

ottobock.

You'll always remember your first step.

C-Brace[®] orthotronic mobility system



Quality for life

Contents

- 3 You'll always remember your first step
- 4 Wolfgang's story
- 8 Christin's story
- 12 The C-Brace® orthotronic mobility system
- 14 Walking with the C-Brace®
- 16 Lucia's story
- 20 The fitting
- 22 Therapy
- 26 Karin's story
- 28 Questions and answers about the C-Brace®



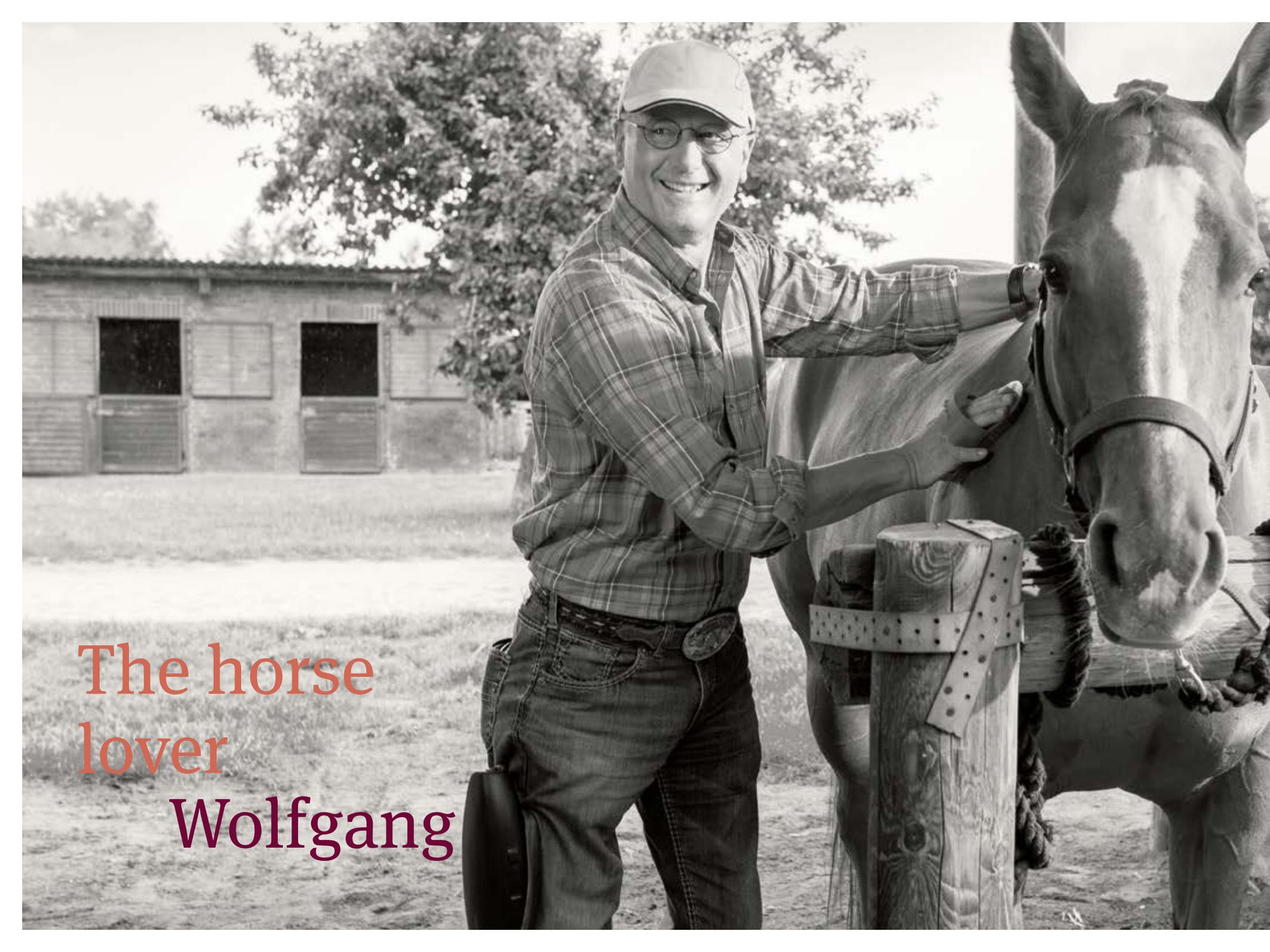


You'll always remember your first step

Do you love touring cities? Do you enjoy working in your home, or are you a passionate hobby gardener? Whatever you do: You shouldn't have to think about walking with every step you take.

