Spring 2021 Issue

Inspiration

PRISMA APP

Our new therapy platform.

PROTECTION MASK

The mask that protects YOU.

INNOBOOSTER

Going new ways.

LÖWENSTEIN medical

LENA.

We are hard at work on our new ventilation mask.

LÖWENSTEIN medical

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Dear Customers, Business Partners and Employees,

At the end of 2020 we are publishing our second issue of Inspiration. What a year it has been for us all – for the company, Germany, the whole world. With thousands of ventilators we have contributed to supporting hospitals and saving lives around the world. At the same time we have made progress in our development projects and have supported (almost) normally thousands of patients with their respiratory home therapy in Germany.

I don't know how you are doing, but I can tell you that many of us look at this year with ambivalent feelings. On the one hand, we are pleased about contributing to the common good in this difficult time and, on the other hand, we are saddened by all the bad news and the increasing poverty and misery in the world.

In this issue we proudly report about people we help to reach their goals with our mobile ventilation solutions and how we strive to adapt our products and services to meet today's needs. We are developing continuously as we head optimistically into the future. Come along with us.

Benjamin Löwenstein
Vice President
Löwenstein Medical

This year we gave our employees a Hoptimist for Christmas. It stands for joy and optimism in the upcoming year 2021.

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GOING NEW WAYS
WITH INNOBOOSTER

At the start of every great success there is an idea. That idea is developed and improved bit by bit. Sometimes it requires some out-of-the-box thinking. That's where InnoBooster comes into play. The task involves bringing innovations to light outside established development methods and advancing them to a stage that allows management to decide whether a project should be pursued. It might be new – perhaps digital – business models, supplementary products without links to ongoing research and development or business processes with greater customer benefit or efficiency potental.

Design Sprint Protection Mask

Our creative potential is enormous. We have only to indentify the promising ideas in order to exploit it. Innobooster focuses on customer benefit and the business models that allow us to implement ideas from which everyone can profit. By that we do not mean contribution margin calculations that can label every idea as successful or "dead" at a very early stage. What matters is how we can create more benefit for the customer and which business model can make the benefit available to the customer. That may sound trivial, but it isn't. Not every idea or new technology satisfies an undiscovered need for customers or users. Customers will not necessarily accept every solution that we dream up. Of prime importance are the interaction with customers and the users' evaluation of ideas.

Innobooster supports the entire Löwenstein Medical Group, every site and field of business. The ideas for innovations come from teams throughout the company. The workshop format, which is what we generally use, is adapted especially for the task or challenge at hand. The experts we need for the workshops come mostly from the areas of Research & Development or Product Management and, as needed, are joined by other experts, nonconformists or skeptics. Moreover, customers or users also get involved. That's not always easy, but it improves the results.

Summary of Design Sprint Protection Mask

One of the formats we use is the Design Sprint. It is a compact workshop whose goal is to develop new ideas into business models, products or business processes. In each case, the focus is on optimizing customer benefit and profitability. The task and basic conditions for a Design Sprint are formulated in a Sprint Challenge by the contracting party. In November 2020 a Design Sprint took place for the protection mask from Löwenstein Medical. A heterogenous team from Product Marketing, Development and International Sales, Digital Health and a start-up expert took up the challenge.

Design Sprint Protection Mask

During the three-day workshop, the findings to date on markets, competitors and customer feedback were shared with team members and undiscovered needs and target groups were analyzed. On a Business Model Canvas the team looked at the core benefit promise and other required key activities.

Among the latter are required partners, key resources, ways to interact with the customer, current expenses and fixed costs and, of course, the revenue side of the equation. The team came up with a coherent business model that could reach the goals set in the Sprint Challenge. Lastly, the team verified the ideas and assumptions in interviews with persons from the target group. All findings were presented in a decision document to an in-house jury.

The process of forming and evaluating ideas is always a matter of divergence and convergence. With limited resources, we cannot pursue every idea, but we need latitude that allows us to leave well-trodden paths and convergence that helps us to focus our resources on the most promising ideas. We want to remain on top with solutions that offer our customers the benefits they need. Digitalization and the newest technologies are only a welcome means to that end. The world around us is full of new possibilities, technologies and innovations. Together let's make the best of it for us all.

INTRODUCING OUR TEAM IN AUSTRIA

Löwenstein Medical grows year after year, supplying patients in branches and respiratory centers around the world. Including the beautiful neighboring country of Austria. At our site nestled among mountains, lakes and wandering paths, our austrian colleagues have set up operations, where they are providing high-quality products to customers in hospitals and to private patients via our two Austrian companies. We introduce you to both of them here.

LÖWENSTEIN MEDICAL HOSPITAL

New company building in Baden with our local team

Heinen + Löwenstein was founded in Vienna in 2006. The current Managing Director Ing. Günther Buchinger remembers the day on which he began with the acquisition. "We started out at practically nil with a rather modest product portfolio of Leoni1, Leon plus, radiant warmers and a couple of incubators," he said. The product selection did not remain small for very long. A short time later the first large order for anesthetic devices came from Wilhelminenspital in Vienna, which is well-known for its high-tech medicine beyond Austria's borders. Overnight "Heinen + Löwenstein" was on everyone's lips and more orders for devices followed for anesthesia, ventilation, neonatology and heat therapy. The company reached the next milestone in 2008 when it made an exclusive contract with HAMILTON. This cooperation boosted growth in intensive care medicine with products from the German parent company and paved the way for many other orders in Austria. Other large orders were landed via Austrian export companies like VAMED.

Large order for Sri Lanka

High-quality Löwenstein Medical products were delivered to countries ranging from Papua-New Guinea, Sri Lanka, Laos, Ukraine, Gabun, Mozambique and Cape Verde to Latin America, Nicaragua, Honduras, Trinidad & Tobago and were put into operation on site by Heinen + Löwenstein employees from Austria. With the increase in orders, the team under Buchinger grew to today's 11 members. With typical Austrian warmth and good spirits, this highly coordinated team manages the ever-growing number of orders from Austria and worldwide projects. Over time the location in Vienna outgrew its offices. Construction of a new company building in Baden near Vienna began in 2017 and employees moved in the following year.

Lobby in the new company building

When the name was changed from Heinen + Löwenstein to Löwenstein Medical Hospital as of 1 January 2021, the next chapter for our team in Austria began with big goals for the coming years. They intend to increase the awareness and importance of the Löwenstein Medical brand in the hospital sector. Closely connected to those efforts is the user and technician training for our products, which we offer in our own training rooms to reinforce good customer relationships.

Training area

LÖWENSTEIN MEDICAL HOMECARE

Heinen + Löwenstein Austria was founded for the Homecare business in September 2009 in Vienna. With support from top management Reinhard Löwenstein and Werner Seifert, the team got to work. In 2011 Heinen + Löwenstein won the first big tender for CPAP devices.

That was just the start of strong growth and more orders. In 2016 the company was renamed "Löwenstein Medical Austria" and relocated to the head office in Salzburg.

