



ottobock.

Step into your future.

The C-Brace® orthotronic mobility system

Quality for life

# Dive into ...

... a number of different stories about a life-changing orthotronic mobility system.

The C-Brace® is a computer-controlled leg orthosis that responds to all everyday movements in real time. While that might sound high-tech, it makes an especially big difference in the everyday lives of users.

They include people with paralysis in their legs who are again able to walk on uneven terrain and slopes as well as take stairs step-over-step. People who now don't have to think

twice about enjoying activities with their families and can experience both the little things – and big ones too – in a completely new way.

These are the people you'll meet in this brochure as they share their stories with you.

And their stories show what's behind this incredible technology: a host of new opportunities to enjoy their lives and everyday routines to the full.

# And discover ...

... the benefits of the C-Brace®.

- Walking requires less physical exertion
- The need for compensating movements is reduced, improving body posture and reducing subsequent damage
- Increased safety compared with conventional leg orthoses
- Controlled walking, even on uneven ground and slopes
- Walking down stairs step-over-step
- Sitting down in a controlled, flowing movement
- High-performance battery lasts all day when fully charged
- Notification sound indicates that battery is too low – automatic safety mode is activated
- User-defined mode can be selected via a smartphone app, e.g. for cycling



## Marjan, the Netherlands

Marjan has incomplete paraplegia as a result of various operations to treat her cancer.



## Indication

In principle, the C-Brace® is an option for all neurological indications of the lower limbs. The leading indications are incomplete paraplegia (lesion between L1 and L5) with very minor or no spasticity as well as post-polio syndrome, a condition that can follow poliomyelitis.



### **Giving up wasn't an option**

The diagnosis was a shock: cancer. Doctors gave Marjan three months to live. “They said I’d never see my children grow up. I would never become a grandmother. I couldn’t accept that.” Marjan chose to fight – and won, thanks also to the support of her husband, Bert. “I never could have done it without him.” After a number of different operations, she had defeated cancer. But Marjan couldn’t walk anymore. For two years, she had to use a wheelchair. “Not being able to walk wasn’t an option. But there wasn’t any way out. Then came the C-Brace®.” It was a breakthrough: Marjan learned to walk again with the C-Brace® – and she can now dance again, ride bicycle and have fun playing with her granddaughter. “She calls me Robo-Nan. Zelin thinks it’s quite cool that her grandma uses something like this,” says Marjan, who’s from the Netherlands. “You can’t give up. You have to fight and keep looking for new options.” And Marjan has found hers: “Since I got the C-Brace®, I finally have ‘my’ life back again.”

*“There’s still so much to experience; giving up wasn’t an option.”*



**Denise, Germany**

Incomplete paraplegia after failed disc surgery.



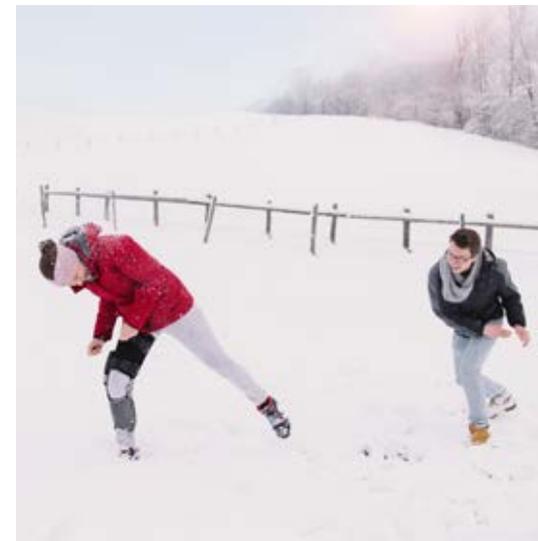
*“The C-Brace® gave me back the freedom to choose for myself what I still want to achieve.”*



**“I can’t sit still”**

Denise was 29 years old and in the prime of her life when what should have been a straightforward intervertebral disc operation went wrong. When she woke up, she couldn’t feel her thigh anymore. One of her legs remains paralysed. It was an existential crisis that she overcame thanks to her irrepensible determination.

