Step into your future.™
The new C-Brace®
The day starts early; it’s raining and time is short. With a lecture beginning at 8 o’clock, David has a quick cup of coffee. He heads down the stairs; it’s pouring outside, but fortunately David has his umbrella. He barely makes the bus, takes his seat, and catches his breath. This might sound like an everyday occurrence for many, but not for David.

Now a 24-year-old student, he had a serious motorcycle accident in 2016. Whether it was caused by a moment of inattiveness, poor visibility, or someone else’s mistake, doesn’t really matter in the end. The fact is David’s left leg is now completely paralyzed from the hip down due to a spinal cord injury. “An injury like that would probably have put me in a wheelchair in the past, or my everyday life and independence would have been quite limited at a minimum,” David says.

But not today. David is now studying renewable energy and energy efficiency in Regensburg, Germany, and works in the development department at a start-up. This is his everyday life. When he is with his family in Traunstein, he spends a lot of time with his brother. They like being out in nature together. David goes climbing, cycling, and spends his evenings with friends. But many things have changed again for David since he started wearing the C-Brace.

He was previously fitted with a stance phase controlled system. When he was at home, he got around without walking aids but used a completely locked joint. When he was outside, however, David had to depend on walking aids. “My muscles were always completely recharged at the end of the day. I had to support myself with my arms to a large extent, and my hands were never free. I only used my right leg on stairs and hopped up and down there. When I came to an incline, I had to figure out how to get down.

Negotiating the cobblestones in Regensburg’s old town was really challenging, and walking in the woods on uneven trails here in Traunstein would have been impossible for me.” Which takes us back to where we started: getting down the stairs from his flat on the first floor, having a hand free for his umbrella, and getting on the bus – all this gives David a whole new attitude towards life with the C-Brace. “Every step used to mean a certain impact on my hip. With the C-Brace, everything is much more comfortable, gentler, smoother.” David is naturally fascinated by the technology of the C-Brace as well. “I love technology, so I asked about this highly complex sensor system right away,” David says. “It’s really impressive and a win for me in every way. I like that I can rely on this technology.”
Let’s start at the beginning: Melvin has polio; there’s no way of knowing when and how he became infected anymore. “I was born in Mumbai in India, and my parents in Germany adopted me when I was three. My mother was a pediatrician, so she naturally did everything to make sure I got the best care from the outset.” Melvin was an athletic child who loved to be active despite his disability. He started swimming at the age of ten and attended Paralympic youth camps, first as a participant and later as a coach. “It’s incredibly important not to put excessive strain on the body when you have polio; however, this causes the muscles to deteriorate, and they cannot be built up again after that.” And this is where the C-Brace comes into play again. “The first time I walked with the C-Brace was incredible. It truly was another quantum leap. I would never have expected that,” Melvin says.

The C-Brace provides him with considerable relief while walking. Not only is Melvin able to walk for much longer distances than he did before, he also puts less strain on his body and muscles. “The C-Brace also supports me when I’m walking and moving about – not just when I’m standing, as my previous fitting did. And it does all this whether I’m at home or on one of my many outings.” Ordinary, everyday movements are suddenly possible again. “But you don’t learn how to fly right away of course, even with the C-Brace. You do have to practice and see how the system reacts. But it’s definitely worth it.” Being able to walk backwards again with the C-Brace is a special experience for Melvin. “To sum it up, one biggest step forward was taking a step back.” Today, Melvin wouldn’t want to be without the C-Brace and its technology; he is certain of that. “To put it in technical terms, I previously had an analogue system, and now I’m using a digital system that can be controlled with a modern app. It’s completely convinced me.” Sometimes you simply have to give new technology a chance.

“My biggest step forward was taking a step back.”
Hannah, a mother of two, suffered injuries to her spinal cord nerves after an operation, and one of her legs was completely paralyzed as a result. “The time immediately after the operation was really the most difficult period of my life. I was in a wheelchair and the doctors predicted things would stay that way. My husband is a police officer and isn’t home much. I was pregnant with our second child, and my future life and daily routine felt like an insurmountable obstacle,” Hannah says openly. The young woman simply didn’t know what to do. She lives in the countryside, so any trip is a long one. “My neighbors helped and gave me a ride so I could go grocery shopping once a month,” she reports.