Since then the team in Austria has made a major contribution to providing help to patients with sleep-related breathing disorders. The service spectrum ranges from sleep apnea treatment and oxygen therapy to life-support home ventilation and all required auxiliary services. Accessories for therapy devices and masks from all manufacturers also are made available to patients in order to make their treatment as comfortable as possible. In September 2020 another milestone was reached with the first installation of elisa devices sold through a tender.

First elisa installation in September 2020

The growing team in Austria recently received reinforcements in two additional salespeople. Currently 26 employees work at the sites in Salzburg, Baden, Graz Liebenau and Villach / Kärnten under the direction of Sales Manager Monika Mestermann.

Map with Austrian sites

If you are familiar with Austria, you know all about the long distances over mountains and through valleys. Sometimes our colleagues are on the road for hours in order to serve patients. We think it is very important to be close to patients. That's one reason we are working to improve our availability through new Respiratory Centers.

Dinner for team in traditional attire

Employees in Austria look after every detail with great care and support each other throughout the country. The team members' close bonds and readiness to help, along with a service orientation, are the keys to their success and to the satisfaction of patients and local hospitals.

INNOVATION NEEDS SPACE

NEW R&D AND PRODUCTION CENTER FOR HOSPITAL VENTILATION

Oxygen lines snake through the building, signs point the way to the intensive care unit, and anesthesia hookups are visible in many rooms. The clues are everywhere that the ambitious construction project in Steinbach is not for a normal office building. Onlookers at the construction site have speculated that it could be a new hospital for COVID-19 patients. It's not. Long before the pandemic, Löwenstein Medical had been searching for a new home for its future research, development and production center for intensive care ventilation and anesthesia. "It's not by chance that we are now in Steinbach," said Thomas Reins. The managing director listed the reasons – close to local public transport, proximity to the airport, and short distances to the university hospital Frankfurt and other important research partners.

"In the end, the trusting, close cooperation with the city administration, magistrate and Mayor Steffen Bonk were decisive factors in our choice of site," said Reins. The search was all about finding a place for Löwenstein Medical to continue its success story in the Taunus region and set up a suitable base for about 140 employees.

"We reached an important milestone in August when the shell of the building was completed. The dimensions of the space only hint at the challenges facing the think tank as its members devise new therapeutic procedures in anesthesia and intensive care medicine," said building owner Reinhard Löwenstein. "The sixty-four hundred square meter building also represents a clear commitment to Germany as a place for business and the Taunus region." From the in-house lab for electromagnetic compatability and simulation rooms for ventilation to creative labs for developers, the new Research, Development and Production Center reflects Löwenstein Medical's pursuit of innovation and creativity.

Because of the coronavirus, the traditional topping off ceremony was celebrated by just a small group of about 40 guests and construction workers. The building owner's welcoming address and speeches by the architect, the mayor of Steinbach and the professor for anesthesia and intensive care medicine at the Frankfurt university hospital were followed by the laying of the cornerstone, the traditional topping off speech and reception as a thank-you to the participating companies and workers. Although the move will not be completed until April 2021, employees are already looking forward to their attractive workplace.

THE WETTENBERG BRANCH IS GROWING

Since January 2016, when the Löwenstein Medical Wettenberg branch moved into a new building in the industrial area "Im Ostpark" with the IFM engineering office for medical technology, both companies have grown steadily. At the start of 2020, an addition to the building provided more room for everyone.

The Wettenberg branch is moving into the second upper floor. Sufficient space is there for employees, patient service and training rooms. With the conversion of existing space in the building, the Wettenberg branch will have larger warehouse facilities and an area for technical service.

An elevator is being installed now to improve access to the second upper floor for visitors who cannot use the stairs. It is scheduled to go into operation in March.

The moves and rebuilding are going ahead at full speed. By the end of the first quarter 2021, the work will be finished. All things considered, the addition is a huge gain for both Löwenstein Medical companies as they prepare for more development and growth in the coming years.

Wettenberg branch

Neuhäusel site

A NEW HALL IS BUILT ON NEUHÄUSEL SITE

When the pandemic spread from China to Europe, the world urgently needed ventilators for the great numbers of patients. As the manufacturer of ventilators, Löwenstein Medical received numerous orders, including a large order from our federal government. To ramp up production and storage for the extraordinary increase, we built a new hall with 1,600 square meters of space.

The planning process began right away, decisions were made quickly, bids were requested and then in record time a hall was erected on our site in Neuhäusel, not far from our headquarters in Bad Ems.

The move of the elisa production line also was carried out quickly so that the first ventilators could be assembled in the new space.

Throughout the group we still have many orders for the production of ventilators, which we will fill as soon as possible at our sites in Kronberg and Neuhäusel.

We are pleased about the quick gain of additional space for the production of intensive care ventilators and additional warehouse capacity.

PROTECTION MASK

THE MASK THAT PROTECTS YOU.

We have reached our goal of combining Löwenstein Medical competence in making a tightly sealed breathing mask with the need for virus protection. The Protection Mask has successfully made it to the starting line.

The year 2020 was marked by extraordinary events. In a few years when we think back to this time, the first thing to come to mind will probably be the COVID-19 pandemic. Until late winter, the term had been associated with events that took place, geographically, at the other end of the world or, chronologically, decades ago. If you search for the word "pandemic", you'll find a definition from the Robert-Koch-Institut that says: "The short-lived worldwide spread of a new infectious disease with high numbers of cases and, as a rule, severe disease progression."[1]

At the beginning of the year we could not have guessed what the effects of SARS-CoV-2 would be. Everyone followed the newscasts aired throughout the day. Including one of our colleagues from Mask Development. The current events got him to thinking. There was something up about 10 years earlier. During the last pandemic H1N1, also known as "swine flu", influenza viruses spread around the world.

Based on our mask portfolio at that time, our engineer had developed a prototype and called it "pandemic mask".
The flu had a short run and the mask was not developed any further. It got put away in a drawer.

What a stroke of luck to have colleagues and drawers at Löwenstein Medical.

Now things got going. The prototype was well thought out, but no longer state-of-the-art. In 10 years of mask development, a lot of things had changed at Löwenstein Medical. Which mask cushion should we take as the basis? JOYCEone Full Face, of course. One size fits (almost) all.

Selecting the right filter material proved to be more involved. Which particle size at a minimum had to be filtered? How small is SARS-CoV-2 actually? What expertise did we already have at Löwenstein Medical? Close contact with colleagues in Device Development cleared it up: we could use the filter material from the bacteria filter that we offer for our therapy devices in everyday hospital use.

[1] *Robert-Koch-Institut: Infektionsschutz und Infektionsepidemiologie. Fachwörter – Definitionen – Interpretationen. Berlin 2015, ISBN 978-3-89606-258-1, S. 99.*

In a straightforward and fast process, we created a mask that we first called "employee protection mask". A small number of masks were produced and test-worn by many colleagues at Löwenstein Medical. Because we are a system-relevant company, we could not all switch to mobile work and thereby avoid contact with coworkers. Production of our ventilators had top priority and could not be delayed.