When it comes to being mobile, even with paralysis in the legs, what are the main concerns? – Confidence in your movements and feeling safe while walking. This is the basis of the C-Brace®. It is the first orthosis system to control the entire gait cycle in real time, making much more natural movements possible.

Wolfgang, Christin, Lucia and Karin – a horse lover, an adventurer, a bundle of energy and a power woman – tell their stories. They all use the C-Brace®: Wolfgang and Karin have post-polio syndrome, Christin has incomplete paraplegia and Lucia has neurofibromatosis. But their illnesses merely play a subordinate role...



The horse
lover
Wolfgang



“Everyone at the riding arena saw my huge smile when my dream of riding finally came true.”

Wolfgang, post-polio syndrome

“The outside of a horse is good for the inside of a man” – this saying could have come from Wolfgang. The journalist describes himself as a horse lover. He lives on a small farm with his family, two dogs and a quarter horse.

For years he was leery of getting on a horse. It was hard enough for him just to lead his horse to the pasture or the stable. He didn't even want to try until he was fit with the C-Brace®. “It just made me feel safer,” says Wolfgang. “When I rode for the first time again, it felt like Christmas and Easter all rolled into one.”

Between the farm and the whole, wide world



Wolfgang's day is not just about riding. "I'm a very active person, as much as my post-polio syndrome allows me to be. I have to ration my energy," says Wolfgang. He still works as a journalist part time, likes to travel and takes care of the farm and the animals. "The greatest challenge in my life is definitely integrating my disability." He would like to function and to work and to be able to travel just like other people do. "And I've actually been able to do this really well."

Wolfgang loves the peace and quiet of the farm – and his life on it. He is out and about a lot in meadows where the ground is uneven, as well as in the woods where there are rocks and roots. And he has to work hard, too, like when he carries firewood for the stove into the house.

But he also likes to travel once in a while. Then the terrain he has to deal with includes stairs at train stations and the ramps to get on planes. "The last time I had the feeling of being able to overcome obstacles was when I was eight years old, before I got polio," says Wolfgang.

Going on walks with his wife is also important for him. "She used to go on walks in high heels that she couldn't really walk well in," he says with a smile. With his old orthosis, they just didn't walk very far. "But since I started using the C-Brace®, she's given up high heels and wears comfortable walking shoes."



C-Brace®

- More natural movement patterns
- Controlled walking, even on uneven ground
- Many users feel much safer and experience a whole new quality of life as a result
- Moveable ankle joint as a variation that allows for a more natural footfall and
- More natural rollover. The orthopaedic technician adapts the range of movement to the individual patient.



“I can ride again thanks to the fact that I feel safe and have confidence in the C-Brace®.”



**Adventurer
Christin**



“I love travelling and my wish is to eventually see the whole world. I’m rarely afraid and always try new things.”

Christin, incomplete paraplegia

Christin’s most recent adventure was brought to her by Lucy, her Jack Russell terrier. The dog gave birth to five puppies, making Christin a doggy grandmother. Now she is there for the puppies around the clock and intervenes when their squabbles get out of hand.

Everyday life can change quickly. Usually Christin is out and about with Lucy every day. They travel rough, narrow country lanes, cross hardened tractor tracks, clamber over roots or run down small hills. Soon the puppies will be old enough for these excursions too.

Off the beaten path, right through the park



“I like being out and about with family and friends. We go to the zoo, explore the enclosures and enjoy our time together.” Christin and Lucy are often accompanied by Christin’s best friend Cindy and her two daughters. The zoo is their favourite place to visit. Christin lifts the children up into the air and horses around with them. Next to the animals, there is nothing more wonderful for the girls in the moment. Christin and Cindy load the exhausted gang of rascals, including the dog, back into the van in the evening and Christin drives them home.

In the past the 31-year-old would have been using a wheelchair. She has minor spasticity in the legs and incomplete paraplegia. This is due to complications during a follow-up visit in the hospital,

which damaged nerves in the area of the lumbar spine. Two benign tumours on the spinal cord had previously been surgically removed. “I walked into the hospital, and then I was discharged in a wheelchair,” Christin tells us. “But I’m a positive person and never wanted to curl up crying by myself in a corner.”

