ORTEMA

K COM by ORTEMA

The Intelligent Knee Brace Concept

The intelligent
K-COM knee brace concept

In Germany, more than 100,000 patients injure their anterior cruciate ligament every year. In addition, a not inconsiderable number tear the posterior cruciate ligament or suffer other knee joint injuries or signs of wear and tear such as osteoarthritis. The anterior cruciate ligament, which acts as a central stabilizer, is thus the most frequently injured ligament in the knee joint.

The severity of the injury, which was often inadequately classified as a simple strain in the past, is now more frequently diagnosed by modern procedures. Without an anterior cruciate ligament, a knee joint wears out much faster. Five years after an anterior cruciate ligament injury, more than 80% of patients have painful meniscus injuries and incipient osteoarthritis. If surgical stabilization is not possible, the knee joint can be protected using braces.

Since the treatment of knee joint injuries is a major focus of medical treatment in sports orthopedics at the Orthopedic Clinic Markgröningen (OKM), it is important that postoperative and conservative orthotic care is also provided at the highest level in our Center for Arthroscopy and Special Joint Surgery.

The K-COM knee brace represents the most comprehensive care concept for stabilization due to the indication-dependent choice of model and the individual fabrication technique.

Intensive cooperation with specialized doctors, physiotherapists and athletes has made it possible to develop a truly new fitting concept for the knee joint. One that is particularly convincing for our patients due to the optimal stabilization of the knee joint with minimal weight and maximum wearing comfort. We are constantly developing the K-COM concept further. It has established itself excellently over the last decades and is used by many renowned physicians for the treatment of injuries and knee instabilities with great approval.

K-COM by ORTEMA

KNEE BRACE

made of carbon fiber and titanium

The individual knee brace,
that you do not feel in everyday
and during sports.

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ORTEMA

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The 3D scan captures the circumferences and lengths of the leg extremely accurately.

Modeling the scan data on the screen.

The flexion and extension limitations can be mounted independently of each other.

There are many reasons to choose K-COM

More than 30 years ago, the idea was born in our company to develop our own knee orthosis. The reason: insufficient supply possibilities by other knee braces.
Since then, all our experience has been incorporated into the ongoing further development of the K-COM concept. This is particularly true for use in competitive sports. Here, the K-COM knee brace must prove its worth even under extreme stress. This is ensured by high-tech materials such as high-strength carbon fiber and low-wear titanium splints as well as state-of-the-art manufacturing techniques.
This experience and constant improvements benefit above all the user in daily use. This is also demonstrated by the above-average positive response from our patients. Clinical studies with over 2,000 evaluated questionnaires in a ten-year overview clearly prove this. In particular, gonarthrosis treatment with axial malalignment achieves excellent results.

In the Vivo Workload Measurement of the subject groups at the German Sport University in Cologne so as to determine the stabilization characteristics of the K-COM knee brace.

GETESTET IM INSTITUT FÜR BIOMECHANIK UND ORTHOPÄDIE*
Deutsche Sporthochschule Köln
Prof. Dr. G. Brüggemann*

Indications:

- Anterior cruciate ligament injury
- Posterior cruciate ligament injury
- Injury to the collateral ligaments and meniscuses
- Complex knee instabilities
- Cartilage damage and arthrosis
- Knock-knee and bow-legged mal-positions

Test Winner:

In the German equivalent of the MOT test (TÜV) by the base institute for biomechanics, namely TÜV Munich, our K-COM ranked first amongst 14 of the most commonly used knee braces.

Institut für BASIS MUNICH Biomechanik

Partially flexible thigh and lower leg shells
Only 1,5 mm thick shells in sandwich construction with the ability to adapt to the changing muscular relief.

Optimal anatomical fit
Gives optimal wearing comfort.

Torsion-resistant, non-slipping carbon fibre construction
Stabilizes the joint where the knee needs it most.

Polycentric joints made of titanium
Developed to meet biomechanical criteria-flat, light and extremely stable.

Flexion and extension limitation
Extension adjustable from 0° to 40°.
Flexion adjustable from 0° to 90°.

