C-Brace®.
You'll always remember your first step.
Christin has incomplete paraplegia. After therapy and four years of depending on a wheelchair, she is actively involved in life again.

C-Brace®–
Orthotics reinvented

With the C-Brace®, Ottobock is changing the way of thinking in orthotics. In conjunction with your skill as an orthotist, this innovative orthosis system opens up astounding possibilities.

In the past, paralysis orthosis fittings for the lower limbs have been severely limited. No matter which system you as the orthotist selected: the only function was releasing and locking the knee joint. The C-Brace® orthotronic mobility system is a new generation that can do much more.

As the first mechatronic SSCO** system in the world, it controls both the stance and the swing phase with unique sensor technology.

For the user, it therefore sets previously unimagined standards for mobility and reliability. For you as the orthotist, the C-Brace® presents interesting new challenges and offers incentives to blaze new trails in your profession.

*Stance and Swing Phase Control Orthosis
Key features at a glance:
• One-of-a-kind SSCO® system
• Microprocessor-controlled stance and swing phase
• Entire gait cycle can be controlled dynamically and in real time
• System responds quickly to any situation

New options for users:
• Flexion under load is possible for the first time, e.g. when sitting down, walking down stairs step-over-step and walking down inclines
• Controlled and stable gait characteristics on uneven terrain
• Depending on the situation, individual operating modes can be set by the technician and selected by the user, e.g. for cycling
• Natural body posture helps reduce one-sided physical strain and resulting problems
• Potential for reduced effort, for example when compared to locked systems
• Newfound mobility and a greater feeling of safety for significantly enhanced quality of life
The SSCO® (Stance and Swing Phase Control Orthosis) system includes custom fabricated thigh, calf and foot components. A dynamic fibre composite spring with integrated sensor connects the foot to the calf component.

An ankle moment sensor transmits signals to the microprocessor-controlled hydraulic knee joint unit, which is integrated into a carbon fibre frame along with the electronics. In addition, a knee angle sensor continuously measures the flexion of the knee joint and its angular acceleration.

The system recognises the phase of the gait cycle that the user is in. Accordingly, the hydraulic resistances are regulated, while flexion and extension are controlled. Thanks to ongoing calculations, the C-Brace® can even optimise the gait pattern in each individual phase.

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

Lucia
The 8 phases of walking – functional compensation by the C-Brace®

1. Stance phase flexion damping: controlled stance phase damping supports the knee extending musculature upon heel strike
2. Stance phase flexion damping plus/time: additional damping option that supports the musculature as needed upon increased load transfer. Time limit on additional stance phase damping
3. Stance phase extension damping: knee extension damping in the stance phase for a natural, smooth movement of the knee joint
4. Maximum load: definition of the safe switching point to trigger the swing phase
5. Swing phase initial flexion damping: switching to minimum resistance for optimum initiation of the swing phase
6. Swing phase knee angle threshold/swing phase dynamic factor: controls the end of swing phase flexion for an optimised gait pattern
7. Extension resistance: switching to minimum resistance during swing phase extension
8. Swing phase extension damping: final swing phase extension damping for a soft braking movement at changing walking speeds

The individual adaptation of the C-Brace® by you as the orthotist is of particular importance in order to provide optimum support for the user in each phase of the gait cycle.
C-Brace® –
What's inside:

**Knee angle sensor**
The knee angle sensor in the joint axis measures the current position of the joint every 0.02 seconds.

**Foot component**
Foot component made of fibre-reinforced prepreg, with clamp adapter for the spring element.

**Lower leg shell**
Lower leg shell made of fibre-reinforced prepreg, with clamp adapter for the spring element.

**Spring element**
Carbon or fibreglass spring with integrated ankle moment sensor.

**Microprocessor**
The microprocessor receives and processes sensor signals and controls walking with the C-Brace® in real time.

**Thigh shell**
The custom thigh shell made of fibre-reinforced prepreg guarantees maximum stability with minimum weight.

**Rechargeable battery**
Integrated Li-Ion battery.

**C-Brace® joint unit**

**Control buttons**
The integrated control buttons are used to select the desired mode.
“I like being out and about with family and friends. With the C-Brace® I can simply do so much more.”

Christin
C-Brace® –
Seizing new opportunities

**Indications:**
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.

The following applies:
- The patient must be able to fully stabilise the torso and to stand freely.
- The muscle strength of the hip extensors and flexors must permit the controlled swing-through of the affected leg.
- Compensation through hip movement is possible.

**Contraindications:**
- Swing phase initiation is not possible
- Severe spasticity
- A flexion contraction of more than 15° in the knee and/or hip joint
- Genu varus or valgus of more than 10° that cannot be corrected
- Ankle arthrodesis: passive range of motion less than 2°
- Body weight > 125 kg
- Body height < 150 cm
- Shorter leg length > 15 cm
C-Brace® – development of the occupational profile:
The advancement of technology naturally means there will be new challenges. This applies equally to orthotics. The introduction of the C-Brace® orthotronic mobility system means occupational changes in the job profile of orthotists. In the course of Ottobock certification, we will gladly explain the details to you in person. This is the only way to ensure that your patients can reap the full benefits of the new C-Brace® orthotronic mobility system without restrictions. Only this framework provides sufficient leeway to illuminate all of the technical details and examine the process steps in detail.