She also kept her zest for adventure. “My wish is to see more of the world,” Christin says. She has already been in Egypt to see the pyramids with the C-Brace®, in Australia to visit the Sydney Opera House and in Italy because that is where pasta tastes the best. Christin’s list of travel plans is full. But right now, she first has to finish raising the puppies.



C-Brace®

- Natural movement patterns
- Controlled walking, also on uneven ground
- Walking down stairs step-over-step
- Easier negotiation of inclines
- Sitting down in a controlled, flowing movement
- Usable under various climate conditions



“I like being out and about with family and friends. We go to the zoo, explore the enclosures and enjoy our time together.”



C-Brace[®] orthotronic mobility system What's inside

How does the C-Brace[®] work? How is it possible for people with signs of paralysis in the legs up to incomplete paraplegia to walk with smooth movements again?

SSCO[®] is the answer. The abbreviation stands for **S**tance and **S**wing Phase **C**ontrol **O**rthosis and means that the orthosis controls both the swing and the stance phase while walking. Worldwide for the first time.

A sensor is installed respectively on the knee and ankle joint of the orthosis. 50 times per second, these sensors register what movement you are currently performing and how fast. This information is passed on to the microprocessor in the C-Brace[®], which regulates the required support.

When you swing the leg forward for example, damping decreases and when you stand, it increases so that you can assume a natural, slightly flexed position with your leg. The C-Brace[®] responds to any situation instantly in real time. Even cycling can be possible again. You will always remember your first step with the C-Brace[®]!

Key features at a glance

- Unique technology (SSCO® system) regulates the movements
- Knee damping adjusts dynamically
- The system always responds instantly in real time
- Custom elements made of high-quality and lightweight prepreg
- Second mode, for example to enable cycling
- Variation: an ankle joint that enables a softer footfall and more fluid rollover of the foot

Daily advantages

- Natural movement patterns
- You can support weight on the orthosis for the first time while flexing the leg
- Provides support while sitting down
- Walking down stairs and ramps normally, step-over-step
- Controlled and stable walking on uneven terrain

Thigh shell
Custom-made of prepreg.

C-Brace® joint unit
With integrated battery and microprocessor.

Control buttons
Used to select the desired mode.

Knee angle sensor
In the joint axis. Measures the current position of the joint and the speed of the movements.

Microprocessor
Controls walking in real time.

Lower leg shell
Custom-made of prepreg.

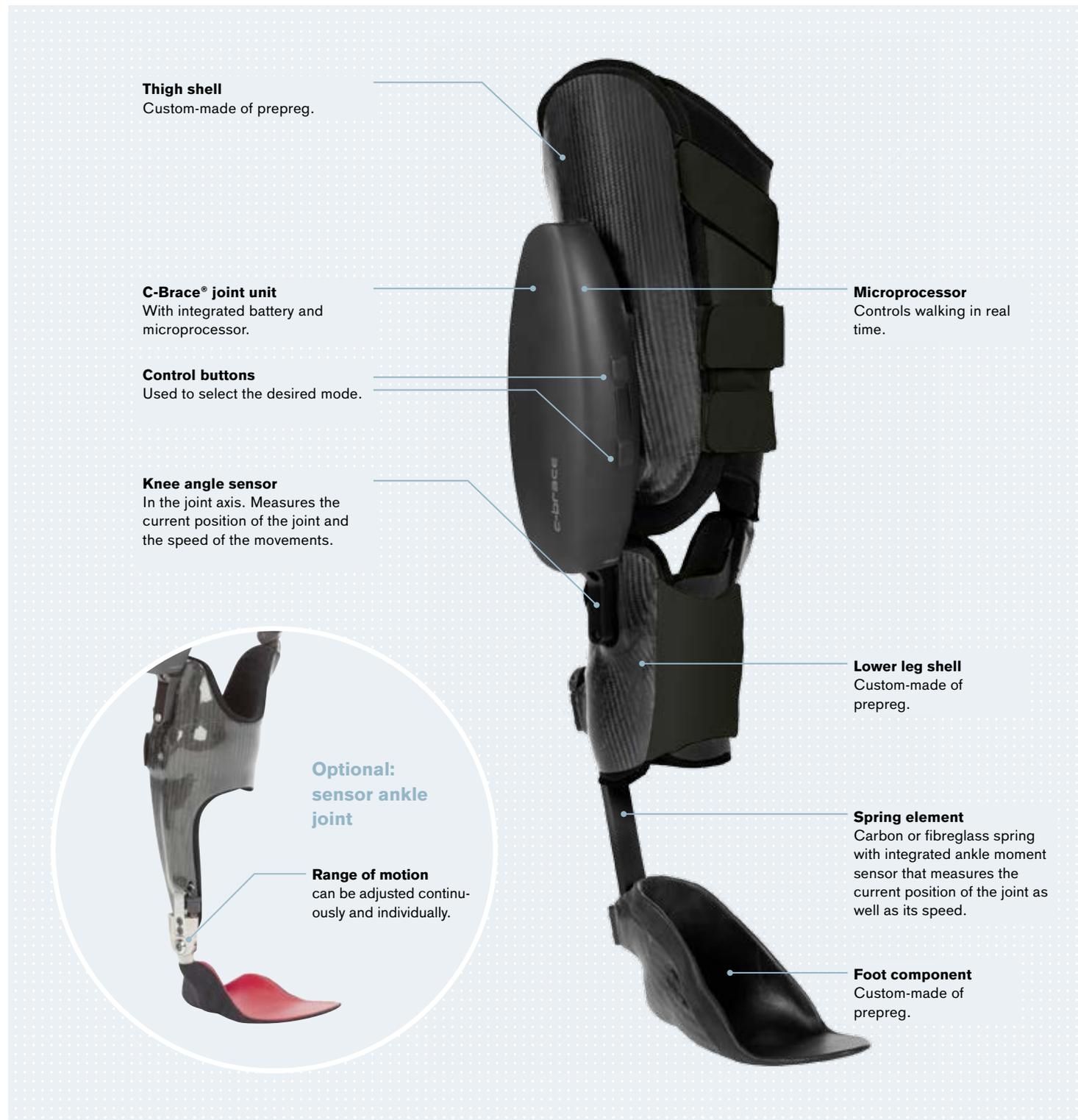
Spring element
Carbon or fibreglass spring with integrated ankle moment sensor that measures the current position of the joint as well as its speed.