And with the help of Mark – who was first her physiotherapist, and today her fiancé. He was impressed by the strength shown by the mother of two, who had separated from her husband shortly before her operation. The pair became increasingly close – and Denise regained her freedom bit by bit, thanks to the C-Brace® as well. Her efforts were successful – today, she’s equally active on the playground and in the pool. She climbs mountains, scaled the Eiffel Tower and can keep up with her sons. “My C-Brace® is like a pair of glasses for me now. I can’t see without my glasses, and I can’t walk without my C-Brace®.”



**David, US**

Paralysed in both legs due to a spine injury.



**The C-Brace® changed everything**

David was a soldier in the US Marines when a bomb exploded right next to him on a mission. It was a blow that affected him physically as well as mentally: He has been paralysed in both legs since then and has used a wheelchair for seven years. “I have been down the darkest part of the road, to make the final decision to not want to live anymore,” David says today. “He had given up,” affirms his father, Bruce. The 70-year-old always stayed close to his son’s side, motivating and supporting him.

Then everything changed: “I’ll never forget how David put the C-Brace® on for the first time and he walked right down the hall,” Bruce recalls. “The C-Brace® changed everything,” says David, who is now the proud father of a patchwork family of five children. “I used to serve my country, and now I serve my family.”



*“I don’t think I’m handicapped.  
I think I’m very handycapable.”*



### Back in the swing of things

David had to work hard at first to get back to his normal everyday life. A student who loved being active, he'd had a severe motorcycle accident in 2016. His left leg has been completely paralysed from the hip down ever since. "Before, I didn't want to accept help, but now I have to – and I can cope with it much better," he says.

It was hard at first. But David fought his way back. His first orthosis let him get about without walking aids at home, but not outside. "I was always completely exhausted at the end of the day then. Walking on cobblestones was a challenge. And walking on bumpy paths in the forest was completely impossible." Things are different today. David now goes hiking together with his brother again on a regular basis and plays sports, too. Activities that long seemed impossible are part of his everyday life now.



**David, Germany**

David's left leg was paralysed in a motorcycle accident.

*"Walking with the C-Brace® is a giant leap forward for me."*



**You have to give new technology a chance**

Melvin had polio, or infantile paralysis. His left leg was weaker from the start. But that didn't stop him playing sports, even as a child. He started swimming at the age of ten and attended Paralympic youth camps, first as a participant and later as a coach.

"It's extremely important to avoid putting too much strain on your body when you have polio. Otherwise, you lose muscle mass and can't build it up again." Then Melvin became one of the first people in the world to use the C-Brace®. The new orthosis significantly reduced the strain on his body. Melvin, who works as a systems technician, could suddenly walk much longer and farther. It was a completely new feeling that impressed him the very first time he tried out the orthosis. Thanks to the new device, he realised he could even walk backwards again. He still smiles when he thinks about it.



**Melvin, Germany**

Melvin's left leg became paralysed after he had polio as a child.

*"For me, the biggest step forward was taking a step back."*



### The C-Brace® gives you freedom

The mother of two sustained nerve damage in her spinal cord during an operation. One of her legs was paralysed. “The time just after the operation was the most difficult period of my life. I was in a wheelchair and the doctors predicted that things would stay that way. I was pregnant, and my future life felt like an insurmountable obstacle.” The young woman didn’t know where to turn. “You’re dependent on other people. And every movement is difficult, of course.” Hannah wore locked orthoses at the time, which were already an improvement compared to the wheelchair. But she wasn’t independent in her day-to-day life anymore. For Hannah, the C-Brace® means more than just being able to walk up and down inclines or on uneven surfaces: “The C-Brace® gave me back my freedom. I can take care of my children and myself again, and I’m very grateful for that.”