The mask team collected all the feedback from colleagues and optimized the prototype. Everything was tested once again and reworked. By then the reworked and renamed "Protection Mask" had only a slight resemblance to its predecessor.

All materials are heat resistant, so the mask can be thermally disinfected, sterilized or boiled. The field of vision, which is larger than the earlier model's, allows unrestricted work. Finally, the Protection Mask does its part for environmental protection because it is reusable. Only the particle filter has to be replaced. All other mask parts can be reprocessed.

Wearing a mask has become routine for us. Sometimes we don't even notice that we're wearing one. Only when the coffee cup can't get to the lips do we realize that the mask is in the way. Whatever you call it – everyday mask, community mask, face mask – the mask protects us in daily life. All those masks, however, are fundamentally different from our Protection Mask. They allow air to seep in from the sides. That can happen with FFP2 masks too. None of those masks fits the contours of the face 100 percent.

When we inhale, the air leaking in from the sides gets into our airways more quickly than air that goes through a filter, where resistance is higher. The "side" air can be contaminated by virus. When we wear an everyday mask, we protect others because our exhaled air remains in the mask. Our own protection is limited because we breathe the air that comes in from the sides of the mask. The Protection Mask, on the other hand, fits tightly all around and thus provides protection for the wearer. Another positive side effect is that eyeglasses do not fog up.

It is important to consider when and where each type of mask is worn. In places where the viral load is high, it makes sense to wear the Protection Mask. In routine hospital work, in production facilities, in the transport business or training workshops, the Protection Mask protects you and others.

Summed up, it offers the following benefits:

- Protection for you and others, thanks to a no-leak fit
- Top filter performance
    - filters even the tiniest particles (Ø 0,1 µm)
- One size fits (almost) all
- Reusable (can be disinfected and sterilized)

The pandemic continues. Many work groups are working on solutions and starting in 2021, vaccinations will protect a portion of the population. The Protection Mask offers the protection we need now.

LOTS OF MOTIVATION, INNOVATION AND TOP-LEVEL ENGINEERING

For three years System Architect Benjamin Adametz, Product Manager Agim Imeri and Product Designer Anne Wonsyld worked on the development of LUISA. In a round-table talk they recalled their greatest challenges and their most innovative solutions.

With LUISA Löwenstein Medical brings to market a ventilator that sets new standards for today and aims to impress its users for many years to come. How do you develop a device to meet such high expectations?

Agim Imeri, product manager In the first step in 2017, we clarified which expectations the market – that is, patients, doctors and caregivers – had for a ventilator in this particular class. And it wasn't limited to just a few, given the extremely broad range of users. LUISA is now used at home and in the hospital for many different clinical pictures, for adults and children alike.

What were some of the concrete wishes for the development of LUISA?

Imeri We wanted to make LUISA as mobile, compact and easy-to-use as possible. The last of those for safety reasons. When a ventilator can be operated intuitively and simply, many potential causes for error are eliminated. To name just one example – the tools and adapters required for other devices to connect different tube systems. In everyday life such items often are misplaced and then the device can be used only to a limited extent. We needed a solution that would work without any adapters and tools.

Sounds ambitious. Can such expectations be implemented one-to-one?

Benjamin Adametz, system architect With that very question in our heads we developers got to work. How could we implement our vision of an ideal ventilator? At a few points I sometimes doubted the feasibility. A minimum tidal volume of 30 milliliters, a base the size of a piece of legal paper – those were extremely ambitious goals.

Anne Wonsyld, product designer The objective in one of the very early phases was to find a definitive design idea. Based on certain specifications – for example, the desired device footprint – I came up with a variety of designs. One of them was ultimately chosen. It served as the frame on which the engineers could orient themselves. Compared to a straight shoe box look, our design with the slanted positioning of the display demanded more space. That also applies to the radii, the rounded off edges. The earlier the framework is known, the easier it is for developers to plan.

What was the basis for the design idea? How important were aesthetics or functionality?

Wonsyld They always go hand in hand. When I develop the design for a ventilator, I naturally have the future user in mind. Above all, most users wish for a way to participate in life without restrictions. That the ventilator has to be highly mobile and compact is not just a matter of technical specifications – those requirements are clear design criteria too. It should have the look of everyday life and lifestyle; we want to avoid the standard hospital look. Consequently, LUISA resembles a tablet with the technology hidden behind the touchscreen. The choices of color and shape also are part of the lifestyle look, which you can see in other devices from the same product line, like prisma VENT. The high recognition value that results encourages users to approach the new device with a certain level of trust right from the start.

Imeri On the practical side, it was clear to us very early on that LUISA should be used in two positions – lying horizontally or standing vertically. That would give the user a lot of flexibility. Next to a bed or on a wheelchair, there is only a little bit of room left because there's already so much other medical equipment.

Adametz At the same time we developers were facing the same enormous challenge. The two undersides had to be free of connections. All the components had to be placed so that the device had a good center of gravity, a solid standing. We couldn't take for granted that the pneumatics would function properly in both positions. And everything in a compact size! We had lots of discussions and repeatedly asked ourselves "Is that realistic?" Don't we have to make LUISA a little bit bigger? We were tempted. That would have solved so many design problems with one stroke.

Wonsyld But the users want to go out into the world, take part in everyday life – and have the ventilator along as a constant companion in all situations. Just a few centimeters can make all the difference in the world.

Adametz That's why our developers stayed on the ball, always ready to take another shot at it. They needed many, many hours. We're talking about incredible motivation and innovation, engineering at a very high level.

Agim Imeri, Product Manager

Anne Wonsyld, Product Designer

Benjamin Adametz, System Architect

What challenges arose from the compact size of the device?

Adametz One of the complexities is the interplay of different electronic components. Some, like the cables for the ultra-fast USB-C interface, are highly sensitive. Others, like the blower, are strong sources of interference. So it has to be carefully placed. And of course in the end we couldn't do without compromises. Instead of an internal power supply, we decided to go for an external one.

And how was the wish for simple operation implemented?

Wonsyld That too began with a clear, reduced design. We wanted to take the complexity out of ventilation and reduce the users' fear of contact with the device.

Adametz LUISA can now be operated intutitively on the integrated touchscreen via the app. There are, of course, complete instructions for use, but in many usage scenarios, it suffices to switch on the device and go. We know that apps now raise expectations. Nothing should jerk, nothing should annoy. That's why we had our own in-house software specialists program the app. I should add that we wanted to have as much competence as possible from inside the company, to rely on our own specialists. Only then can we deliver an optimum product. This company philosophy really paid off in the development of LUISA.

Imeri By the way, regulatory requirements for software are very high. Even the subject of usability is relevant to safety. One example – which is competely normal in real life – is a hospital unit that uses five different ventilator models. If operation of the different devices is complicated and a nurse loses the overview, things can get really dangerous.