“But that’s the thing – you’re dependent on others and have to wait until they are ready to drive into town. And of course every movement, every step is difficult.” Hannah was using locked orthoses at this time, which were an improvement over the wheelchair, but she still couldn’t be independent in her everyday life. For Hannah, getting the C-Brace meant more than just walking uphill, downhill, on uneven ground, and even feeling safe in stumbling situations. The C-Brace means getting back to her everyday life. “The C-Brace gave me back my freedom and daily routine. I can take care of my children and myself on my own again, and I’m very grateful for that. We shouldn’t just be thankful for having enough to eat in our everyday lives, but also for being able to pick things up off the floor. That’s something we shouldn’t take for granted,” says Hannah. Today, she once again has goals she wants to achieve. “When I couldn’t move, I gained weight. I now walk two miles a day and work out. I can drive a car and be independent. And, the most important thing of all, I can carry my children again.” With the help of the C-Brace, Hannah regained confidence in herself and in life.

“The C-Brace gave me back my freedom.”

“Raising two young children requires a lot of energy and can become extra challenging when relying on others to accomplish routine tasks, like grocery shopping. Hannah’s story exemplifies how regaining independence, restoring confidence, and progressing through the day with the freedom of movement can change the trajectory of her life, and that of her entire family. The C-Brace has brought confidence back into my life, and I am able to take care of and control my life again.”
Wolfgang contracted polio at the age of eight, and his right leg was paralyzed as a result. “For a long time I simply ignored my illness; I refused to deal with it and just pretended it wasn’t happening.” He only faced his illness later on, and this certainly helped him find his way as well. “I was very athletic before my illness, but was then confined to a wheelchair at times, and had to walk with an old-fashioned splint apparatus as a child. But since I couldn’t walk very well, I took up swimming.” He also later discovered his passion for horses and riding due to the fact he couldn’t walk very well.

The effects of post-polio syndrome emerged when he was 40, making many everyday things even more challenging for Wolfgang. “Before that, there were times when I could walk and also ride without using walking aids, but after that I couldn’t anymore,” he reports. From then on, many years of his life were dominated by the fear of falling and injuring himself — several severe leg fractures and numerous hospital stays attest to this. “When I was fitted with the first generation of the C-Brace, I felt safe again for the first time in a long time,” Wolfgang says. “It’s probably difficult to imagine how valuable that is.” Being able to walk smoothly and stepping down gently on an unlocked leg are key. But the most important thing is being supported even when there are tripping hazards, as he knows the orthosis will “catch” him in a manner of speaking. The new C-Brace Wolfgang wears now is an important step along his way. “The basic functions are the same. I can walk down stairs and ramps as well,” he says. “But what’s really special is that the new C-Brace reacts even faster and is more intuitive. It responds even when I shift my weight slightly, and I really feel my orthosis knows what I’m doing and how I’ll move ahead of time.”

Wolfgang no longer thinks about his orthosis at all; it’s just there. “I like putting it on in the morning and taking it off again at night. I ride again occasionally, I go hiking and do Nordic walking and yoga. When I think about it, I don’t really feel that I have a disability anymore.”

“I know I’m on my way.”

“I’m in charge of my own fate and am responsible for making the best of it.”

Wolfgang

One thing Wolfgang says stands out: “I know I’m on my way.” His journey was and is not always easy; the path isn’t always straight, and there are certainly challenges. But the fact he can say this after many years of illness should encourage others.
Benefits of the C-Brace®

• Natural movement patterns
• Controlled walking, including on uneven ground
• Easier walking on inclines
• Walking down stairs step-over-step
• Sitting down in a controlled movement
• Walking requires less physical exertion
• The need for compensating movements is reduced, improving body posture and reducing subsequent damage
• The movable ankle joint enables a more natural footfall and rollover
• The user can look ahead
• Inconspicuous to wear, also under clothing
• 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, e.g. for cycling
• Smartphone app for adjusting modes

What’s inside

How does the C-Brace work? How can people with symptoms ranging from paralysis in their legs up to incomplete paraplegia walk with smooth, flowing movements again?

SSCO® is the answer. This abbreviation stands for stance and swing phase control orthosis and means the orthosis controls both the swing and the stance phase during the gait cycle. The C-Brace is the world’s first SSCO.

The sensors in the knee joint are constantly evaluating (100 times per second) which movement you are currently performing and how quickly. This information is passed onto the microprocessor in the C-Brace, which regulates the required support.

When you swing your leg forward, for example, damping decreases. And when you stand, damping increases so you can assume a natural, slightly flexed position with your leg. The C-Brace responds to any situation instantly in real time. You’ll always remember your first step with the C-Brace!

