the focus is on emulating a human being. In the video clip, Atlas treats viewers to an advanced gymnastics session during which it (he? her?) jumps onto various platforms, turns 180 degrees, and finishes off the show with a backwards volt. The video clip has attracted a lot of attention from tech writers throughout the world, as is often the case with Boston Dynamics’ innovations.

BOSTON DYNAMICS was founded by entrepreneur Hugh Herr, who had both legs amputated after frostbite-related injuries sustained while rock-climbing in his youth. In adulthood he designed his own special prostheses so that he could continue to climb, and now he manufactures orthopaedic aids and has received a number of prizes and awards for his innovations.

HUGH HERR HAS collaborated with Össur in various capacities, for example, the product RHEO KNEE has been developed in collaboration with him. The aim of RHEO KNEE is to enable the user of the prosthetic knee to be able to walk, cycle and jog without difficulty. One of the product’s major advantages is that the braking function works with magnetic fluid in a low-pressure system, has a long useful life, and requires less maintenance than microprocessor units with higher pressure.

RHEO KNEE IS CONTROLLED by Össur Logic software, which offers exercises and a pedometer via mobile phone so that users can clearly see their progress. If we weren’t already certain, we are now: The new technology within orthopaedics is **here to stay.**



What's the secret behind successful treatment?

How do professionals within healthcare and rehabilitation ensure that their patients are satisfied? And what do they think about the digital development? We posed four questions to three experts in the field.

By **Marie Eriksson**

Questions:

1. How do you ensure that your patients are satisfied?
2. What is your view on the digital development within the care sector?
3. Do you use treatment protocols in your activities? If so, can you provide an example?
4. In the latest treatment guidelines regarding osteoarthritis from OARSI*, alternatives such as knee braces, i.e. aids worn on the body, are included. What is your view on the use of braces in the treatment of osteoarthritis?

**Osteoarthritis Research Society International (OARSI)*

LARS ENGEBRETSEN

Professor in orthopaedics, head of medical research in the International Olympic Committee (IOC).

1. I deal with patients within sports medicine with injuries to skeletal muscle. We usually use a questionnaire to ensure that the patient is satisfied, and to check the treatment results.

2. It will revolutionise healthcare. The digitalisation process will make many processes easier and will individualise the treatment.

3. In Norway, treatment protocols are used in conjunction with cancer treatment and, to some extent, within psychiatry. Within orthopaedics we have our own protocols for e.g. hip and knee prostheses, but preliminarily not within sports medicine.

4. There is much to suggest that knee braces will be used more than at present. There is a need for studies that show effects over a longer period of time, more than six months, for example. These types of braces have the potential to be able to be used by many patients with osteoarthritis.

JAN OLAV LOHNE

Orthopaedic engineer at Ortopediteknikk.

1. I try to be clear and to create trust so that it feels easier to contact me if something is not as it should be. We carry out customer surveys and have goal indicators in relation to e.g. production time.

2. Not everything can be scanned. A trained eye is also valuable, it's important to know the craft. At present 3D printing is often more expensive and of inferior quality to traditional methods, but developments are progressing.

3. One of the most recently revised treatment protocols at our company concerns patients with diabetes or others who are at risk. It ensures equal treatment and enables us to catch at-risk patients in a good way.

4. We know that exercise and activity is important and that a knee brace can make it possible for a person to exercise in a proper manner. But it will never be possible to replace exercise with a brace. A brace is not necessarily suitable for everyone, but many people could find it beneficial.

MARIT FJØREN

Physiotherapist at Ryenklinikken AS and also works for Norway's Ice Hockey Association at U18 level.

1. For me it is important to take the patient seriously, and to ensure that we are working towards a common goal. Often it is a question of quality of life – reducing or eliminating pain, and achieving concrete goals or better functionality.

2. It is necessary to keep up with developments when it comes to the use of digital systems, devices and aids. But at the same time we can also be grateful for the continuous development of new products that help us and the patients.