Extremely light combined with stability
Maximal stabilization of the knee with a minimum of weight.

Counter-rotating Velcro® strap system
Enabling the K-COM knee brace a non-slipping fit without adding to unnecessary thickness.

Our Service Production

Supply your Patients with the ORTEMA Technique

GET YOUR INDIVIDUAL ORTEMA ORTHOSIS IN JUST 5 EASY STEPS

(using the example of a K-COM knee brace)

Discover the proven quality of ORTEMA for your patients. With our service manufacturing, we offer the opportunity to have custom-made orthoses manufactured according to individual specifications, crafted to the highest standards of quality.

And it's as simple as that: You send us the scan data of your patient along with the documentation, and we will deliver a ready-to-try orthosis within ten working days, plus postal delivery time.

Benifit from the advantages of the ORTEMA Service Production:

- Time and cost efficiency
- Bridging staff shortages
- Developing new business fields
- Benefiting from our expertise

Have we sparked your interest?

Please request the ORTEMA Service Production documents by phone, fax or email:

Phone: +49 7145 - 91 53 800
Fax: +49 7145 - 91 53 980
email: servicefertigung@ortema.de

1. Order

If you have a patient in need of a custom K-COM knee orthosis, please contact us to initiate the Service Production order.

2. 3D-Scan

You create a 3D scan of the patient's leg according to our specifications and send the data to us via email or upload.

3. Manufacturing

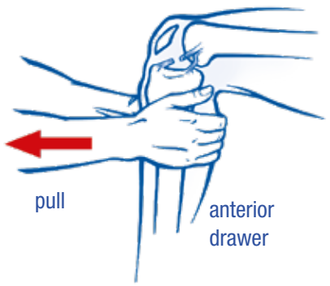
We create the 3D model and manufacture the K-COM knee orthosis according to the exact indication.

4. Adjustment

The trial-ready K-COM knee orthosis is then sent to you.

The K-COM system overview:

Version **ACL**

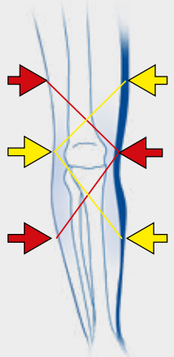


Indication:
- Anterior cruciate ligament injury
- Meniscus injury and refixation
- Injury of the capsular ligament
- Cartilage reparations
- Early functional stabilization

Biomechanical function:
The individually manufactured, torsion-resistant framework construction offers the optimal stabilization for avoiding the anterior compartment.

Prescription:
A knee brace with carbon-fiber construction according to a plaster cast or 3D-scan for the permanent support in the version ‘ACL’.

Version **Bilateral**

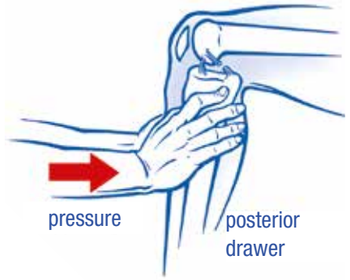


Indication:
- Anterior cruciate ligament injury
- Rupture of the collateral ligaments (medial/lateral collateral ligament)
- Meniscus injury and refixation
- Injury to the capsular ligament
- Cartilage reparations
- Early functional stabilization
- Knee endoprosthesis

Biomechanical function:
Avoiding the anterior compartment and a more effective stabilization through bilateral setting on the thigh and shank. Unilateral relief.

Prescription:
A knee brace with carbon-fiber construction according to a plaster cast or 3D-scan for the permanent support in the version ‘bilateral’.

Version **PCL**



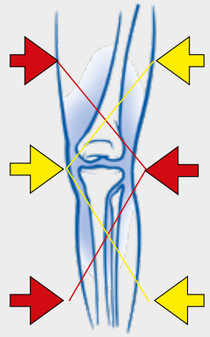
Indication:
- Rupture of posterior cruciate ligament
- Combination injury with participation of the posterior cruciate ligament

Biomechanical function:
Avoiding the posterior compartment through rear shank setting. A belt close to the joint in the bending zone promotes a dynamic forward shank motion.