### Hannah, US

Hannah's right leg was paralysed following a failed operation.



*“You are thankful for food, but you are not thankful that you can pick up a sock.”*

**Wolfgang, Germany**

Wolfgang had polio as a child and post-polio syndrome as an adult, which resulted in his right leg being paralysed.



*“I know I’m on my way.”*

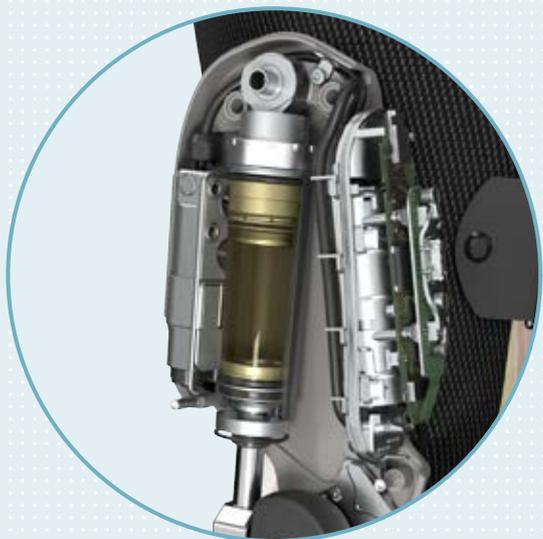
**The C-Brace® is part of me**

Wolfgang was eight when he contracted infantile paralysis, or polio. He subsequently had post-polio syndrome as well: “Prior to that, I could still walk sometimes and ride as well, but that wasn’t possible afterwards.” The next period of his life was dominated by the fear of falling – several severe fractures and numerous hospital stays attest to this.

The C-Brace® changed Wolfgang’s life immensely. “I learned how to walk again, something I had been able to do when I was eight.” The fact that he rarely thinks about his orthosis anymore feels like a gift to him. It’s simply there for him.

“I like putting it on in the morning and taking it off again at night. I ride again occasionally, I go biking and do Nordic walking and yoga. When I think about it, I don’t really feel that I have a disability anymore.”





**Thigh shell**  
Custom fabricated

**C-Brace® joint unit**  
With integrated Li-Ion battery and microprocessor

**Lower leg shell**  
Custom fabricated

**Ankle joint**  
Can be combined with various ankle joints

**Foot component**  
Custom fabricated



**Display**  
View system information

**Microprocessor**  
Controls walking in real time



**The Cockpit app**

**Information system and mode setting available via smartphone**



**C-Brace® animation**

Scan the QR code to see how the C-Brace® works and what happens in the joint!



# What the C-Brace<sup>®</sup> orthotronic mobility system enables

SSCO<sup>®</sup> (Stance and Swing Phase Control Orthosis) is the secret behind the C-Brace<sup>®</sup> orthotronic mobility system. It means that the orthosis controls both the swing and the stance phase during the gait cycle – for the first time anywhere in the world.

The sensors in the orthotic knee joint register which movement you are currently performing – 100 times per second.

This information is passed on to the microprocessor in the C-Brace<sup>®</sup>, which regulates the required support.