3. I use treatment protocols in certain cases, but I work a great deal on the basis of individual functionality for the patient. Post-op there are instructions from the orthopaedist or surgeon, and sometimes those instructions are very strict.

4. Personally, I could be better at considering the use of a brace. But, like me, many physiotherapists lack sufficient knowledge about the different types of braces that are available. The use of a brace can, for example, provide more stability for people who need it.

Selecting the right support is key to enjoyable skiing.

Erling Granström likes slalom skiing – he does it a lot (around 50 days a year), and he is quick. It is hard to believe that he has had a damaged knee since the 1970s and has been diagnosed with arthritis.

By **Marie Eriksson**



Erling Granström lives near Sweden's largest ski resort in Åre. Apart from swishing down the slopes himself, he also likes to teach skiers at various levels, everything from groups of children to more advanced speed racers.

"During the week-long school sports holiday, for example, I could be giving lessons from 8 a.m. to 5 p.m. more or less every day", says Erling, who otherwise works as a corporate advisor at a bank.Recently he reduced his working hours from full-time to 80%.

"It means that I can do even more skiing now."

HIS VOICE SOUNDS happy. 63 years old. But what does age matter? It's just a number, after all. You can do a lot, if you have the willpower; and if you manage to find the right sort of aid. At least, that is how it was in Erling's case. When, at the age of 19, he was chasing the ball during an intense football match, an opponent suddenly crashed into him, and his knee was damaged. The doctor found that the meniscus, the cartilage in the knee joint, had been crushed, and he removed it via surgery. That was followed by keyhole operations over a number of years, since the knee continued to cause him pain. His dream of playing football at a more advanced level faded away, and his attention turned to skiing instead. But his knee would cause him considerable pain and swell up, both during and after a skiing run.



Didn't you ever consider giving up completely for good at that stage?

"No, I wanted to find something that would help instead."

This dedicated fan of skiing tested different types of orthopaedic aids, such as braces and protection that could reduce the strain on his knees, for example.

"And I changed my style of skiing to ensure that I didn't put too much strain on the knee. After a few hours on the slopes I would need to rest and recover for several days."

Many years of searching and testing followed, until finally he found a brace that seemed to work well, at least to begin with.

"But then I discovered that the knee was becoming overheated and swollen due to my use of the brace," says Erling.

SO HE WAS BACK to square one and the search for the ultimate support for more enjoyable skiing continued. There were doctors who talked about the possibility of an operation. It may go well and reduce the pain, but there was also a certain risk that that wouldn't be the case.

"And in that case I wouldn't be able to go skiing as much, so it didn't feel like a viable alternative."

ABOUT FIVE YEARS ago a doctor suggested that it was likely his pain was due to osteoarthritis. But according to the local healthcare authority, the brace that the doctor recommended was unfortunately too expensive to purchase. On the other hand, they were willing to approve an operation that would be many times more expensive than the brace in question and not without risks.

Erling came into contact with another doctor who ruled out a referral for surgery and prescribed him an Unloader One knee brace. That was over four years ago.

"Since I got it I have been able to ski quickly and as usual again. I don't feel pain for as long, and I am able to ski for longer sessions. It has made a big difference, and I don't need as much time for rest and recovery as I did before."

Is there anything about the Unloader One brace that could be better?

"I can only base my answer on my own needs, but I would like it if I could lock it into one position. If, for example, I happen to fall over when I'm on the slope, I don't want my leg to bend too much", concludes Erling.

Vacu

Even if a perfect vacuum does not exist, not even in outer space, the ability to create vacuum pressure in a volume has many useful applications that have now become completely necessary for a large number of processes and applications within industry and medicine.

By **Anders Lindgren**

The word vacuum stems from the Latin adjective vacuus, meaning ”vacant” or ”void”, and in classical physics a vacuum is defined as an air-free space or a part of space that is devoid of matter. Philosophers and scientists alike, from ancient times to Sir Isaac Newton, wrestled with the idea of an absolute vacuum, but it has turned out that not even the void of outer space represents a perfect vacuum. Furthermore, one of the basic principles of quantum mechanics says that there is no such thing as a perfect vacuum, and that a vacuum is actually full of virtual particles that constantly arise and then disappear after a short moment.