Prescription:
A knee brace with carbon-fiber construction according to a plaster cast or 3D-scan for the permanent support in the version ‘PCL’.

innovative & individual

Version **Geriatrie**

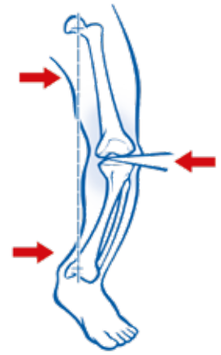


Indication:
- Knee joints arthrosis
- Pangonarthrosis
- Genu recurvatum

Biomechanical function:
Guiding the knee joint through extensive brace construction. Rear tray guidance makes it easier for older patients to put the brace on.

Prescription:
A knee brace with carbon-fiber construction according to a plaster cast or 3D-scan for the permanent support in the version ‘geriatrics‘.

Version **Varus**

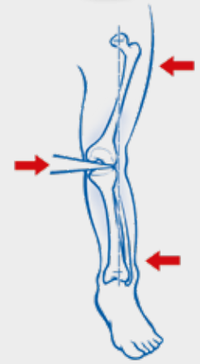


Indication:
- Varus gonarthrosis with axial malalignment

Biomechanical function:
Three point correction of the bone axis with interior relief of the overstrained portion of the joint.

Prescription:
A knee brace with carbon-fiber construction according to a plaster cast or 3D-scan for the permanent support in the version ‘varus‘.

Version **Valgus**



Indication:
- Valgus gonarthrosis with axial malalignment

Biomechanical function:
Three point correction of the bone axis with exterior relief of the overstrained portion of the joint.

Prescription:
A knee brace with carbon-fiber construction according to a plaster cast or 3D-scan for the permanent support in the version ‘valgus’.

Endoprothesis Support

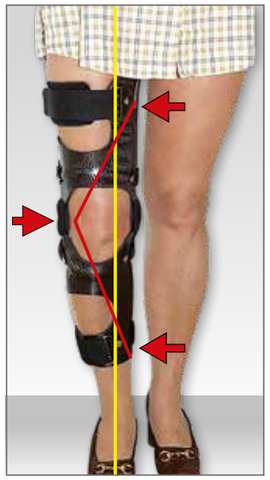
Dual-sided support of a 48 year old woman with dual-sided total knee endoprotheses after severe knee trauma caused by sporting accidents in her childhood. Since she lives in an area known for skiing, she requires a rather large range of movement. When establishing the proper orthotic care, special attention had to be given to the construction of the endoprotheses. This determines the brace's pivot point. The mechanical compromise axis must be coordinated with the implant.

The heavy gonarthrosis suffered by this 48 year old patient with varus malalignment requires a dual-sided form of knee TEP support. This picture portrays a knee brace for external stabilization for physical strain.

The knee braces guide the joint and relieve the rotational movements. The patient wears the brace during physical strain and when playing sports (Alpine skiing).

Bowlegged Malalignment Support

This is the case of varus gonarthrosis suffered by an active 65 year old woman. Thanks to the K-COM knee brace **'varus'** version, the medial joint section can be relieved and the patient, who works at exhibitions and fairs, can also stand for longer periods of time without discomfort or other complaints. Seen cosmetically, the brace can be worn free of problem under a pair of pants.



To effectively correct a varus gonarthrosis while simultaneously relieving the medial joint sections, we apply the three point correction principle. The support points are located medially on the thigh and lower leg. The corrective pressure is applied laterally. With that, the axial malalignment can be reduced.

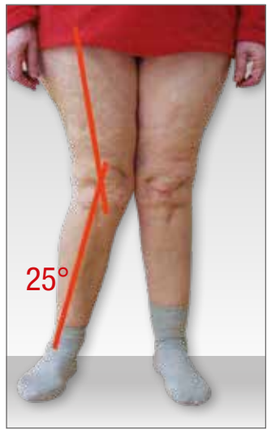
Only a sufficiently long model of the knee brace can achieve a sustainable correction of the leg's axial malalignment.