Foot component
Custom fabricated

Unilateral ankle joint
Range of movement can be adjusted continuously and individually

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

Display
Information system and mode setting available via smartphone

The Cockpit app

Lower leg shell
Individually fabricated

Thigh shell
Custom fabricated
Walking with the C-Brace®

No matter what position your leg is in, or whether you’re walking slowly or quickly, the C-Brace is always adapting 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 gently dampens the movement, even at changing walking speeds.
Examination and fitting recommendation
Before deciding whether the C-Brace is suitable for you, the orthotist performs some tests. With the help of the diagnostic trial orthosis, you work together to find out if you can use the C-Brace.

Trial and fabrication
Now, your individual test orthosis is fabricated to determine a precise fit. The technician takes plaster casts of your leg for this purpose and fabricates a test orthosis to check the fit. The final C-Brace is then fabricated.

Fitting and adjustment
The technician adapts the C-Brace to your requirements with the help of the Setup app. If desired, the technician configures a second mode, which allows activities such as cycling.

Quality and service
Ottobock regularly performs a mandatory service inspection. Your orthotist checks the fit and settings at the same time.

Training and rehabilitation
You gradually learn how to use the C-Brace by working with trained physiotherapists.

The fitting
Your certified orthotist is your primary point of contact. He or she will work with you to determine whether you can wear the C-Brace.

For example, it is essential that you can stand freely. You should also be able to swing your leg forward from the hip.

The initial tests will be conducted while you are wearing the diagnostic trial orthosis (DTO). It’s not as comfortable as the final orthosis, which you will wear after the successful examination and custom fabrication. But it allows you to experience how the C-Brace works for the first time and gives you a feel for the movements. This is important so that you can be confident in choosing the C-Brace.

Once you have decided on the C-Brace, an orthosis is fabricated specifically for your body size and according to your requirements. You then learn how to use the C-Brace.

You should plan several weeks for the entire process. This creates a foundation that allows you to achieve the full range of functionality.

Indication
In principle, the C-Brace can be considered 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, the condition following poliomyelitis.

One team: working together with your orthotist is key. He or she fits the orthosis.

The diagnostic trial orthosis: this lets you get an initial feel for the new movements.
1. 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, and walk down a ramp and sit down without dropping into the seat. Because the C-Brace 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, one-sided strain.

2. 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.

3. How does the C-Brace make 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.

4. Can I wear the orthosis over my clothing? Generally, yes. However, your pants should fit closely to avoid wrinkles, which can lead to pressure sores.

5. Can I operate a vehicle with the C-Brace? Yes, you can. However, the leg with the orthosis may not be used to control the vehicle (e.g. operate the accelerator and brake pedals). Specialized garages can retrofit the vehicle if required and adapt it to your needs (e.g. manual controls for the brake and accelerator).

6. Do I have to wear special footwear or always use the same shoes? You can wear any type of shoe in principle. However, the orthotist sets the same 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.

7. Can I use the orthosis without shoes? No, because the risk of slipping with the foot component would be too great. This would also change the heel height.

8. 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.

9. Can I use the orthosis while showering or bathing? The C-Brace is protected against splashed water, so being out in the rain is generally not a problem.

10. How often do I have to charge the C-Brace? We recommend daily charging. It is best to always keep the C-Brace upright for charging and storage.

11. What happens when the battery is drained completely? Can I continue walking? When the battery is low, a notification sound warns you promptly. 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 and technology.

12. Does the C-Brace offer me any other potential applications? Your orthotist can configure a user-defined mode for you. It allows activities such as cycling. Your movements are not dampened in this case. The C-Brace also recognizes when you sit down and reduces the damping so you can sit comfortably.

13. How can I switch to the user-defined mode? This is done using the smartphone app.

14. What do I do if there is a defect? The system automatically switches to safety mode (see question 11). Please contact the orthotist 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 orthotist in this case.

16. What happens during service appointments? You will need to return your orthosis regularly for a service appointment. Your orthotist sends the joint and charging cable of the C-Brace to Ottobock for inspection.

17. Is there anything I should keep in mind when storing the orthosis? The orthosis should be stored upright to prevent air from accumulating in the hydraulics.

18. Does the C-Brace technology work under various climatic conditions as well? Generally, yes. However, the relative humidity must not exceed 93%, and the temperature has to be between 14 and 104 °F.
Discover the possibilities

The C-Brace has changed lives by giving people the independence and freedom they deserve. Step into your future with the new C-Brace.