Adametz For that same reason we are very proud of the fact that LUISA functions with all tube systems without the need for adapters and tools. No other ventilator in its class can claim that. The solution was not at all trivial.

LUISA was designed as a highly mobile ventilator. What is the capacity of the rechargeable battery?

Imeri "Mobility" first sounds like another trendy word. But if the battery gives out when you're on the road, it is suddenly a matter of life and death. Long battery run times can be critical to survival. At the same time, we did not want to overload the device with a very large battery pack. That's why we decided in favor of one internal and two external batteries, which could be connected as needed. With this solution we had a ventilator that could run for a long 18-hour day.

Bottom line: With LUISA has Löwenstein Medical delivered the perfect ventilator?

Adametz There is no perfect device. In this case, we came up with a solution for different user scenarios in mobile and stationary use. Satisfying so many users always involves compromises. But I believe that we have been very successful with those compromises.

Wonsyld Above all, only a few minor compromises had to be made. From a design perspective, only one little aspect was modified during further development. We had originally designed the handle to be retractable and extendable. Later on we decided against that and built in a mechanical wearing part. Otherwise, we implemented the original design almost one-to-one – something that cannot be presumed in such a complex project.

What happens with the LUISA Team now that the development phase has ended?

Adametz Some features, like the CO_2 connection in the device, are already provided for in the hardware, but not yet implemented in the software. Development continues on that. But there won't be any more changes to the hardware itself. Anyone who buys LUISA today has a fully developed device; software undates are free of charge and available over the entire product life cycle. For that reason we, as a team, will continue to look after LUISA. We are looking forward to getting feedback from the users – and will optimize the software based on what they tell us.

BREATHE ANYWHERE WITH LUISA AND

LARS ON USEDOM

"I make my own decisions about my life and can do these crazy things."

"Pack Lars in cotton padding just because he has this disability? Out of the question!"

Spend every single day in a wheelchair? Lars would be bored out of his mind. So for a change of pace, the 23-year-old psychology student switches to a dogsled and lets eight huskies pull him at high speed along a Baltic Sea beach.

At the sound of the wolves howling from the other side of the dike, the relaxed expression disappears from Lars' face. Just a moment earlier he was quietly scanning the sea. Lars, whose disability makes him dependent on a ventilator and wheelchair, wants to hang out with his parents at the Baltic Sea for the weekend. But when the eerie howling begins, Lars doesn't look very relaxed at all. Then a broad smile spreads across his face. "Finally! There they are!" he says to his parents Inge and Michel, standing on the sand nearby.

The howling gets closer and then the first leashed wolf appears on the beach. Wait a second – a wolf on a leash? No, of course not. That's not a wolf on the sand near Heringsdorf on Usedom, but a husky, a sled dog followed closely by seven other huskies, a complete dogsled team. They are accompanied by a strong, bald man who is pulling a four-wheel cart behind him and a petite blond woman who shouts out commands to the pack of hounds, telling them where to go. That is, straight to Lars and his parents. "The dogs can hardly wait," says Marianne, the dogsled musher, when she gets within shouting distance. "How are you doing, Lars?" "I'm exited!" he says. "It'll be pure freedom!"

LUISA ANIMATES AND MOBILIZES

Freedom is very important to Lars. Diastrophic dysplasia has left him with arms and legs that are shorter than the extremities of other adults. His spinal cord and breathing muscles are damaged, so at night he depends on LUISA, his ventilator. During the day LUISA gives him support when he exerts himself. At this moment Lars is being ventilated to make him strong for the upcoming adventure.

But first a flashback. Just one day earlier Lars, Inge and Michel checked out the musher camp in Heringsdorf to which mushers and their dogs had traveled for a race on Usedom. Lars started up a conversation with the musher couple Marianne and Dirk. When they learned of his long-prepared plan, they were all in. "You want to ride along? Sure! We can do that!" Dirk said. Less than 24 hours later, Lars is being strapped into a special car seat that had been fastened to the training cart with lashing straps. The dogs are barking impatiently. Lars is finally ready to go. He sits up front on the cart with Marianne behind him in musher position. A quick command and the dogs begin running, the cart behind them getting off to a jerky start. Mushers use training carts when there isn't enough snow for sleds. Fast rides can be made with carts too; Marianne promises up to 30 kilometers per hour.

Now the cart is racing toward the horizon – with an astonished Inge watching every move. "Look! Look at that!" she calls excitedly to her husband. Michel looks, but doesn't say a word. The same for Dirk, whose eyes tear up. And Lars? He sits in the cart, grinning from ear to ear, enjoying the speed and the flow. The wind whistles past him and every uneven spot on the ground shakes him up. "That was so cool," he says later after being lifted back onto his wheelchair. "It was like I was weightless!" In the evening at the hotel, spirits are still high. Lars and Michel are already planning the next adventure. Lars would love to go diving. "Unfortunately," he says, "we haven't come up with a solution for the ventilator." Hearing that, Inge can only shake her head and say, "Sometime, somehow, we'll manage that too. It's always been that way. Since we've had Lars, our motto is 'Nothing is impossible'."

"Nothing is impossible. Miracles just take a little longer."

Here's the way to the video:

breatheanywhere.com

BREATHE ANYWHERE WITH LUISA AND

BIANCA IN ST. PETER-ORDING

Race at high speed along the beach near St. Peter-Ordning? Much too risky for a ventilation patient with progressive muscular dystrophy! That's what you think. "If someone says,'You can't do that,' then I want to do it all the more," says Bianca.

Her sister's death turned the world upside down. "It was as though someone had flipped a switch," Bianca recalls. The 44-year-old Hamburger is sitting in the dunes of St. Peter-Ording with a fresh North Sea breeze ruffling her long, blond hair. "All of a sudden, the wish for extreme experiences was there. And I thought to myself: Of course I want to go on a safari. . . Why not?" Right. Why not? Well. . . maybe because Bianca has progressive muscular dystrophy, the very same incurable disease that her sister suffered. Maybe because the disease makes her dependent on a wheelchair and on LUISA, her ventilator? Don't they sound like real obstacles? Not the way Bianca sees it: "Whether I can walk or not doesn't matter. You set the limits yourself – in your head."

The safari in Africa, Bianca's first major expedition, is ancient history today. Emotionally, it was a great adventure and logistically, a tour de force. And the proof that in Bianca's life much more is possible than seems at first glance. "Sometimes you have to go the extra mile for the good things," says Bianca's husband Andreas, who does not leave her side during the expeditions. "If we say, 'We'll do that,' then we definitely do it!" So what are the two of them doing here and now in St. Peter-Ording? "I want to race along the beach in a kite buggy," says Bianca, gazing on the endless stretch of sand on the other side of the dunes. "Anything involving lots of action is my thing. Then I feel free and alive and forget the pain I often have."

