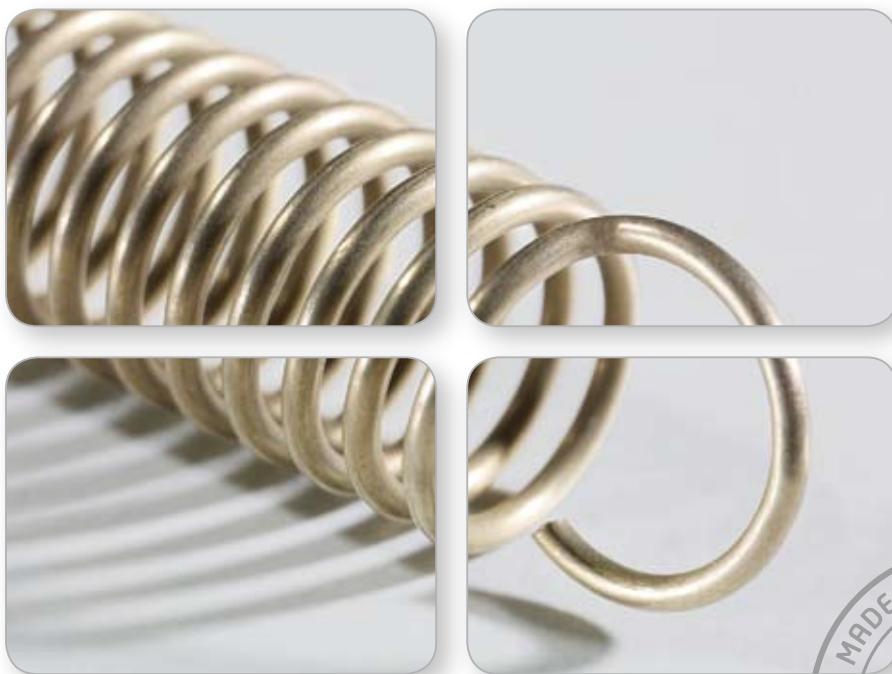




# BORT DynamicFX Back Brace

Spring reinforced for a life on the move.



orthopedics  
surgery  
sports medicine  
rehabilitation



## Osteoporosis - A brief roundup of the facts!

Bone mass increases over about the first 30 years of our life, when it reaches its maximum and slowly declines again. Osteoporosis is one of the world's major public health problems and is steadily increasing due to growing life expectancy, especially in the industrialised countries. Experts estimate there are about 7.8 million sufferers in Germany having to cope with chronic pain.

Osteoporosis is classified into primary (95% of cases) and secondary disease (5%).

The cause of primary osteoporosis remains unknown, but the risk factors for its development have been identified:

- ⌚ Hereditary factors, age and gender
- ⌚ Pregnancy / breast feeding
- ⌚ Lack of exercise (but also competitive sports)
- ⌚ Malnutrition/underweight
- ⌚ Medications (e.g. cortisone)
- ⌚ Hormone deficiency
- ⌚ Semi-luxuries and stimulants

Every year there are more than 300,000 osteoporosis related fractures. The fractured vertebrae decrease in height, show wedge-like malformations and cause kyphosis of the part of the skeleton affected. Muscles and tendons are shortened, become hardened and tense – and require not only conservative but also surgical treatment strategies.



### Diagnostic methods for osteoporosis

Osteoporosis can be effectively treated if recognised early. Various diagnostic methods are available for early detection and monitoring, such as bone biopsy, dual energy X-ray absorptiometry (DXA), quantitative and peripheral quantitative computed tomography (QTC/pQTC) and quantitative ultrasonometry (QUS).



*"Osteoporosis can  
be effectively treated  
if detected early."*



## Can a brace maintain posture and still remain movable?

Back braces are prescribed for the prevention of osteoporotic vertebral fractures with the aim of straightening the upper part of the body and relieving anterior loading of the vertebrae. Braces also prevent extreme vertebral movements and are used both for overt fractures as part of a purely conservative therapy and as postoperative supportive devices. Reclination braces can, for example, help kyphotic patients regain their upright posture.