Foot component
Custom-made of prepreg.

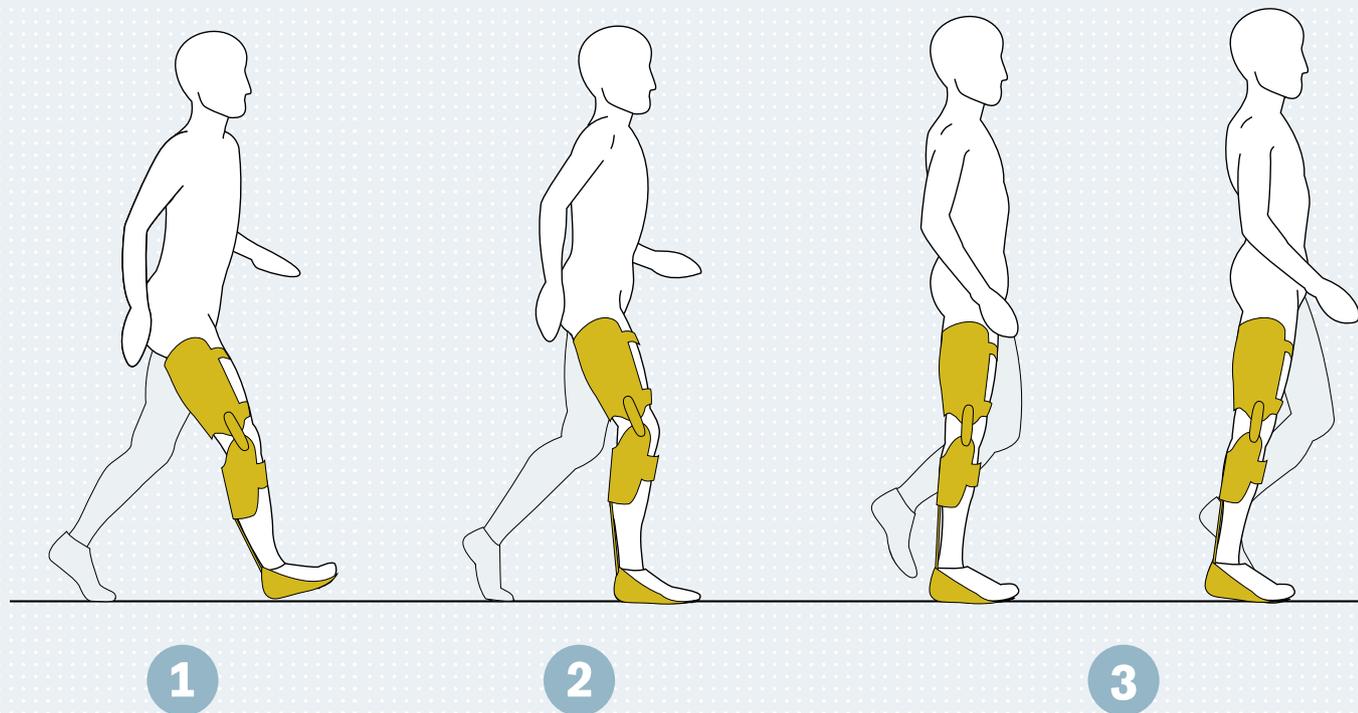


**Optional:
sensor ankle
joint**

Range of motion
can be adjusted continuously and individually.



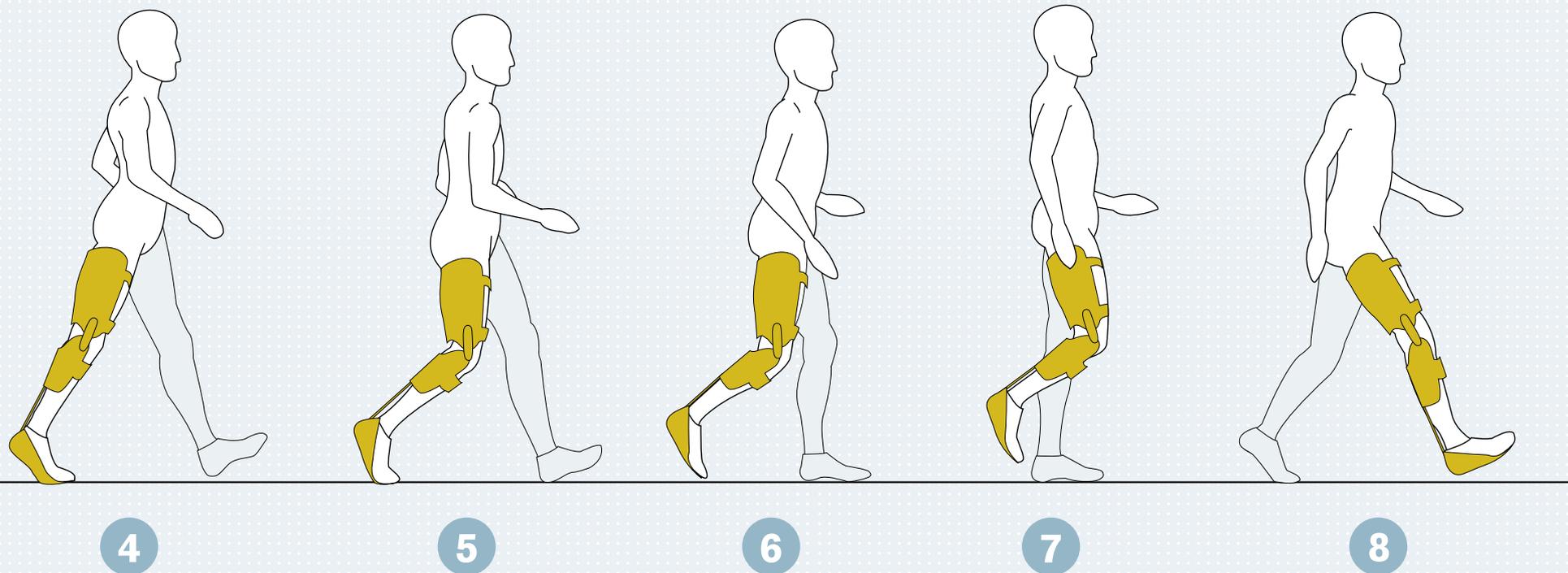
Walking with the C-Brace[®]



No matter whether you are walking fast or slow, or in what position your leg is at the time: the C-Brace[®] adapts to changing situations. Always at just the right time.



Scan this code with your mobile phone!
A video shows Lucia as she walks with her old orthosis and with the C-Brace[®]. Experience the difference!



1 – 4 Stepping down and rollover

The knee does not have to be fully extended when stepping down with the heel. A natural, smooth rollover movement is realised thanks to orthosis damping. 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.



A bundle
of energy
Lucia



“Sitting still and being quiet is difficult for me. Sometimes I have so many ideas in my head, I don’t even know where to start.”