Bianca and Andreas have driven to St. Peter-Ording for a long weekend. Upon arrival, they relax, take a look around. From their spot in the dunes they can see the first buggies. Fantastic vehicles, remotely reminiscent of go-carts, are pulled, like kite surfers, by enormous sails reaching into the skies. At speeds of up to 70 kilometers per hour, they race over the beach, swirling clouds of sand behind them. Fascinated, Bianca watches it all with big eyes. Isn't that a little scary? Isn't it too risky? "Some people who are close to me do worry," she says, "but it's my life. I know what I'm doing. And yes, I do think I'm rather brave." To make sure that the ride in a kite buggy is both exciting and safe, the team from Löwenstein Medical contacted a kite buggy pro in advance. Down on the beach, the buggy driving instructor Moritz welcomes Bianca and Andreas. He waves toward his kite buggy and says, "I can take you along as a passenger on the back of the buggy. We just have to figure out how to buckle you in good and tight."

"I need that. I want to prove to myself that I am still here."

In a short time the solution is found. "Bianca can stay in her wheelchair seat," Andreas explains. "It is well protected and buckled up. The seat can be removed from the wheelchair and can be fastened onto the buggy with belts."

Okay then, do it. Moritz and Andreas lift Bianca and the seat from the wheelchair and strap everything, including LUISA, onto the buggy. Helmet on, everyone in position. Finally, Moritz lets the kite fly. With a loud "whoosh" the kite rises from the sand, majestic and still in the sky over the kite buggy. For the moment. Then Moritz turns his kite into the wind. The buggy jerks and then suddenly takes off, moving fast. As for Bianca? She gives in to the thrill, feels the speed, the wind that pounds her cheeks, the jolting of the buggy as it tears across the beach.

"I could have jumped and screamed – it was awesome!" she says later when she's back in her wheelchair. Andreas also had his turn in the buggy and now sits in the dunes, a broad grin across his face. "Bianca plays the starring role in my life. When I can make such experiences happen for her, it's a lot of fun for me too."

And so it goes: make a wish, plan carefully, enjoy the sensations, take a deep breath. What's up next? What adventures are still on Bianca's list? "I want to go to the Antarctic," says Bianca, as though she's casually mentioning the next North Sea vacation. "I have already been in the cyro chamber with wheelchair and ventilator. The technology can take the cold temperatures." But, she stresses, her adventures don't always have to be extreme. "I enjoy the little things too – and I work my way forward from there."

Here's the way to the video:

breatheanywhere.com

RESEARCH NEWS

In this section we present a selection of particularly interesting literature on the subjects of ventilation, respiratory therapy and related diagnostics. You are invited to give us your feedback on our selected articles or forward to us your own personal literature highlights.

Respiratory medicine in times of COVID-19:
In May a German working group published a position paper on the **application of respiratory support** for Acute Respiratory Failure (ARF) in **COVID-19** cases. It contains five thematic key statements:

1) Pathophysiology of COVID-19-related acute respiratory failure in two different types of pneumonia, Type L and Type H.
2) Chronological sequence and prognosis of ARF in the course of the disease and appropriate therapy monitoring parameters
3) Types of mechanical treatment (from O_2 therapy and Nasal High Flow to CPAP and NIV/IV) and suitable means of protection from infection
4) NIV in Acute Respiratory Failure
5) Continuity of care in the treatment of ARF

Pfeifer, M., Ewig, S., Voshaar, T., Randerath, W., Bauer, T., Geiseler, J., et al.: Position Paper for the State-of-the-Art Application of Respiratory Support in Patients with COVID-19. Respiration 2020;99; 521–541.doi: 10.1159/000509104.

DGSM and DGP have published a position paper on **the management of diagnostic procedures and treatment of Sleep-related Breathing Disorders (SBD)** in the context of the **coronavirus pandemic**. It recommends maintaining sleep-medicine services under the hygiene and protective measures described in the paper. To date there is no proof that COVID-19 worsens as a result of CPAP treatment. However, it may be necessary to take special hygiene measures such as isolation in homecare. Concrete recommendations are given on the organization and implementation of sleep medicine services.

Büchner, N., Woehrle, H., Dellweg, D., Wiater, A., Young, P., Hein, H., Randerath, W.: Management of diagnostic procedures and treatment of sleep related breathing disorders in the context of the coronavirus pandemic. German Respiratory Society (DGP), German Sleep Society (DGSM). Somnologie (Berl). 2020 Jun 22:1-11 German doi: 10.1007/s11818-020-00253-w.

The centers of the ESADA studies (European Sleep Apnea Database) report a steep decline in **sleep medicine services** provided in Europe **during the pandemic wave** in early 2020. Services in sleep labs in particular decreased by 80 percent, outpatient services less dramatically and the number of telemedical services remained almost unchanged. Some centers even began offering telemedical services during this phase.

Grote, L., McNicholas, W.T., Hedner, J.: Sleep apnoea management in Europe during the COVID-19 pandemic: data from the European Sleep Apnoea Database (ESADA). Eur. Respir J 2020; 55: 2001323 [https://doi.org/ 10.1183/13993003.01323-2020].

CPAP/APAP Therapy:
The analysis of a large German healthcare database on **long-term mortality** compared the outcome of more than 2,000 patients with **OSA and PAP therapy** with the same number of control patients with OSA and without PAP therapy and similar characteristics. In the year prior to OSA diagnosis, the PAP patients showed a significantly higher rate of hospitalization than the control group, but the rate was lower in subsequent control years. After four years the mortality in the PAP group was 25 percent lower than in the control group.

Woehrle, H., Schoebel, C., Oldenburg, O., Young, P., Fietze, I., Ficker, J. H., et al.: Low long-term mortality in patients with sleep apnoea and positive airway pressure therapy. Analysis of a large German healthcare database. Somnologie 2020 24;151–158. doi: 10.1007/s11818-020-00259.4.

A meta analysis of randomized controlled trials involving OSA patients examined the effect of **CPAP therapy on depression** and showed improvement in psychological symptoms with therapy of at least four hours per night.

Yang, X., Yang, J., Yang, C., Niu, L., Song, F., Wang, L.: Continuous positive airway pressure can improve depression in patients with obstructive sleep apnoea syndrome. A meta-analysis based on randomized controlled trials. Journal of Intl. Medical Research 48 (3). doi: 10.1177/0300060519895096.

Ventilation:
An observational study showed an increase in utilization of **mechanical ventilation** for patients in **Spain** from 2001 to 2015. In that period the incidence of NIV rose from 19 to 109 patients per 100,000 inhabitants. The frequency of Invasive Ventilation also increased from 2001 to 2003 and then decreased from 2003 to 2015. The In Hospital Mortality of ventilated patients fell significantly during the analysis period; it was higher for invasively ventilated patients, with the comorbidity index highest for non-invasively ventilated patients.

de-Miguel-Díez, J., Jiménez-García, R., Hernández-Barrera, V., Zamorano- Leon, J. J., Villanueva-Orbaiz, R., Albaladejo-Vicente, R., López-De-andrés, A.: Trends in mechanical ventilation use and mortality over time in patients receiving mechanical ventilation in Spain from 2001 to 2015. European Journal of Internal Medicine 2020 74;67–72. doi: 10.1016/j.ejim.2019.11.023.