In cooperation with the prominent orthopedic specialist Prof. Dr. Rudolf Bertagnoli, a completely new brace has now been developed which, unlike other braces, does not remain static:

the BORT DynamicFX Back Brace (Art. No. 180 300) is the first back brace on the market which through its spring tension elements dynamically straightens the upper part of the body by means of shoulder straps and actively supports mobility. The musculoskeletal apparatus is not restricted – on the contrary, muscular activities are promoted, accompanied and utilised. The function and effectiveness of the BORT DynamicFX Back Brace have been investigated and confirmed by the spine institute ProSpine in a study on hospitalised patients.



**BORT DynamicFX Back Brace**

Art. No. 180 300

### Functionality and effect of the BORT DynamicFX Back Brace

- Counteracts the kyphosis in the thoracic spine area by activating the trunk muscles
- Improves the body's posture and strengthens the muscles
- Stabilises the achieved degree of straightening
- Reduces pain in the overstrained back muscles
- Increases mobility by reducing pain and straightening the spinal kyphosis
- Reduces the risk of falls by improving the body's statics

*"Improves body posture  
and strengthens the muscles."*

## BORT DynamicFX Back Brace - the more effective brace gets people moving.

Commercially available brace systems have so far been characterised by a relatively rigid overall concept. The BORT DynamicFX Back Brace is different, because its flexibly adjustable functional components do not immobilise. Corresponding to the required degree of stabilisation, the intensity of the dynamics can be selected from five springs of differing strengths; the spring elements can be exchanged without difficulty at any time. The posture correction is based on a biofeedback mechanism and straightens the upper part of the body by means of shoulder straps. The BORT DynamicFX Back Brace has both a static and dynamic straightening effect and supports the wearer like an active support, but without restricting the musculoskeletal apparatus. The BORT DynamicFX Back Brace gives patients the certainty of being able to cope with activities of daily living over the long term and is especially versatile in therapeutic use.

### Therapeutic indications for the BORT DynamicFX Back Brace

- Osteoporosis
- Conservative for secondary kyphoses (stable fracture, tumour)
- Painful hunched back
- Muscular insufficiency
- Conservative for spondylitis
- Scheuermann's disease
- Pre/postoperative stabilisation



### Structure of the BORT DynamicFX Back Brace

In the BORT DynamicFX Back Brace, two adjustable shoulder straps are secured to a dorsal base plate and are passed under the arms towards ventral. The straps are then passed over the shoulders again towards dorsal where they are secured to the neck section. The straps are attached to the base plate with springs of differing stiffness.

The neck section and pelvic strap are connected to each other dorsally by an adjustable strap. Connection to the pelvic strap is also by means of a spring. The base plate is fixed by means of an abdominal section encircling the waist.

- Both shoulder straps and the centrally positioned strap over the spine are activated by springs in the BORT DynamicFX Back Brace.



## BORT DynamicFX Back Brace

# Technical information

The orthopaedic technician assembles a BORT DynamicFX Back Brace individually to meet each patient's needs. He selects the base plate in the correct size – small (length 32 cm), medium (length 40 cm), large (length 48 cm) or x-large (length 56 cm) – adapts it to the patient's specific body shape, checks the fit and function at regular intervals and makes corrections as required. The correct choice of base plate according to the affected body region and the patient's specific height is decisive for the success of therapy.

### Brief overview of therapeutic use:

In contrast to the conventional static braces of the competitors, the **BORT DynamicFX Back Brace** is the only dynamic brace that supports its wearer in the endeavour to preserve natural mobility.