Lucia, neurofibromatosis

Lucia loves the carnival, perhaps because the carnival is just as lively as she is. During the celebrations last year, a friend asked her to dance as he always does. But something was different. “I stepped onto the dance floor and everybody looked surprised.”

This is because Lucia was not dancing in her wheelchair but moving with the C-Brace® orthotronic mobility system for the first time. “When the song finished, everyone applauded – and all I could do at first was go red,” she says, laughing.

So much to see! So much to tell!



Time and time again, acquaintances and friends want to know how the C-Brace® works. But the technology behind the orthosis system isn't important to Lucia. "I used to walk stiffly, like a robot, and now I walk like a human being," she says.

Lucia's legs have been almost completely paralysed since she was 30 years old. The paralysis is the result of a disease called neurofibromatosis. "The doctors said at the time that as long as I lived, I would have to be in a wheelchair. That was inconceivable for me." She practised until she was finally able to get about using orthoses.

But since the orthoses only allowed for the mechanical locking and unlocking of the orthotic knee joint back then, she continued to use the wheelchair often.

"I move more smoothly with the C-Brace®," says the 58-year-old. "That takes the pressure off my back and I don't have such bad headaches and lower back pain." She can pay attention to her surroundings while walking and has to concentrate less on every step. Lucia beams as she says, "For me, the C-Brace® is the best."



C-Brace®

- Walking becomes easier (less physical exertion)
- The user can look ahead
- Many users feel much safer and experience a whole new quality of life as a result
- Fewer compensating movements required
- Improved body posture and reduced subsequent damage
- Dynamic mobility makes the weight of the orthosis less noticeable
- Can be worn over and under trousers
- Various shoes may be worn as long as the heel height is consistent



“I used to take stairs and steps backwards. Now I look ahead when I’m walking rather than paying such close attention to uneven ground, and I enjoy what’s around me.”

Quality and service

Ottobock performs a mandatory service inspection every 24 months. Your orthotist verifies the fit and settings at the same time.



Examination and fitting recommendation

Before deciding whether the C-Brace® is suitable for you, the orthotist performs some tests with you. With the help of the dynamic test orthosis (DTO), you work together to find out if you can use the C-Brace®.



User

Measuring and fabrication

Now your individual test orthosis is produced. It is adapted precisely to the shape of your body. This is why the orthotist prepares plaster casts of your leg in the course of taking measurements. After the successful trial fitting of the test orthosis, the final C-Brace® orthosis is produced according to the Ottobock quality standards.



Training and rehabilitation

You work with trained physiotherapists to gradually learn how to use the orthosis system.



Trial fitting and adjustment

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



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 the leg forward from the hip.

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

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

You need to plan several weeks for the entire process. This builds a foundation which allows you to realise the full range of functionality. Would you like to obtain the advice of an orthotist who is certified to provide fittings with the C-Brace®? Our regional Ottobock contacts will be happy to help you.



Indication:

In principle, the C-Brace® can be considered for all neurological indications of the lower extremities. 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: cooperation with the orthotist is important. He adapts the orthosis to your needs.



The dynamic test orthosis: it allows you to get an initial feel for the new movements.



Therapy

Esther Brücker has accompanied many patients on their journey with the C-Brace®. As a physiotherapist, she gets involved early in the process when a decision is made whether the C-Brace® is the best fitting for the patient.

“Therapy begins with a consultation. I want to know more about the patient’s history, the social and work environment, and what the patient wants to accomplish with the C-Brace®.

I also examine the physical conditions such as muscle functions, balance and mobility. After the orthotist has fabricated the orthosis in cooperation with Ottobock, I spend even more time with the patient.

This is when intensive training begins. I help the patient become familiar with the functions of the C-Brace® and use it to the best possible advantage. Often disused muscles are activated when the orthosis system is used. Then the patient frequently notes muscle activity that was not perceived before.

A special relationship based on trust is established between the therapist and patient over time. This is important so that we can practice movement patterns for which the patient may first lack confidence, or which were only performed with strenuous compensating movements in the past. When the patient is suddenly able to walk down stairs normally again, or across uneven ground, there is a real sense of achievement – and some very emotional moments. The patient’s self-confidence and motivation become stronger.”



Esther Brücker, physiotherapist at Ottobock



Superwoman
Karin



“I need to move. I’m just a very active person and always have been, even as a child.”

Karin, post-polio syndrome

Karin contracted polio when she was six months old. Her right leg has been paralysed ever since. Her early years were spent almost entirely lying down. Later she wore orthoses that encompassed virtually her whole body.