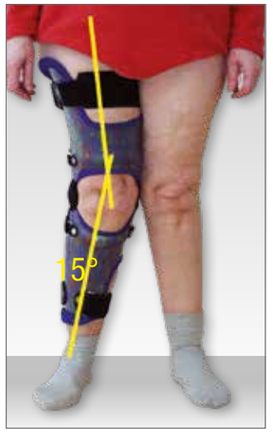
For sports requiring strong rotational movement of the knee joint, only a very effective form of stabilization can bring about relief.

Knock-Kneed Malalignment Support

Support offered by a K-COM knee brace **'valgus'** version intended for axial correction and the relief of the lateral knee compartment. Thanks to the brace, the valgus malalignment could be corrected from app. 25° to app. 15° and the lateral femoral condyle has been relieved.

For the K-COM valgus version knee brace, a long lateral rail guide ensures an effective stabilization of the knee joint.





Post-Tibial Plateau Fracture Support

Brace support to stabilize the knee joint after a tibial plateau fracture and valgus residual instability after a fall. The patient can take care of her household and personal needs once again with the support and the leg's malalignment is reduced by the K-COM knee brace.

After falling down the stairs, the patient suffered a fracture of the tibial plateau, which was operated on. A K-COM knee brace was made use of to compensate for the post-operative residual malalignment.

Special provisions

Patients with complex deformities often cannot be adequately provided with off-the-shelf orthoses due to anatomical conditions such as body measurements and shapes. This is where the advantages of an individual and high-quality orthopedic aid become apparent. For more effective correction of the deformity, taking into account the volume, a combination of materials made of flexible plastic and stable carbon fiber can also be sensible. In addition, the orthosis design should be adapted to the anatomy and diagnosis of the individual. This allows for functional and comfortable orthosis care.

On the left: A special joint effectively brings the knee into extension.

On the right: An additional foot part ensures a reliable and slip-free fit of the knee orthosis.

Anterior Cruciate Ligament Support

Thanks to the partial re-sectioning of the medial meniscus in connection with a not so optimally placed anterior cruciate ligament replacement, the knee joint needs to be upheld in an even more effective manner and the lateral compartment should be relieved as much as is possible. The bilateral version effectively stabilizes the joint in a manner contributing heavily against rotational residual instability. In addition, the medial meniscus area is also relieved by the 3 point correction principle.

Non-optimal positioning of the implant (circular) with a constantly recurring instability.

Thanks to a functional designing of the locking system, the K-COM knee brace enables an optimal range of movement freedom, especially when bending over, which is very important when conducting sporting activity.

Rotational Instability Support

A 55 year old patient who has been operated on several occasions with a constantly recurring instability refuses a further operation and would like to be further treated conservatively via a knee brace. The former competitive sportsman is assisted by the K-COM knee brace and the anterior drawer is dependably avoided during sporting activity. The K-COM corrects the malalignment by establishing lateral pressure at the height of the joint line and serves for medial relief.

In addition to a continual residual instability, the patient also displays a distinct varus gonarthrosis (circular).

Anterior Cruciate Ligament and External Meniscus Support

When there's a combination of injuries involving the anterior cruciate ligament, meniscus, and collateral ligament structures, we make use of the bilateral version. This consists of thigh and lower leg semi-circular support and, thanks to the extensive support, achieves an app. 20% improvement of the guidance and rotational stability over the ACL version. More importantly, it achieves a stabilization advantage for active patients with gonarthrosis.

The ACL version (yellow/right) is the standard version of support for anterior cruciate ligament ruptures. The bilateral version (red) consists of semi-circular thigh/lower leg support and is used in the case of a combination of injuries.