A VACUUM CAN also be described as a volume in which the pressure is lower than the atmospheric pressure. This vacuum pressure can be created with vacuum pumps or vacuum chambers and gives the volume a number of properties that are useful for a variety of applications.

The space which is relatively free from air and other particles creates protection from chemical degradation. Protecting the filament in light bulbs was one of the first widely used industrial applications of a vacuum. Later on, the chemical inertia that is created by a vacuum was used in applications such as welding and vacuum packing. A vacuum also lowers the boiling point for fluids, a phenomenon that is used in freeze-drying, distillation and process cleaning.

In a vacuum chamber with a high to ultrahigh vacuum (10 to 3 mmHg), particle beams can be used to apply or remove material without contaminating the surface during the manufacture of microchips, semiconductors and optical coatings.

THE ITALIAN PHYSICIST and mathematician Evangelista Torricelli (1608-1647) developed the mercury barometer and was the first person to succeed in creating a vacuum for a lengthy period of time. A few years later, in 1654, Otto von Guericke (1602-1686), a politician and inventor from Magdeburg in Germany,

uum

at the service of mankind

demonstrated his air pump and the enormous bonding force possessed by a vacuum. He bound together two hemispheres that were made of copper and had a diameter of 50 centimetres. When the air had been pumped out of the volume, an attempt was made to pull the hemispheres apart by using harnessed horses. It took a total of sixteen horses, eight harnessed to each side of the globe, to succeed.

THE SUCTION EFFECT THAT arises when a vacuum is created has been used for beauty treatments since ancient times. People have believed that a vacuum can help to rectify everything from wrinkles and cellulite to hair loss and small breasts. However, no long-term effects of vacuum treatments have been able to be proven scientifically, and interest in the use of a vacuum in beauty treatments fell away after the first half of the 20th century, although a number of beauty salons, not least in Asia, still use such methods.

Even if a vacuum cannot help you to get rid of your wrinkles, it does contribute to increasing the blood flow in body parts to which it is applied. A vacuum has been shown, among other things, to have a beneficial effect on the healing of sores, and vacuum pumps are used within healthcare for different types of drainage. Vacuum pumps are also used in conjunction with radiotherapy and radiosurgery, and in systems for childbirth deliveries using vacuum extraction. The vacuum's strong bonding force and its ability to increase blood flow are two properties that are utilised in prosthetic solutions. Find out more on the next page!

DID YOU KNOW THAT...

...a vacuum chamber with an ultrahigh vacuum works under one billionth (10-12) of atmospheric pressure, which is 760 mmHg (millimetres of mercury)?

...researchers at Chalmers have succeeded in creating light from a vacuum by getting photons to change from virtual to real photons, in other words measurable light?

...tardigrades can survive in a vacuum for at least two weeks?

...the beginning and end of the significant inflation of the universe in connection with the Big Bang is believed to have arisen from transfers between different states of vacuum?



A force to be reckoned with

With the force from an active vacuum and Össur's Seal-In liners, a strong and secure suspension is created. For the user of a prosthetic aid this means increased mobility, a reduced use of energy and better blood circulation in the residual limb.

By **Anders Lindgren** Illustrations: **Love Eneroth**

For almost ten years, transtibial amputees have had the option to choose an active vacuum for suspension of their prostheses. Since transfemoral amputees have been dependent on a sleeve to maintain a vacuum, they have not been able to utilise the benefits of the revolution that the use of active vacuum within prosthetics has entailed. About five years ago, Össur introduced Unity – a system with a mechanical pump that creates an active vacuum suspension that does not require a sleeve and can thus also be used on prostheses for amputations above the knee. The fact that the solution is "sleeveless" also gives the user of the prosthesis a much higher degree of mobility in the knee.