### Notes on period of wear

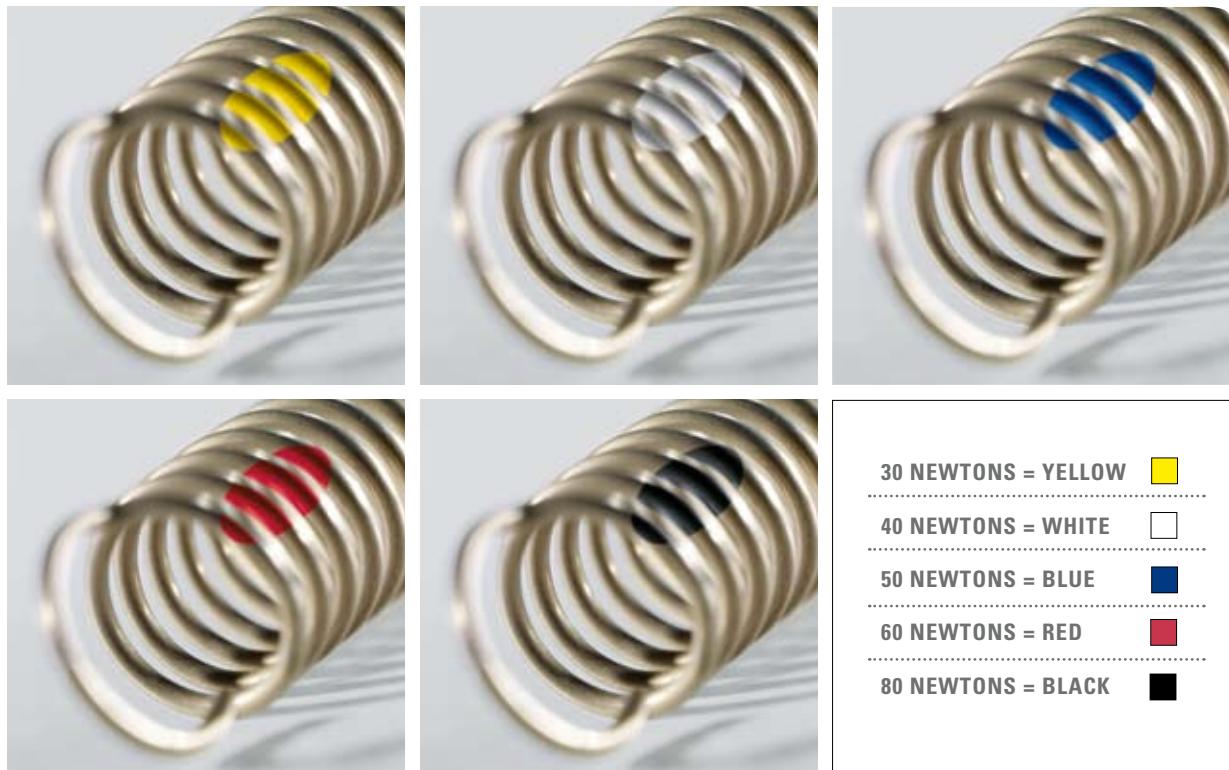
A physician will decide over the long term how long the **BORT DynamicFX Back Brace** is to be worn based on his individual treatment recommendation, and may refer to the following data for guidance:

	1st week	2nd week	3rd week	4th week
MORNING	<b>1 h</b>	<b>1,5 h</b>	<b>2 h</b>	<b>3 h</b>
AFTERNOON	<b>1 h</b>	<b>1,5 h</b>	<b>2 h</b>	<b>3 h</b>

## *“Dynamic as a spring!”*

### Selecting spring tension elements

The strength of the spring determines the degree of straightening and therefore the improvement in posture. Five colour-coded spring strengths are available.



- Only orthopaedic technicians or trained specialist personnel may fit the BORT DynamicFX Back Brace to meet individual requirements.

## Treatment recommendation

### Spring strengths 30 N to 50 N:

Muscular dysbalance, radicular irritation syndrome, incipient spinal stenosis, irritation of the sacroiliac joint and preventive stabilisation.