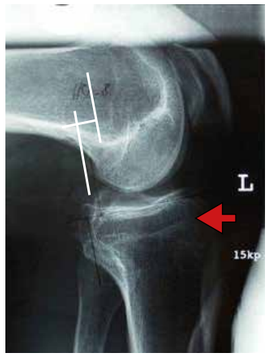
Gonarthrosis Support

A 40 year old patient who has been operated on several times displaying distinct varus gonarthrosis. Due to several accident-related traumas, she refuses a further operation and would like to be taken care of conservatively with a knee brace. The former competitive athlete receives unilateral relief from K-COM and with that, is sufficiently supported. She can continue to conduct her job as a ski instructor.

Distinct varus gonarthrosis suffered by a 40 year old athlete.

Posterior Cruciate Ligament Support

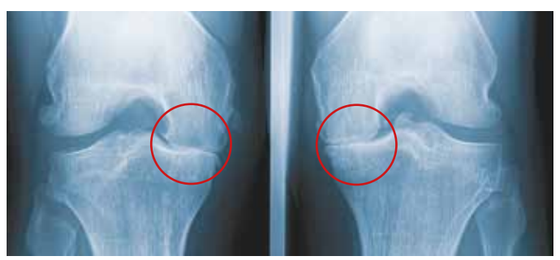
For an injury to the posterior cruciate ligament, a dorsolateral stabilization (instability towards the rear/outwards) becomes extremely important. In addition, the posterior drawer must be effectively avoided, since otherwise heavy knee joint and cartilage damage can occur in the course of time. Through just the right fitting of the K-COM knee brace and the posterior socket on the lower leg, this can be optimally achieved.



Through a rear lower leg socket and the joint-tight strap in the bending area, the rear drawer effect is effectively avoided and a dynamic lower leg feed rate is promoted.

Dual-Sided Support

Dual-sided, distinct varus gonarthrosis in a 59 year old patient, who currently refuses operative measures such as corrective osteotomy. For bodily activity, he uses knee braces to establish an axis correction and relief. For a more effective correction of the varus positioning, we have made use of a bilateral K-COM version for this case.



Support
Motocross / Offroad

The knee brace is also used to prevent knee injuries, especially where falls are inevitable.
It is used acutely after cruciate ligament rupture, operations or old injuries.

The benefits:

- A specially developed kneecap protector for offroad sports is easily fixed to the brace (small photo on the right)
- Fits perfectly under the motocross pants or a supermoto leather suit

Support
Ski

Knee injuries are at the top of the injury statistics of the International Ski Federation (FIS) in the Ski World Cup. The consequences, such as a torn cruciate ligament, are far-reaching for the athletes: surgery, months of follow-up treatment, the hard struggle to compensate for the loss of training and to regain competitive form.

The benefits:

- The length of the lower leg shell is matched to the height of the ski boot
- Exactly adapted to the anatomy of ski racers (e.g. with pronounced thigh musculature)

Support
Ice hockey

For ice hockey players, the knee joints are their capital. Injuries in this area often set athletes back months or end their careers overnight. The K-COM knee brace specifically protects this complicated joint with its stable carbon fiber construction and ensures a quick „return to sport“ even after an injury such as a cruciate ligament rupture.

The benefits:

- Due to the thin design, the K-COM does not wear and does not hinder during sprints or abrupt changes of direction
- Designed for the goalie in a modified version that does not restrict the butterfly position

Support
Mountainbike / Downhill

A custom-made carbon fiber brace for mountain biking must neither press nor slip.
Regardless of whether mountain biking, downhill, BMX or riding on single trails - the knee must remain stable.

The benefits:

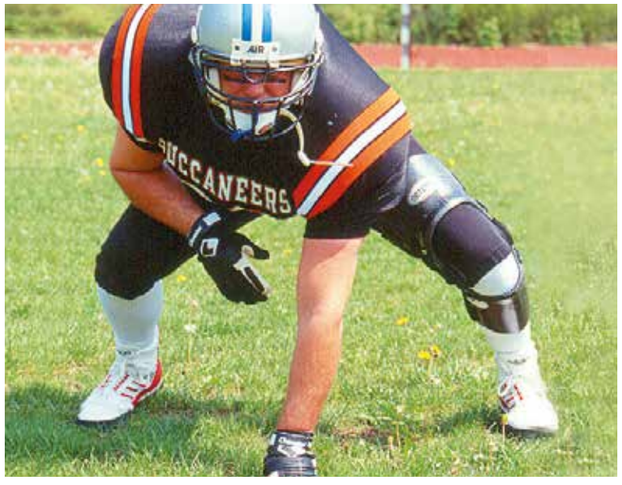
- The knee is relieved and guided from the outside by means of a perfectly fitting brace
- Stabilizes the knee joint over a longer period of time and serves the user for safe driving in both hobby and professional use