A review from Germany compares the **effectiveness and evidence of NIV and Nasal High-Flow Therapy.** Based on the current state of knowledge, recommendations are made for the use of one or the other treatment, depending on the type of respiratory failure, e.g., acute hypoxemic or postextubation respiratory failure, or stable, chronic Obstructive Pulmonary Disease (COPD). The importance of NIV is undisputed for the indications examined. Nasal High Flow Therapy showed initial, mostly good and sometimes surprising results, which are, however, incomplete.

Bräunlich, J., Wirtz, H.: Differential Therapy NIV – NHF Pneumologie (Stuttgart, Germany) 2020;74 (03), 137–148. doi: 10.1055/a-1065-6385.

A study was made of the outcome of treatment and other factors related to prolonged weaning in more than 11,000 cases in the WeanNet **Register** from 2011 to 2016. Patients involved were transferred from the intensive care unit to a specialized **weaning center**. The average duration of weaning per patient decreased from 22 to 18 days between 2011 and 2015. Weaning was successful in approximately two-thirds of the patients. The strongest predictors of unsuccessful weaning were the length of mechanical ventilation in the ICU, age, low Body-Mass Index and pre-existing neuromuscular conditions. The high success rate confirmed the significance of weaning centers in reducing as much as possible the number of long-term invasively ventilated patients.

Windisch,W., Dellweg, D., Geiseler, J., Westhoff, M., Pfeifer, M., Suchi, S., Schönhofer, B.: Prolonged Weaning from Mechanical Ventilation: results from specialized weaning centers – a registry-based study from the WeanNet Initiative. Dtsch Arztebl Int 2020;117:197–204. DOI: 10.3238/arztebl.2020.0197.

In a retrospective study, PSG recordings previously made were re-evaluated in a blinded manner. A comparison was made of three different methods of **flow assessment** (effort-based, pressure/flow monitor, and device-interface) with regard to the incidence of respiratory events. Result: The incorporation of the respiratory signals, which the non-invasive ventilator made available to the PSG over an interface, provided sufficiently reliable results regarding the incidence of respiratory events.

Maarouf, A., Domanski, U., Schröder, M., et al.: Detection of respiratory events under non-invasive ventilation (NIV) depending on the type of flow measurement. Comparison of pressure-based versus ventilator-based flow measurement. Somnologie 24, 159–167 (2020). https://doi: 10.1007/s11818-020-00261-w.

Diagnostics:

The DGSM has published a partial update of the German **S3 Guideline Sleep-Related Breathing Disorders** in Adults. Among other things, the escalation from the screening test to polygraphy and polysomnography and blood gas analysis are more precisely described, as is the possibility of initiating outpatient CPAP/APAP therapy for certain subgroups. Recommendations for alternative types of treatment were amended to reflect the current state of supporting evidence.

Stuck, B. A.. Arzt, M., Fietze, I.; Galetke, W., Hein, H., Heiser, C., et al.: Partial update of the German S3 Guideline Sleep-Related Breathing Disorders in Adults. AWMF Register-No. 063-001 – German Sleep Society (DGSM, Deutsche Gesellschaft für Schlafforschung und Schlafmedizin). Somnologie 2020 24;176–208 doi: 10.1007/s11818-020- 00257-6.

An international working group reviewed the **evolution and role of the AHI** as the prime diagnostic metric in Obstructive Sleep Apnea (OSA). Also examined were complementary factors such as symptoms, phenotyping in OSA, comorbidities and additional clinical markers, which, when combined with AHI, could permit experts to devise more effective customized therapy options. The group noted that there is a lack of knowledge and guidelines required to implement standard, practical and evidence-based approaches in clinical practice.

Pevernagie, DA., Gnidovec-Strazisar, B., Grote, L., Heinzer, R., McNicholas WT., Penzel, T., Randerath, W., Schiza, S., Verbraecken, J., Arnardottir, ES.: On the rise and fall of the apnea−hypopnea index. A historical review and critical appraisal. J Sleep Res. 2020 Aug;29(4):e13066. doi: 10.1111/jsr.13066. Epub 2020 May 14. PMID: 32406974.

In this study two **insomnia** phenotypes were identified, based on measured sleep efficiency. It was determined that pulse wave analysis can support diagnostic differentiation, for example, insomnia's influence on the cardiovascular system. SOMNOcheck micro cardio provided support for the conclusion that **pulse wave analysis** can be used for assessment of relevant autonomic and cardiovascular function during sleep in insomniacs.

Laharnar, N., Grote, L., Zou, D., Hedner, J., Sommermeyer, D., Straßberger, C., et al.: Overnight pulse wave analysis to assess autonomic changes during sleep in insomnia patients and healthy sleepers. PLoSONE 2020 15(5): e0232589. https://doi.org/10.1371/journal.pone.0232589.

Do you too want to enjoy life more?

What if the nightly PAP therapy was less of a chore and more joie de vivre?

We at Löwenstein Medical, from Research & Development to Patient Services, ask ourselves this challenging question every day.

The question applies to the versatile mask portfolio with JOYCE and CARA, which accompanies the patient in his life-long PAP therapy, and to the continuous development of our sleep therapy devices that quietly and effectively ensure the patient's restorative sleep.

However, only about one-half of persons affected by Obstructive Sleep Apnea regularly use the devices for the recommended minimum of four hours per night or they stop therapy entirely within the first weeks or months. Many reasons are given for the low compliance which cannot be resolved by technological progress in mask and device development alone.

What's true for other types of therapy is seen in sleep therapy too. Patients who work at understanding their therapy and have access to information and support as needed are more motivated to remain faithful to their therapy over a long period of time.

Particularly in chronic diseases such as sleep apnea, however, it is not always possible for medical personnel to maintain close patient contact and give patients the knowledge they need to cope with the first critical days and weeks of therapy.

That's where our new white variants of the proven **prisma SOFT and prisma SMART** series come in.

What's so special?
We connect you even more simply and just as securely.

For years we have offered for all sleep therapy devices from Löwenstein **prisma CLOUD**, an established telemedicine solution that allows the doctor to oversee patient therapy simply and securely at any time. That means first that the doctor has fully automatic access to current therapy information from anywhere. In times of COVID-19 it is clearly advantageous to be able to ensure close care and, if therapy problems arise, to guarantee early intervention while observing physical distancing rules.

In the interest of the simplest operation possible, the new white variants transmit data via an integrated modem to prisma CLOUD – without any additional accessories. Data protection and security are given in all software offers from Löwenstein Medical.

prisma SMART plus
prisma SOFT plus

prisma SMART max
prisma SOFT max

What's the advantage for patients?
prisma APP: Treated. Informed. Motivated.