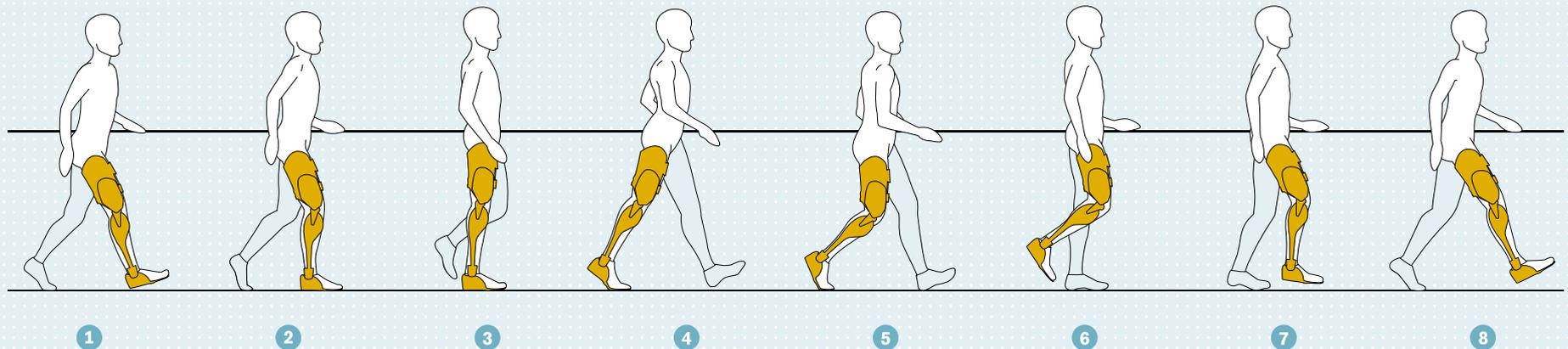
No matter whether you're walking quickly or slowly, or what position your leg is in at the time: the C-Brace<sup>®</sup> adapts to changing situations. Always at just the right moment.

## 1–4 Stepping down and rolling over

As with a natural gait, the knee is not fully extended when stepping down with the heel. The orthosis damping results in a smooth rollover movement. Finally, the orthosis switches shortly before the toes leave the ground.

## 5–8 Swinging forward and stepping down

The orthosis resistance in the knee joint is now minimal. This allows the leg to swing forward with the help of a slight movement from the hip. In the final phase of a step, the C-Brace<sup>®</sup> gently dampens the movement, even at changing walking speeds.



# Users

## Examination and fitting recommendation

Before deciding whether the C-Brace® is suitable for you, the orthotics and prosthetics professional (O&P professional) performs some tests with you. With the help of the diagnostic trial orthosis (DTO), you work together to find out if you can use the C-Brace®.

## Trial and fabrication

Now your custom trial orthosis is fabricated to determine a precise fit. The technician takes plaster casts of your leg for this purpose and fabricates an interim orthosis to check the fit. The final C-Brace® orthotronic mobility system is then made.

## Fitting and adjustment

The technician adapts the C-Brace® to your requirements with the help of a setup app. If desired, the technician configures a second mode that allows activities such as cycling.

## Quality and service

Ottobock regularly performs a mandatory service inspection. Your O&P professional checks the fit and settings at the same time.

## Training and rehabilitation

You gradually learn how to use the orthotronic mobility system by working with trained physiotherapists.



# Your path to the C-Brace®

## Fitting

Your certified O&P professional is your primary point of contact. He or she will work with you to determine whether you can wear the C-Brace®.

It is essential that you can stand freely and swing your leg forwards.

The initial test is conducted while you wear the diagnostic trial orthosis (DTO). It isn't as comfortable as your final orthosis, but it gives you an initial impression of what it's like to walk with the C-Brace®. Once you have decided on the C-Brace®, your custom orthosis is fabricated. You then learn how to use the C-Brace®.

## Therapy

Therapy begins with a consultation. Your therapist will want to know more about your medical history, your social and work environment and what you want to accomplish with the C-Brace®.

Your therapist will also examine your physical conditions such as muscle functions, balance and mobility. After the technician has fabricated the orthosis in cooperation with Ottobock, they will spend even more time with you.

This is when intensive training begins. The therapist helps you become familiar with the functions of the C-Brace® and use it to the best possible advantage.



**The diagnostic trial orthosis:** this lets you get an initial feel for the new movements.



**A team:** working closely with your O&P professional and physiotherapist helps you make the most of your C-Brace®.



### Online tutorials

Scan the QR code for online tutorials showing therapeutic exercises:



# Questions and answers about the C-Brace®

## 1. Are there physical requirements to be able to use the C-Brace®?

The C-Brace® is intended for adolescents and adults and is approved for a body weight of up to 125 kg.