### Spring strengths 60 N and 80 N:

NPP, spinal stenosis, facet syndrome, osteochondrosis, spondylolisthesis.

### Conservative treatment:

In conservative treatment, the spring strength is selected according to the type of disease and the patient's individual constitution.

### Postoperative use:

After operations, preferably spring strengths 80 N to 60 N are used. After half the recommended wearing period, the spring strength should be reduced and 50 N to 30 N should be used.

# Effect scientifically confirmed.

The straightening forces of the BORT DynamicFX Back Brace were investigated in a study in six persons, some suffering from osteoporosis and some healthy.<sup>1</sup> To generate the series of measurements, the study subjects aged between 42 and 78 years performed two different exercises while wearing the back brace. Independently of the individual execution of the movement, the straightening forces of the BORT DynamicFX Back Brace should increase as the flexion of the trunk increases and appropriately support the muscles but not completely replace the muscular strength.

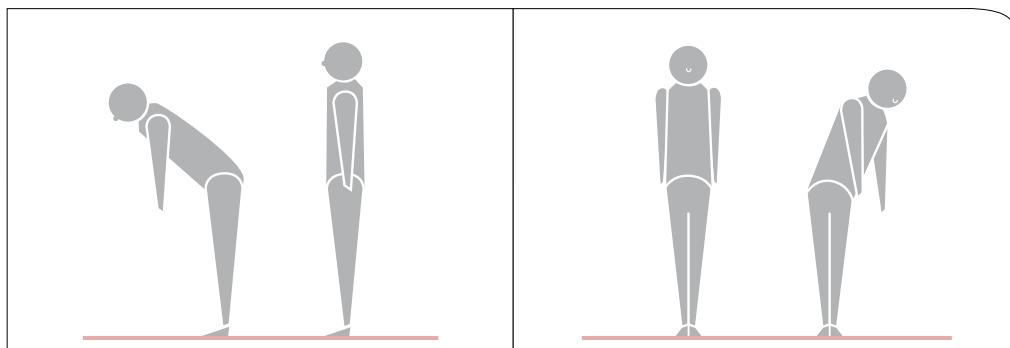
The full study can be requested at [www.dynamicfx.de](http://www.dynamicfx.de).

Subjects:		BORT DynamicFX Back Brace:			
	AGE	SEX	HEIGHT	LENGTH BASE PLATE	SPRING STRENGTH
1	42	m	180 cm	48 cm	30, 40, 50, 60 N/mm
2	58	f	168 cm	32 cm	50 N/mm
3	60	f	154 cm	32 cm	50 N/mm
4	73	m	176 cm	40 cm	50 N/mm
5*	74	f	157 cm	32 cm	50 N/mm
6*	78	f	161 cm	32 cm	50 N/mm

\* Treatment-dependent osteoporosis



<sup>1</sup> Kienle A, Vogel R, Wilke H-J: Straightening forces of the BORT Dynamic FX thoracolumbar orthosis. SpineServ GmbH & Co. KG. (Ulm) 2010.



⇒ **Forward bend:** with the knees straight, bend as far forwards and downwards as possible.

⇒ **Diagonal forward bend:** with the knees straight, point the hands towards an object located 20 cm in front of and 20 cm to the left of the tip of the left foot.