Besides the well-known effective and quiet therapy, featuring many comfort parameters settings and the unique integrated deep sleep indicator, the white therapy devices are equipped with an integrated Bluetooth interface.

Thanks to the prisma APP, patients now SEE and UNDERSTAND their therapy results. Here all the interesting information about therapy is combined with game-like design elements and individual goals that turn this highly personal therapy journal into a virtual therapy companion.

Do you feel tired and rumpled in the morning? A red pillow shows up often. When you get up, do you feel fit and well-rested? The green pillow smiles at you.
The prisma APP focuses on building up knowledge for self-help and motivation through information.

What supports the patients also helps the caregivers. The **prisma APP** automatically filters and answers frequently asked questions with user videos, tips on issues like how to correct the mask fit, hygiene recommendations and lots of other information.

But of course the prisma APP never replaces the trusting expert-patient bond. However, the doctor can use his/her time more effectively for patients. The prisma APP is a reliable alternative that helps to increase patient competence in self-help, generate trust in the therapy and sustainably improve patient motivation. And so we come full circle: **what if PAP therapy, thanks to simple operation and new digital accompaniment, was less of a chore and more joie de vivre?**

Conversation with doctor, aided by prisma CLOUD

Digital Key Competence

Simple.
Flexible.
Reliable.

prisma APP

SELF-MANAGEMENT
Digital therapy companion.

For a better outcome.

prisma CLOUD & my.prismaCLOUD

TELEMEDICINE
Continuous therapy monitoring ensures early detection of the need for intervention.

For efficient caregiving.

Treated.
Informed.
Motivated.

CAN DIGITAL FEEDBACK THERAPY MOTIVATE AND SUPPORT ME?

The consistent use of (continuous) positive airway pressure (PAP) remains the greatest challenge in the treatment of Obstrutive Sleep Apnea (OSA).[1] The main issue is the patient's acceptance of the therapy and motivation to commit to using it for a lifetime. Almost one-quarter of CPAP users terminate therapy within the first two weeks[2,3] and up to 50 percent stop using it completely within 12 months[4,5], despite the availability of comfort features and continuous improvements to devices.

App-based communication offers sleep experts a way to motivate and support patients that is mobile, barrier-free and resource-sparing. In a controlled, randomized study the initial results from a prototype of prisma APP were evaluated.

Dr. Christian Franke is the scientific head of this study, an Investigator Initiated Trail (IIT), and managing partner of the FAZ (Facharztzentrum) in Sonneberg, Coburg and Suhl. We asked him about the potential benefit of app-based communication, with tools such as prisma APP, for both doctors and patients and for his predictions of special benefits and challenges in future doctor-patient communication.

Dr. Franke, your goal is to professionalize personal attention with modern medicine and economic efficiency in such a way that patients feel well treated. Before we get to the app-based communication with prisma APP, can you tell us what 'therapy success' in PAP therapy means to you and an your patients?

A large portion of symptomatic patients with moderate to severe OSA and high psychological stress adhere to prescribed use of their PAP devices[2,3] and benefit subjectively from therapy the longer they use the device on average per day.[3] Many patients, however, have problems with adhering to initiated therapy adequately and permanently. And of our patients, many have different interpretations of 'therapy success'. I would say it means a very personal, positive benefit-risk ratio with improved quality of life, even though the patients have to use a medical device regularly.

Where do you see the greatest challenges to your patients in achieving and sustaining this success?

The reasons for inadequate adherence or poor quality of life associated with use of PAP therapy devices can vary greatly. Above all are typical side effects such as mask leakage, poor mask fit, changes to mucous membranes and skin, dyspnea, noises, social and personal relationship worries, lack of knowldge of how one can alleviate the therapy problems and also reasons with a social-cognitive origin.[1] Minimizing those factors requires a high degree of intersectoral collaboration and communication involving sleep medicine centers, Home Care Providers (HCPs), doctors and patients.

Therapy success begins in the diagnostic phase with the way the diagnosis is given to the patient. With the highest degree of professionalism and empathy, the sleep specialist should explain the different treatment alternatives and the benefit-risk analysis and, after jointly weighing up the options with the patient, should initiate therapy promptly. It is critical during the first phase that experienced medical personnel, working hand-in-hand with docotrs and HCPs, provide personalized care without putting the patient under any time pressure.

The second phase follows seamlessly. Using previously obtained data, the specialist should assess the likelihood that a patient will adhere to therapy as soon as possible after CPAP is initiated. The probability for further improvement in compliance increases when targeted intervention takes place early for patients with poor CPAP adherence and not first when the patient's problems have become apparent.

[1] *C. Franke, Ist die Zeit reif für die Einführung der Telemedizin bei OSA? (Is it time for the introduction of telemedine for OSA?) Atemwegs- und Lungenkrankheiten, Jahrgang 46, Nr. 6/2020, S. 325–340.*
[2] *C.J. Stepnowsky, M.R. Marler, J. Palau, J. Annette Brooks, Social-cognitive correlates of CPAP adherence in experienced users, Sleep Med. 7 (2006) 350–356, https://doi.org/10.1016/j.sleep.2005.11.004.*
[3] *H. Engleman, M. Wild, Improving cpap use by patients with the sleep apnoea/hypopnoea syndrome (sahs), Sleep Med. Rev. 7 (2001) 81–99 (n.d.).*
[4] *C.J. Stepnowsky, P.J. Moore, P.J. Moore, Nasal cpap treatment for obstructive sleep apnea: developing a new perspective on dosing strategies and compliance, J. Psychosom. Res. 54 (2003) 599–605.*
[5] *M.P. Buman, D.R. Epstein, M. Gutierrez, C. Herb, K. Hollingshead, J.L. Huberty, E.B. Hekler, S. Vega-López, P. Ohri-Vachaspati, A.C. Hekler, C.M. Baldwin, BeWell24: development and process evaluation of a smartphone "app" to improve sleep, sedentary, and active behaviors in US veterans with increased metabolic risk, Transl. Behav. Med. 6 (2016) 438–448.*

At this point, that is, in the early treatment phase from three days to about three months (and later in long-term treatment), there has been a gap in care. It often arose because most sleep medicine centers were more or less available to advise patients with questions, but determining the patient's concrete problem required increased time and effort and/or personal contact.

After thorough literature research and with our own retrospective analyses, we identified an app-based, telemedical application as a realistic chance to improve the quality of medical care.

In our ongoing research since 2018/2019, we focus on the patient-based approach of digital health applications, which use algorithms that automatically process the data and, in best case, inform the patient automatically when a doctor's decision may be required. In such a patient-centric caregiving process, it is ideally up to the patient when and if the therapy data should be securely transmitted to the doctor and also at which time contact should be made with the sleep medicine center, the treating physician or the HCP in order to discuss the possibility of an intervention or a change in care.