Support
American Football

This intense team sport involves very high stresses due to physical contact, which often results in injuries to the knee joints. The speed, long levers and dynamics of this sport place particular demands on knee brace designs.

The benefits:

- Titanium joint bars are molded in high-strength car bon fiber to withstand the great stresses of this sport
- Adapted to the larger muscle volume well trained football player



Support
Kitesurfing/ Wakeboard

People often underestimate the stress involved in surfing, wakeboarding or kiteboarding, because enormous loads are placed on the knee joints and their structures when they hit the water surface. Associated injuries to the cruciate ligament, collateral ligament or meniscus structures prevent surfing for the athlete.

The benefits:

- Sits absolutely stable and non-slip on or under the wetsuit
- Can also be used in salt water without any problems

The innovative knee orthosis concept for prevention in ski sports

PrävenThese

The facts

In downhill racing, athletes reach speeds of up to 150 km/h. In addition, high-tech materials allow ski racers to ski at the absolute limit - and beyond. This also applies to the stresses on tendons, ligaments and bones. No wonder that the knee joint is the most affected body region in the international FIS Ski World Cup, accounting for around 36% of all injuries. In the 2017/18 season alone, several athletes from various national teams suffered a cruciate ligament tear even before the Olympic Games in South Korea.

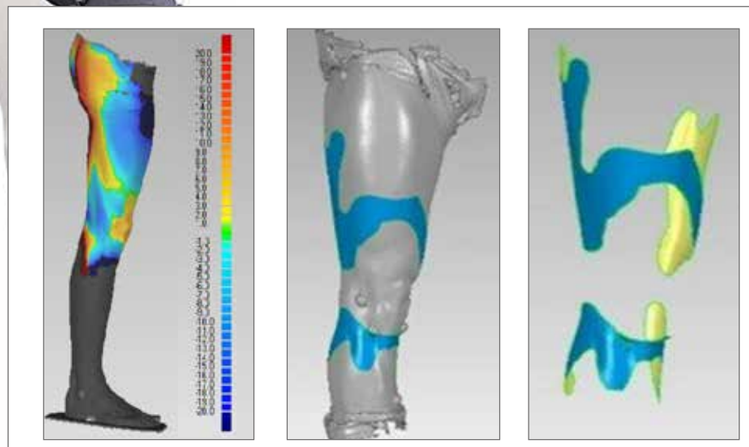
The challenge

How can the knee joint be effectively protected without limiting the athlete's performance at the same time? This challenge was taken up by a project group funded by the German Federal Institute for Sport Science (BISp) and coordinated by Münchner Innovationsmanufaktur GmbH. In addition to sports scientists from the DSV and physicians from the Technical University of Munich, experts from the Bavarian Olympic Training Center and engineers from Phoenix GmbH, the panel of experts also included experienced orthopedic technicians from ORTEMA. Within 18 months, the project group developed an innovative knee brace concept tailored to the needs of alpine skiing - the **PrävenThese.**

The 3D cut of the PrävenThese combines fit, stabilization and freedom of movement.

Individual in every detail

A novel carbon knee orthosis was designed with polycentric titanium joints that stabilize the knee joint without restricting movement. By means of several 3D surface scans in different angular positions of the knee joint, zones on the upper and lower leg can be calculated that show the least possible change in volume and shape during muscle activity. The carbon frame of the PrevenThese follows these support surfaces when it is individually cut. This means that muscle contraction is not affected despite stabilization of the knee joint.
The **PrävenThese** combines the proven protection principle of an individually manufactured knee brace, such as the tried-and-tested ORTEMA K-COM knee orthosis, with a new concept of connection to the leg that offers not only maximum protection but also outstanding wearer comfort.