When she was fitted with a knee-ankle-foot orthosis that allowed her to lock the knee joint manually, her lively childhood began. “I rampaged around at home and climbed the tallest tree. I had no fear.”

Out and about with a smile



Sport became Karin's passion. The Magdeburg native played table tennis in her hometown and was a track-and-field athlete in disabled sports in the GDR. She celebrated her greatest success in sports as GDR champion in swimming. One thought was her constant companion during this time: she wanted an orthosis that would dampen movements in the knee rather than locking it permanently.

Along came the C-Brace®. "I put on the orthosis system, started walking and it was a whole new experience," the 59-year-old tells us. "Somehow my locked leg had always been in the way. Now I move more smoothly, normally. Stepping down, for example when walking down stairs, is much quieter." She has also noticed an improvement in her

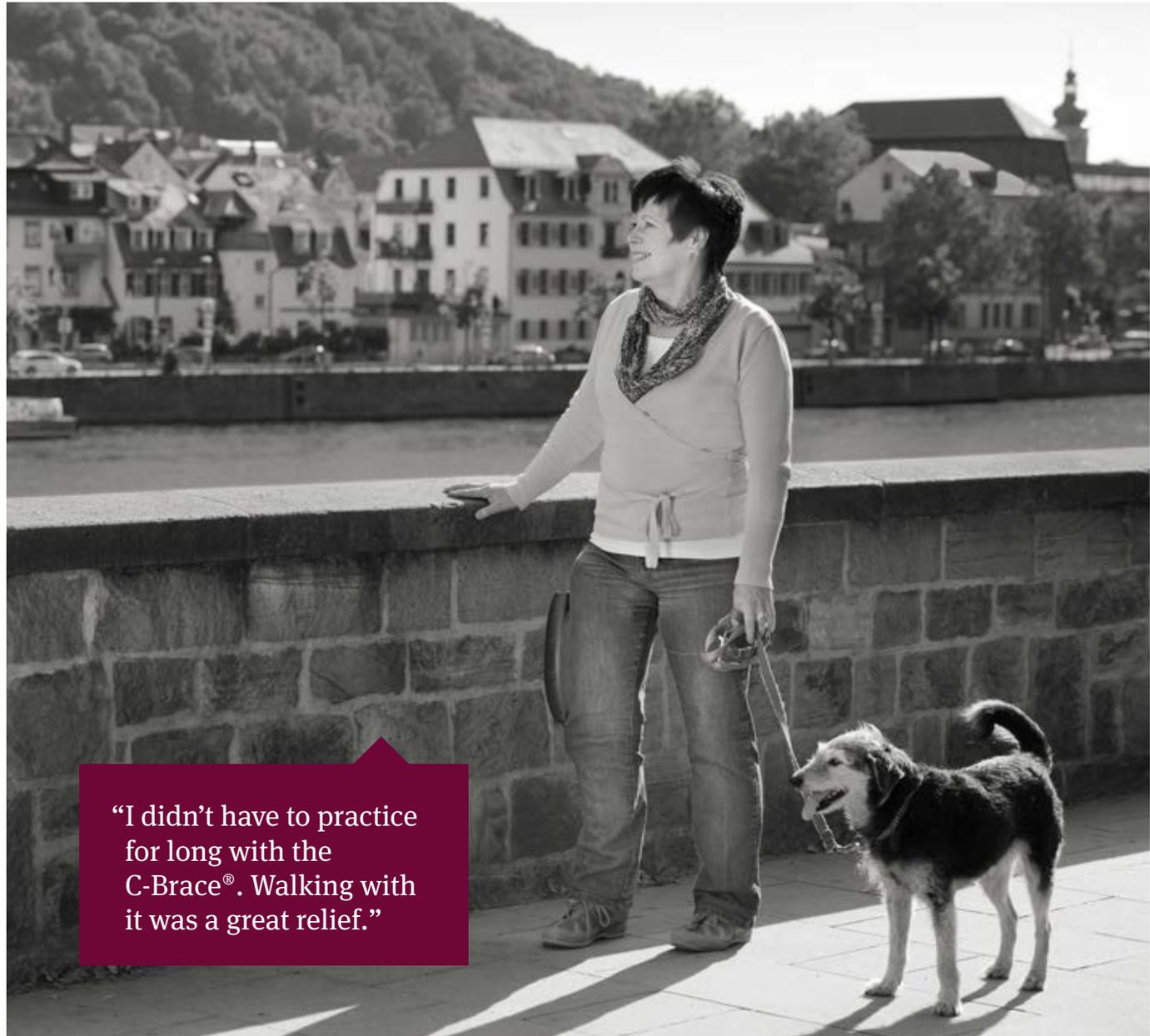
health. "Since my gait is dampened now, I experience less back pain, especially when walking down hills. My sound left side is not subject to as much strain."