Let's talk about the initial findings from this study. The PAP therapy got positive marks in the control and the intervention groups, with the best results related to subjective questions about the reduction in sleepiness. The effect of the digital support tool primsa APP on the CPAP usage after 12 weeks is clear. While the control group used CPAP on average 219 (± 190) minutes per night, the intervention group had mean usage of 332 (± 159) minutes per night.

In your opinion, how does the prisma APP support these results?

In brief, the prisma APP works with the elements **feedback, motivation and troubleshooting support.**

Specifically, the prisma APP generates a short daily feedback report that tells the user how long the device was used; a detailed weekly report that includes information about leaks, AHI and – to an extent – sleep quality; and the option of setting a personal weekly adherence goal. In addition, personalized motivational statements are transmitted and an interactive questionnaire is made available in which the patient can write about his/her symptoms and results and can ask for help if problems arise.

The app also offers the user the option of sharing data with the treating doctor before making telephone or personal contact, or transmits a recommendation for the patient to contact the doctor as needed (e.g., if the AHI is high).

How did the patients get on with the prototype of the app? Were you contacted more frequently by the app users with technical or medical questions or by the control group?

Thus far we have had more than 100 patients in the study, which includes a follow-up over three months, and about 50 patients completed the follow-up. They managed the prototype of the app very well. What impressed me was that the over 65-year-olds are smartphone owners with their own e-mail addresses. Consequently, we had very few exclusions from the study for lack of technical readiness or usage options.

I can answer your second question only with my impressions, because we cannot analyze data until the study ends in spring/summer 2021. I have the feeling that the intensity of follow-up questions is not substantially greater or smaller, but that the quality of the questions in the study group is more targeted and better informed – exactly what I wish for in good doctor-patient communication.

How can app-based communication support your work and patient care, particularly doctor-patient communication and care with regard to economic efficiency?

The app-based telemedicine in OSA should have the basic goal of further improving both the general care of affected persons and the therapy results. From my perspective, an ideal system would

- automatically and electronically give feedback on therapy adherence and effectiveness to the patient using the device at home,
- implement an automatic questionnaire about possible problems or subjective satisfaction, and
- provide instructional help with typical problems in handling the device and the mask.

Such a system would assess the data and, if needed, recommend that the patient contact the treating physician. The patient could then decide whether or not to act on the recommendation.

Ideally, the system would then compile the patient-managed, telemedically prepared data from the device and the patient questionnaire and transmit everything to the treating physician while complying with current standards for end-to-end encryption.[6]
A medically indicated treatment is always economical not when studies

[6] *C. Franke, Ist die Zeit reif für die Einführung der Telemedizin bei OSA? (Is it time for the introduction of telemedine for OSA?) Atemwegs- und Lungenkrankheiten, Jahrgang 46, Nr. 6/2020, S. 325-340.*

prove its usefullness, but rather when patients use it effectively over the long term.

In PAP treatment of OSA, the improvement in therapy adherence is the best means for improving economic efficiency – in two different ways. The first is by not letting a relatively expensive therapy go to waste. The second is by exploiting the benefits of therapy, that is, reduction of symptoms, decrease in socio-economic risks of non-restorative sleep, and improvement in respiratory and cardiometabolic morbidity and mortality. Digital health applications can help us to reach those goals.

When considering economic efficiency, we dare not forget that telemedical applications always tap resources. That means the purely technical costs and the expense of software development, maintenance and updates. Then there are the resources of personnel and time, which we doctors in sleep medicine centers and practices have to set aside so that we can be available to patients at almost anytime to respond to problems, give advice and arrange exchanges of data.

Still another aspect comes to mind with the issue of cost-effectiveness. Future prescriptions of such digital applications, which not only potentially but verifiably utilize resources of (contractual) medical care, have to be integrated in a suitable reimbursement structure for physicians if they are to function as intended. If we turn the argument around, that means: Anyone who would prescribe such applications without substantive remuneration systems in EBM would not simply make an inefficient move but would throw open the doors to the introduction or expansion of non-remunerated medical services.
Therefore, in defense of our professional interests, I see it as our primary task to prevent such a scenario.

Which do you expect to see in the future? That patients will routinely see and understand their data and contact their doctors as needed, or that you, the doctor, will continuously analyze patient data and intervene if required?

Definitely the first!

For one thing, I am convinced that the **continuous** monitoring and analysis of patient data from PAP therapy by a doctor, health insurer or HCP is highly questionable ethically and legally under GDPR (think: loss of privacy). For another, such a strategy would consume considerably more resources and would therefore be uneconomical (socioeconomic risks from potential cost increases related to the implementation of such telemedicine systems).[6]

Moreover, a continuous monitoring and intervention model would release the patient from his/her **personal responsibility** and would counteract the previously mentioned compliance elements of **feedback, motivation, troubleshooting** and, most of all, the **patient's autonomy**.

HAVE YOU HEARD?

In the category "Have You Heard?" you can read interesting items about the entire Löwenstein Group.

Philosophy and Values

Our philosophy and values are reflected in our firm commitment to our customers. We want to satisfy every customer and treat every customer as we would like to be treated. Passion, innovation and flexiblility are at the core of our customer orientation.

Our Mission und Vision

Why is there Löwenstein Medical? Our innovative solutions improve patient care. That's why we are striving to become the manufacturer with the largest product portfolio in intensive care medicine and respiratory care. In addition, we are continuously expanding our international business in sleep and respiratory diagnostics.

Löwenstein Medical Anniversaries

Löwenstein Medical congratulates employees who are celebrating job anniversaries and thanks them for their engagement and loyalty through the years:

Since the last issue we congratulated Matthias Neubrand for **30 years** of service; Markus Hötger for **25 years**; and Andreas Müller, Andreas Stockmann, Anette Dallmann, Isabell Beilstein, Nadine Manderla and Brigitte Moritz for **20 years**.

LinkedIn + Facebook

We are now on the social networks **LinkedIn** and **Facebook** where we post information about Löwenstein Medical.
Subscribe to our channel!
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YouTube

You can watch many new tutorials for our ventilators and respiratory therapy devices on our YouTube channel.
NEW this month: several training videos on LUISA!

This will take you directly to the Löwenstein Medical channel

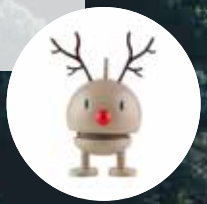
youtube.com/c/LöwensteinMedicalInternational

Löwenstein Academy

As of January 2021, we will offer our training online too. The Löwenstein Academy is going digital. You're welcome to visit us and sign up for a spot in our Webinars or in presence training, which will also be offered. We look forward to working with you.

Hoptimist

Just one thing is involved with the Hoptimist: Delight. The little figure is designed to bring a smile to your face. As its name tells you, Hoptimist boosts optimism. In 1968 the success story began in a little workshop run by the Danish woodturner Hans Gustav Ehrenreich. Today the figure delights both children and adults. In a really special way Hoptimist brightens up the day.



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