3D surface scans show the areas with the least changes in volume and shape (image left).

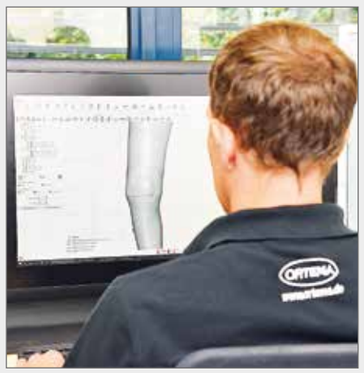
The 3D cut is calculated with the scan data and is needed for the frame design.

Return to Sport

PrävenThese enables injured athletes to return to their sport-specific training sessions after a short time, which has been scientifically documented in various test series. Here, a double-sided fitting with preventive stabilization of the uninjured opposite side seems to make sense.

Manufacturing of the PrävenThese

1. **The 3D surface scan in different angular positions of the leg with set marker points forms the basis for calculating the frame design of the knee brace.**



2. **The acquired scan data is modeled on the screen.**

3. **The milling process is prepared on the screen and the appropriate blank is selected.**

4. **The titanium joint bars are laminated into the carbon construction.**

5. **The PrävenThese fits perfectly even in the downhill position.**

IPOMAX
Customized KNEE BRACE

Indications:
- Anterior cruciate ligament injury
- Rupture to the collateral ligaments (medial collateral ligament/lateral collateral ligament)
- Meniscus injury and refixation
- Injury to the capsular ligament
- Cartilage reparations
- Early function stabilization

Area of use:
- Post-operative
- Post-traumatic
- Immediate support for a limited period of time (max. 6 months)

Biomechanical function:
Knee brace made of thermoplastic malleable synthetics. These braces can be warmed up and retrofitted several times for post-operative swelling (after an OP) or muscle atrophy (loss of muscle mass) as well as to be adjusted in accordance with growth. After cooling down, the brace remains stable in the formed leg geometry.

Sizes: (right and left)
Adults S / M / L Children XS

Prescription:
A customized synthetic knee brace.

- Stabilization of the knee joints with a light frame construction according to the 3 point principle
- Extension and flexion can be adjusted independently
- Malleable thermoplastic thanks to a novel synthetic
- Available in 4 sizes (also in children's sizes) for the right and left leg

Synthetic
models

Indications:
- Anterior cruciate ligament injury
- Rupture of the collateral ligaments (medial collateral ligament/lateral collateral ligament)
- Meniscus injury and refixation
- Injury to the capsular ligament
- Cartilage reparations
- Early function stabilization

Ideal for children and adolescents: The synthetic knee brace can be retrofitted very easily and adjusted to a person accordingly as they grow.

Area of use:
- Post-operative
- Post-traumatic

Biomechanical function:
Knee brace made of thermoplastic malleable synthetics. These braces can be warmed up and retrofitted several times for post-operative swelling (after an OP) or muscle atrophy (loss of muscle mass) as well as to be adjusted in accordance with growth.

Prescription:
A synthetic knee brace based on a plaster cast or 3D scan.

Adjusted quickly and easily

Warmed up with hot air

Deformation in the plastic state

Adjusting on the leg

Function test on the patient

Version: 09/2024

1 **ORTEMA - Orthopedic-Technology, Medical Supplies & Sport Protection**

2 **OKM - Orthopädische Klinik Markgröningen**
Specialized clinic for Sports Orthopedics, Endoprosthetics, Neuroorthopedics and Handsurgery, Conservative orthopedics and Pain Therapy

3 **ORTEMA - Rehabilitation & Therapy, Medical Fitness & Health**

P P **Parking spaces directly in front of the main entrance and in the parking garage**

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- *Orthotics*
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- *Sports orthopedics*
- *Research & Development*

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- *Bike*
- *American Football*
- *Riding*
- *Handicaped sports*

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