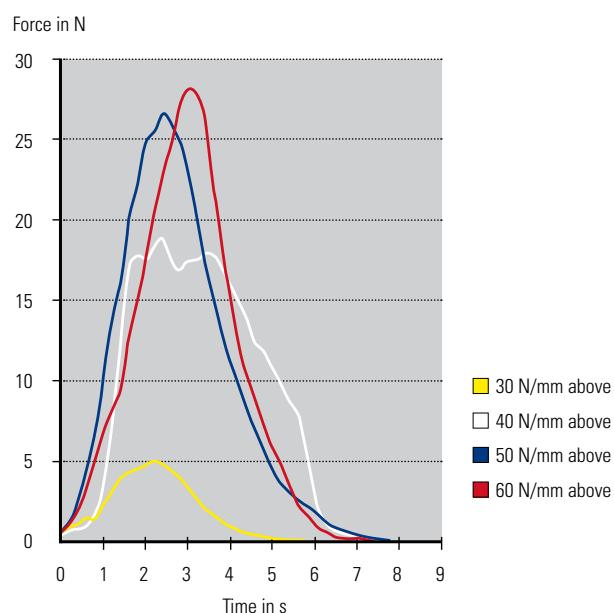
**Force and pressure measurements were performed on the right shoulder strap before and during the exercises** (in the straight forward bend a similarly large force is to be assumed, while with the diagonal variant the force on the left is probably smaller). The movement was measured between the neck section and the pelvic strap of the brace.

*"The brace can assume about 20 % of the forces generated by muscular strength."*

### Results of the study

Before starting the exercises, a mean force of about 1.5 N was measured on the left shoulder and a total force of about 3 N was therefore reached on both sides. The mean pressure under the strap was approx. 6 kPa (approx. 46 mmHg). During the forward bend, a maximum force of 30 N was measured on the right shoulder. In the diagonal forward bend, the maximum was markedly higher at 40 N. The mean pressures of 11.4 kPa (85.5 mmHg) in the forward bend were somewhat below the pressures of 13.3 kPa (99.9 mmHg) measured in the diagonal forward bend. In most cases the force and pressure between the shoulder strap and shoulder increased simultaneously, but differed only slightly during the course.

**MEASURED STRAIGHTENING FORCE  
RIGHT SHOULDER STRAP**



## Scientific discussion

Even in the upright position, the **BORT DynamicFX Back Brace** pushed the shoulder strap backwards with a force of approx. 3 N. In the forward bend, this force increased to approx. 60 N. In the diagonal forward bend, approx. 40 N was measured on the right shoulder alone. No comparative data are available for other braces, since the proclaimed effects are only rarely demonstrated empirically. In the present study, the kyphotic angle of the thoracic spine was measured before and after fitting an osteoporosis body suit and the effect on the degree of thoracic kyphosis of the spine in upright position was described; movements were disregarded. Other research groups have investigated the effect of different braces on spinal stiffness.

The interpretation of the measured results presented here is informative even without reference values from other studies. In the experimental model with two differently executed forward bends, the force values caused by the **BORT DynamicFX Back Brace** were measured as up to 60 N. These results showed that the **BORT DynamicFX Back Brace** can assume about 20% of the muscularly generated forces. This value appears appropriate, since on the one hand the muscles must not become atrophied, but on the other hand need support because in the long term they cannot assure straightening on their own.

During the movement of the brace, it was shown independently of the subjects' individual pattern of movement that the straightening force increased the greater the flexion and decreased again as the subjects straightened. The brace therefore consistently exerts its effect and is therefore universally effective.

The straightening forces are suitable for improving body posture, reducing the angle of kyphosis and achieving an increase in height by straightening the upper part of the body. Moreover, a correction in the body's centre of gravity reduces the risk of falls and improves safety in daily living.

*"The universally desired effect  
is achieved by the straightening force."*



### Conclusion

The BORT DynamicFX Back Brace already exerts straightening forces on the shoulder strap with the wearer in upright position. In the forward bend, these forces increase to values below the maximum muscular forces, for example of the trunk flexor muscles, and therefore cannot replace, but can effectively support the muscles. The pressures between the shoulder and the shoulder strap of the brace are within a range which is also selectively adjusted

in other braces, and can therefore be rated as uncritical with intermittent use.

➲ **The movement measurement showed that despite individual execution of movements, an increasing forward or diagonal forward flexion of the trunk is associated with an augmented straightening force. Treatment with the BORT DynamicFX Back Brace therefore universally achieves the desired effect.**



*"Reduces painful  
overloading of the  
back muscles."*



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