## 2. What does the C-Brace® offer compared to other KAFOs?

The range of motion is expanded.

You can walk down stairs with natural movement patterns, walk down a ramp and sit down without dropping into the seat. Because the orthotronic mobility system controls the entire gait cycle dynamically, safety is also improved, which means you are less likely to stumble. Physical strain is reduced, especially when one side of the body is not affected and was used for compensating movements. This can reduce damage caused by excessive, unilateral strain.

## 3. Do the size and weight of the orthosis have a detrimental impact on the gait pattern?

No, there are no noticeable limitations. It's true that the orthosis is heavier than other KAFOs. But this is less noticeable since walking is more dynamic.

## 4. How has the C-Brace® made walking different?

Safety while walking is improved because the C-Brace® controls walking in real time and responds quickly. Your movements become smoother and more natural.

## 5. Can I wear the orthosis over trousers?

In general, yes. However, the trousers should fit closely to avoid wrinkles, which can lead to pressure sores. We recommend wearing the C-Brace® directly on your skin.

## 6. Can I operate a vehicle with the C-Brace®?

The respective national legal regulations determine whether or not you can operate a vehicle with an orthosis. Always check these regulations in advance.

The leg with the orthosis may not be used to control the vehicle (e.g. operate the accelerator and brake pedals). Specialised garages can retrofit the vehicle if required and adapt it to your needs (e.g. manual controls for the brake and accelerator).

## 7. Do I have to wear special footwear or always use the same shoes?

You can wear any type of shoe in principle. However, the O&P professional adjusts the C-Brace® for one heel height, and you should then maintain that. You may have to wear shoes that are a size larger in order to leave sufficient room for the foot component. A comfortable, wide, low shoe with laces or hook-and-loop closures makes it easier to use the C-Brace®.

## 8. Can I use the orthosis without footwear?

No, because the risk of slipping with the foot component would be too great. This would also change the heel height.

## 9. Is the C-Brace® waterproof?

The C-Brace® cannot be used in wet areas, such as the shower or bath. It must not be exposed to salt water, either.

However, in Germany you are entitled to an additional orthosis for wet areas. Ask your O&P professional about the Aqualine orthotic system from Ottobock.

**10. Can I be outside in the rain?**

The C-Brace® is protected against splashed water, so being out in the rain is generally not a problem.

**11. What happens when the battery is drained completely? Can I continue walking?**

A notification sound warns you promptly when the battery is low. The C-Brace® then enters a safety mode (empty battery mode). It maintains a certain level of damping, which you and the technician establish in advance. You can therefore continue using the C-Brace®, but not with the usual dynamics.

**12. Does the C-Brace® allow any other potential uses?**

Your O&P professional can configure a user-defined mode for you.

It allows activities such as cycling. The C-Brace® also recognises when you are sitting and reduces the damping so you can sit comfortably.

(Note: when the thigh is horizontal, the joint detects the sitting position and switches off the resistance.)

**13. How can I switch to the user-defined mode?**

You can use the smartphone app to do this. The Cockpit app for users is available free of charge for iOS and Android operating systems in the respective app store.

**14. What do I do if there is a defect?**

The system automatically switches to safety mode (see question 11). Please contact the O&P professional who provided the fitting.

**15. How does the C-Brace® indicate possible errors?**

Malfunctions are indicated by an acoustic and visual signal. Please contact your O&P professional in this case.

**16. What happens during service appointments?**

You will visit your O&P professional regularly for a service appointment. They send the joint and charging cable of the C-Brace® orthotronic mobility system to Ottobock for inspection.

**17. Is there anything I should keep in mind when storing and charging the orthosis?**

The orthosis should be kept still and in a secure position during storage and charging. We recommend charging on a daily basis.

**18. Does the C-Brace® technology work under various climatic conditions as well?**

In general, yes. However, the relative humidity must not exceed 93 per cent, and the temperature has to be between -10 and +40 °C.

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