Patient fittings cannot be provided without certification.

C-Brace® – new individuality at a click of the mouse:
A software package (C-Soft) makes it easy for you as the orthotist to find the optimum settings for every patient. Special emphasis was placed on making the programme with its interface and menus easy to understand and user-friendly. It guides you through various stages step-by-step while analysing each gait phase via Bluetooth®.
Trial fitting and adjustment

The trial fitting of the final C-Brace® orthotronic mobility system follows. With C-Soft, you configure the system to meet the needs of the user. You can also configure a 2nd mode which allows activities such as cycling.

Gait training and rehabilitation

Training with the C-Brace® orthotronic mobility system is an important element of the fitting process. The objectives of the trained physiotherapists are to teach the user how to use the system, to build confidence in the C-Brace® (load transfer) and to practice the functions that are new to the user (expanded ADLs).

Quality and continuous control

Ottobock performs a service inspection every 24 months. The medical supply company also verifies the fit and settings of the C-Brace® in the course of the inspection.
Warranty and service

From the examination to quality control
A fitting with the C-Brace® requires five steps. The time required varies depending on the user, but usually extends over several weeks. From the initial examination to gait training and finally, regular quality control – a comprehensive, individual fitting is essential to ensure that the user reaps the full benefits of the C-Brace®.

Examination and fitting recommendation
Before a final recommendation can be made, you as the orthotist have to review with the user whether the C-Brace® is suitable. The user wears the dynamic test orthosis (DTO) for this purpose.

Measuring and production
You take the user’s measurements, fabricate the plaster negative and positive, and initially produce a test orthosis to verify the fit. If the trial fitting is successful, Ottobock Service Fabrication fabricates the final C-Brace® orthotronic mobility system.

Ottobock offers a standard three-year warranty on the C-Brace® orthotronic mobility system. The warranty can be extended if desired. A service inspection must be performed by Ottobock every 24 months in order to maintain the warranty. We recommend an early inspection after 12 months.
Patient selection aid for the C-Brace® orthotronic mobility system

The selection aid helps to determine whether a patient is suitable for a C-Brace®. However, this document should be considered only an aid. For the final decision, please fit the patient with a dynamic trial orthosis (DTO).

### Cognitive requirements

The patient must be capable of ensuring the proper handling, care and use of the orthosis (e.g. hearing acoustic signals).

### Functional deficit

- Neuromuscular instability of the knee joint in the sagittal plane
  - Diagnosis (by the physician):

### Exclusion criteria

If any of the following apply to your patient, he or she cannot be fitted with a C-Brace® at this time:

- Swing phase initiation from a standing position is not possible
- Weight over 125 kg
- Height less than 150 cm (knee centre measurement)
- Severe spasticity
- Leg shortened more than 15 cm
- Knee flexion contracture more than 15°
- Hip flexion contracture more than 15°
- Insufficient neuromuscular trunk stability for the trial phase
- Genu varus or valgus of more than 10° (uncorrectable) – unacceptable for cosmetic reasons
- Diseases that preclude the use of an orthosis (e.g. oedema, extensive skin irritation)
- Orthoprosthesis
C-Brace® Orthotronic Mobility System

Order form

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<thead>
<tr>
<th>Contact person</th>
<th>Customer number</th>
<th>Date</th>
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Customer

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Shipping address (if different from customer address)

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<th>Company</th>
<th>Street</th>
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Information on the fitting

Age: _______  Height: _______ m  Weight: _______ kg

Affected side:  
- [ ] right
- [ ] left
- [ ] bilateral

Initial fitting of C-Brace® orthotronic mobility system
Follow-up fitting of C-Brace® orthotronic mobility system

Diagnosis: ____________________________________________________________

Other illnesses/limitations: ____________________________________________

The customer will provide

- [ ] Plaster positive for a thermoplastic test orthosis (SF300T=L/R)
- [ ] Thermoplastic test orthosis
- [ ] Plaster positive for the definitive orthosis (SF300F=L/R)
- [ ] Other: __________________________________________________________
- [ ] Thermoplastic test orthosis for the definitive orthosis
- [ ] Photos (frontal and sagittal)

Shipping to Ottobock by customer

Comments

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________
C-Brace® Orthotronic Mobility System

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Order options

- SF300T=L/R Thermoplastic test orthosis (to check fit and static alignment)
- SF300M=L/R Model of the thermoplastic test orthosis (SF300T=L/R)
- SF300F=L/R Prepreg frame (including hook and loop pocket, unfinished carbon fibre look) ¹
- SF300C Fabrication – padding and closures
- SF300S Surface design
- 17B300=L/R C-Brace® joint (including three-year warranty)
- 17CF2=4 Glass fibre spring
- 17CF2=1 Carbon fibre spring
- Warranty extension to 5 years

¹ Please mark the position, size and thickness of the closures

Padding dummy

- Fabricate the orthosis directly on the positive without taking padding distance into consideration.
- The model has been created without padding distance. Please take into account a padding distance for the:
  - thigh of _______ mm/inch
  - calf of _______ mm/inch
  - foot of _______ mm/inch

Comments

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“I move more smoothly with the C-Brace®. That takes the pressure off my back.”

Lucia