WITH UNITY, THE VACUUM is automatically created when the user walks or presses down the heel or toe. With each step the pump draws air out of the prosthetic socket, which generates an increased vacuum pressure of between 38 and 46 cmHg in the interface with the silicon socket. The high vacuum pressure means that the user can really trust that the prosthesis is sitting safely and securely, and the vacuum pressure is also maintained when the user sits down.

COMPARED TO SUSPENSION with a lock and liner coupling, where vacuum pressure is lacking between the silicon liner and the hard outer socket, an active vacuum provides a better fit during the entire gait cycle. The residual limb's volume fluctuations over the course of the day are reduced, and more of the residual limb's soft tissue is preserved over time.

BECAUSE Unity does not provide scope for a piston effect between the residual limb and the socket, the risk of abrasions is reduced. The strong vacuum pressure improves comfort and contributes to creating an increase in the blood flow, which is distributed evenly over the residual limb. The increased blood circulation is beneficial to the healing of sores and makes it easier to keep the residual limb healthy. It enables sores to heal at the same time as the prosthesis is in use, which is not possible with prosthetic solutions that use suspension with a lock and liner coupling.

"This is an important aspect, since 90 per cent of all amputations are performed due to cardiovascular disease, and therefore on people who already have circulation disorders before they become amputees," explains Anton Johannesson, certified orthopaedic engineer at Össur Nordic.

THE OPTIMISED FIT also minimises the use of energy when walking or running, and many of the users who have changed to a Unity solution say that their prosthesis feels more like an integral part of their body rather than an external accessory.

THE UNITY SYSTEM IS unique in that it does not require batteries. Most other systems for active vacuum suspension on the market use electronic pumps or have mechanical pumps that add a lot of extra weight to the prosthesis. The Unity system has a simple construction with few parts, which means a low risk of it breaking, and it only increases the total weight of the prosthesis by 130 grams. It is designed to work at all temperatures and levels of humidity that the user of a prosthetic aid might encounter during normal use.

UNITY IS DESIGNED to be used together with Össur's Seal-In liners. In principle, most prosthetic feet from Össur can be used with Unity. This means that an orthopaedic engineer/prosthetist has a good chance of achieving a prosthetic combination that is most suitable for each individual user, irrespective of whether he or she is a transfemoral or transtibial amputee, has a low or high level of activity, or requires a mechanical or microprocessor-based prosthetic solution.

Sources
Interview with Erna Bruks, Össur Nordic, and Anton Johannesson, certified orthopaedic engineer, Össur Nordic, www.ossur.se, Össur Prosthetic Solutions – Product Catalogue 2017, Unity For All, Unity – Instructions for Use

Pro-Flex
– a foot with finesse

Ingenious champions of mechanics and dedicated innovators – that is the team behind the ground-breaking prosthetic foot Pro-Flex.

By **Marie Eriksson**

Mechanical engineers Arinbjörn Clausen and Bjarni Andrésson are part of the five-strong development team that has created Pro-Flex; a team that set out on a long and winding journey, from idea to finished product, with many challenges along the way. Clausen and Andrésson also emphasise that every success is always achieved by the entire team.

”A non-amputated side of the body is often subjected to an uneven strain and a great deal of wear when you have a prosthesis, and that was one of the important things we wanted to resolve,” explains Arinbjörn Clausen.

”It is a major challenge to imitate a foot’s flexible movements and ability to adapt to different surfaces in a stable manner,” says Bjarni Andrésson.

USERS OF PROSTHETIC FEET are also far from being a homogeneous group and can have greatly varying needs. Some want to be able to go running and hiking, while others prefer dancing or going for long walks – without having to endure pain in e.g. their neck or back.
Put simply, the Pro-Flex- team needed to solve a problem that no one in the world previously had managed to solve; i.e. to bring together the ultimate mix of flexible stability, ingenious function, material and design.




ZWEI

"Have you ever stopped to think what you actually do with your foot when you put it into a shoe or sandal?

THERE WERE MANY QUESTIONS that needed to be answered and resolved. What, specifically, did different types of users want to be able to do with their prosthetic foot? What sorts of limitations were they experiencing with their current model? What materials were best able to deal with various strains, but without being too heavy? How would the team construct the prosthetic foot so that it was both stable and capable of flexible movement? What would it look like? And how would the creators of Pro-Flex manage to achieve such a unique design at a reasonable price?