Karin likes to horse around with her grandkids on the playground – something she herself always enjoyed as a child. She can easily crouch down, walk on sand, react quickly and sit down without effort. Her dog Pepi benefits from her newfound mobility too, enjoying long hikes and bike rides in any weather. "Everyone in the family has noticed that my mobility has improved."



C-Brace®

- Specific movement control improves safety while walking
- After the C-Brace® is charged, the battery lasts all day
- A notification sound provides a timely low battery warning
- Can be worn in the rain
- Second mode, e.g. for cycling
- Modes can be configured using buttons on the joint
- No mechanical noises



“I didn’t have to practice for long with the C-Brace®. Walking with it was a great relief.”

Questions and answers about the C-Brace®

- 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, walk down a ramp and sit down without dropping into the seat. Since the orthosis system controls the entire gait cycle dynamically, safety is also improved so that 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. The orthosis is in fact heavier than other KAFOs. But this is less noticeable since walking is more dynamic.
- 3. How did 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 trousers?**

Generally yes. However, the trousers should fit closely to avoid wrinkles which can lead to pressure sores. We recommend wearing the C-Brace® directly on the skin. You can have a tailor alter the trousers so that the area of the joint unit can be opened with a zipper. Then only this component is visible from the outside.
- 5. Can I operate a vehicle with the C-Brace®?**

Yes, that is possible. However, please observe the applicable legal regulations for operating a vehicle with a physical disability. Specialised garages can retrofit the vehicle if required, adapting it to your needs (e.g. manual controls for the brake and gas pedal).
- 6. Do I have to wear special footwear, or always use the same shoes?**

In principle you can wear all types of shoes. However, the orthotist 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 loafer with laces or hook-and-loop closures makes it easier to use the C-Brace®.
- 7. Can I use the orthosis without shoes?**

No. The risk of slipping with the foot component would be too high. This would also change the heel height.
- 8. Is the C-Brace® waterproof?**

You cannot use the C-Brace® in wet areas, such as the shower or bathtub. It must not be exposed to salt water either.
- 9. Can I be outside in the rain?**

The C-Brace® is protected against splashed water. Being out in the rain is generally not a problem.
- 10. How often do I have to charge the C-Brace®?**

Once the C-Brace® has been charged, you do not need to worry about charging it again during the day. We therefore recommend charging the C-Brace® every night. 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?**

A notification sound warns you of the low battery charge level in a timely manner. Then the C-Brace® enters a safety mode (empty battery mode). It maintains a certain level of damping. This is established by the technician and you in advance. You can therefore continue using the C-Brace®, but not with the usual dynamics and technology.
- 12. Can I charge the C-Brace® in the car?**

This is generally possible. However, please note that you are not permitted to wear the orthosis system on your body at the same time.

13. Are there other application possibilities supported by the C-Brace®?

There is a 2nd mode that can be configured for you by the orthotist. It allows activities such as cycling. Your movements are not dampened in this case. Or you can choose a mode for standing comfortably over extended periods. Then the joint flexes at the push of a button, making this posture easier for you immediately. Without the second mode, it would take a few seconds for the joint to assume this position.

14. How can I switch to 2nd mode?

This is done by pushing a button. The two switches are installed on the joint unit. A remote control is not needed.

15. What do I do in case of a defect?

The system automatically switches to safety mode (see question 11). Please contact the orthotist who provided the fitting.

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

An acoustic signal indicates malfunctions. Please contact your orthotist in this case.

17. What happens in service?

You visit your orthotist for a service appointment every 24 months. Your orthotist sends the spring, joint and charging cable of the C-Brace® orthotronic mobility system to Ottobock for inspection. We recommend an inspection after 12 months, before the regular service date.

18. Is there anything I have to observe for storing the orthosis?

The orthosis should be stored upright to prevent air from accumulating in the hydraulics.

19. Does the C-Brace® technology also work under various climate conditions?

Generally yes. However, the relative humidity is not permitted to exceed 80 % and the temperature has to be between -10 and +60 °C.





Your certified partner



With compliments from



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