"The key is to have a variety of different skills and knowledge within the team, good teamwork and the ability to think outside the box when necessary," says Arinbjörn Clausen.

HAVE YOU EVER stopped to think what you actually do with your foot when you put it into a shoe or sandal? What functions are activated in the foot so that it ends up in the right place? Most people who still have both their feet tend not to think about these things, but the team that developed Pro-Flex certainly did. By interviewing and studying users of prostheses and allowing them to test different solutions, the team has been able to create the prosthetic foot's various functions.

From a purely technical viewpoint, what is it that is so revolutionary about Pro-Flex?

"It has three different rotating joints that are assembled onto each other in three flexible carbon fibre leaves, with one of the leaves forming the sole. The construction enables greater mobility in the ankle and provides more power and stability than any other prosthetic foot," explains Arinbjörn Clausen.

"And the sole adapts to different surfaces," adds Bjarni Andrésson. Clinical tests have also shown that the non-amputated side is clearly subjected to less strain with this prosthetic foot. And thanks to a specially designed foot shell, it is also possible to wear different shoe styles, e.g. sandals.

"It is extremely satisfying to be able to help people live life more freely," says Arinbjörn Clausen. "One of the people I met was an elderly lady who had previously had problems walking, due to strain-related injuries when she used her old prosthesis. But with Pro-Flex she no longer felt any pain, which was a great improvement for her."

Another satisfied user explained: "Now I can walk for 80 minutes a day without feeling any pain in my neck and back"; and "It is very comfortable to stand on this foot, it's a real cocktail party foot."



The actual idea was born in 2011 and four years later the first collection of Pro-Flex was on the market. These days there are five models, each developed for different needs and in a number of sizes.

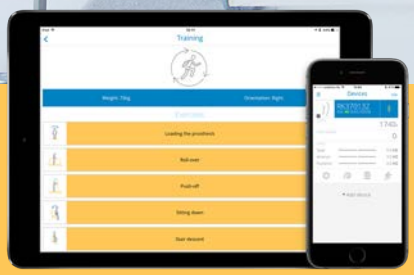
For example, users who want to be able to run competitively with Pro-Flex have different needs and requirements than those who prefer a leisurely stroll.

At the time of writing, Arinbjörn Clausen and Bjarni Andrésson are working on being able to provide even better support for the user's posture, and on adapting Pro-Flex to more groups with different needs.

BUT THE MOST EXCITING aspect is still the work involving sensors in a person's muscle tissue that capture signals from the brain to move the prosthesis. Once the stuff of science fiction, might we see such a product on the market in a few years?

ÖSSUR®





RHEO KNEE® XC

– Secure, adaptive and dynamic

From the moment you take your first step, RHEO KNEE® XC is filled with information that enables it to automatically predict and act in the best way – regardless of the situation. The key is the microprocessor, which automatically adapts to the user. Since the prosthetic knee joint learns more for each step that is taken, it develops together with you, becoming a faithful companion from early rehabilitation to full recovery.

NOW ALSO A TRAINING PARTNER!
In the ÖSSUR LOGIC app there are a lot of specially designed exercises to aid rehabilitation. RHEO KNEE® XC provides direct feedback about (among other things) weight distribution, with the aim of helping the user to become better and more secure in his or her gait.

FOLLOW ÖSSUR ON

TEL +46 18 18 22 00
INFO@OSSUR.COM
WWW.OSSUR.SE

ÖSSUR®



Dynamic Braces

Our Rebound® product family is the result of 40 years' experience of biomechanics and development in collaboration with leading clinics. The braces apply a physiologically correct dynamic force on the cruciate ligaments during rehabilitation.

Functional Healing® by Össur
– Where mobility means recovery.

FOLLOW ÖSSUR ON

TEL +46 18 18 22 00
INFO@OSSUR.COM
WWW.OSSUR.SE