ORTEMA

K COM by ORTEMA

The Intelligent Knee Brace Concept

The intelligent K-COM knee brace concept

Alone in Germany, over 100’000 patients suffer from injuries to their anterior cruciate ligament every year. In addition, a considerable amount of people tear their posterior cruciate ligament or display a number of other knee injuries or signs of wear and tear such as arthrosis. The anterior cruciate ligament, which serves as the central stabilizer, is the most commonly injured ligament in the knee joint.

Dr. med. Jörg Richter

The gravity of the injury, which used to simply and insufficiently be considered a strain, is now more commonly diagnosed by a modern procedure. Without the anterior cruciate ligament, a knee joint wears down at a considerably quicker pace. Just five years after an anterior cruciate ligament injury, over 80% of patients suffer from painful meniscus injuries and the beginning of arthrosis. If no operative stabilization is possible, the knee joint can be protected by ortheses, better known as braces.

Since the treatment of knee injuries is an absolute focal point of the medical treatment in sports orthopedics at the Orthopedic Clinic of Markgröningen (OKM - Orthopädischen Klinik Markgröningen), it is important that the post-operative and conservative orthopedic care and support is offered at the highest level at our center for arthroscopy and special joint surgery.

Hartmut Semsch

As a result of the indication-dependent model selection and our individual manufacturing techniques, the K-COM knee brace presents the most comprehensive support and provision concept for stabilization when caring for the knee joint.

Through the intensive cooperation with specialized medical experts, physiotherapists, and athletes, it has been possible to develop a truly new support and provision concept for the knee joint. It is something that is particularly convincing for our patients, which is established thanks to the optimal stabilization of the knee joint at a minimal weight and maximum wearing comfort. All the while, we continue to further develop the K-COM concept. It has established itself incredibly in recent decades and is used by many well-known physicians for care and support with the most demanding of injuries and knee-instabilities.

Dr. med. Jörg Richter,
Chief Physician of the Clinic for Sports Orthopedics and Arthroscopic Surgery,
Orthopedic Clinic of Markgröningen

Hartmut Semsch,
CEO of ORTEMA GmbH,
Master of Orthopedic Technician

K COM by ORTEMA

KNEE BRACE

Constructed with carbon-fiber and titanium

Made in Germany
by ORTEMA GmbH

The individual knee brace that you just don’t feel while working, living, and playing.

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ORTEMA

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The joint braces are laminated in an extremely solid yet light carbon-fiber construction.

The trim lines of brace sections are determined individually and dependent on the exact indications.

The inflection and extension limitations can be assembled independently of each other.

Testing and controlling the brace results on the treadmill.

There are many reasons to choose K-COM

The idea of developing our own knee brace was born right at our company over 25 years ago. The reason: Insufficient options for care and support offered by other knee braces.

As such, all of our experience has been flowing into the permanent further development of the K-COM concept. This most particularly applies to the use of our braces by serious and professional athletes. This requires our K-COM knee braces to have to pass the test of extreme workloads. To ensure this, we make use of high-tech materials such as high-strength carbon fibers and low-wear titanium braces as well as the most modern manufacturing techniques.

All this experience and the constant improvements help wearers on a daily basis. This has been shown by above-average positive feedback from our patients. Clinical studies with over 2'000 evaluated questionnaires in the span of a ten-year overview clearly indicate these results. Most noteworthy are the excellent results achieved by Gonarthrosis treatment for axle malpositioning.

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.

Test winner
The K-COM was awarded first place comparing 14 of the most commonly used knee braces.

Out-of-House production

Our service for established doctors and medical establishments:

Take part in taking care of *your* patients with the proven ORTEMA technology

Let us manufacture a K-COM knee brace according to your needs and specifications at our establishment. We'll happy work together with your orthopedic technician or your establishment. For this, we only need a plaster cast of the patient's leg. Within ten work days (plus shipping time), your orthopedic technician will receive the test-ready K-COM knee brace. This is allows you to offer your patients the proven ORTEMA K-COM knee brace care and support at the highest level. Are you interested in this type of service?

Then feel free to call us, send us a fax or write us a mail:

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In recent years, the number of ligament injuries taking place in the knee joint has increased heavily. These injuries result primarily from sports injuries and everyday accidents. Through rotations made while falling, a number of combined injuries such as hyperextension or tear to the ACL with injuries to the medial collateral ligaments and/or the meniscuses occur.

If the ACL is torn, then the knee joint is unstable. To avoid arthrosis, an unstable knee joint needs to be operated on, especially with younger patients and athletes. For long-term joint instability, this is where a K-COM knee brace enters the picture.

Also, knock-kneed and bowlegged axis deviations in legs can be corrected with a K-COM knee brace (version 'Valgus' or 'Varus') and relieve the overstrained joint section.

The posterior cruciate ligaments, gonarthrosis treatment and dual-sided support measures present special demands leading to more precise forms of support.

Missing cartilage (in the circle) showing advanced gonarthrosis: A K-COM knee brace corrects the positioning of the leg, releasing the articular surface and stabilizes the knee.

5 Steps to K-COM service

Prescription

1. Your orthopedic technician has the opportunity to have a K-COM knee brace be manufactured individually according to your specifications and based on a plaster cast of your leg.

Plaster cast

2. To make this possible, he/she creates a plaster cast of the patient leg and sends it to ORTEMA.

Shipment of plaster cast to ORTEMA

Manufacturing at ORTEMA

3. We create a cast model and design the K-COM knee brace according to your indication and the latest technical criteria.

Delivery time: 10 work days plus postal mail

Shipment of K-COM to medical establishment

Adjustment

4. Afterwards, the test-ready K-COM knee brace is sent to your technician, who then tries it on you and finished up the final details.

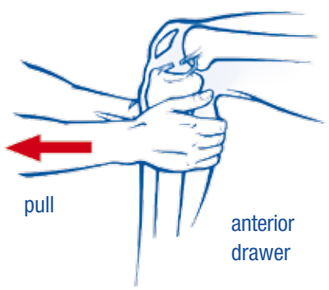
Inspection

5. You have the opportunity to check the function. With all this, you can make use of the high value, individually manufactured K-COM knee brace care and support right at your very own orthopedic establishment.

K-COM Versions

The K-COM system overview: innovative & individual

Version **ACL**

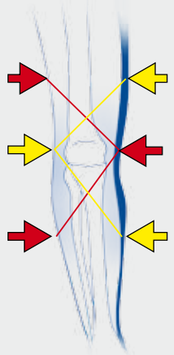


Indication:
- Anterior cruciate ligament injury
- Meniscus injury and refixation
- Injury of the capsular ligament
- Cartilage reparations
- Early functional stabilization

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 for the permanent support in the version 'ACL'.

Version **Bilateral**

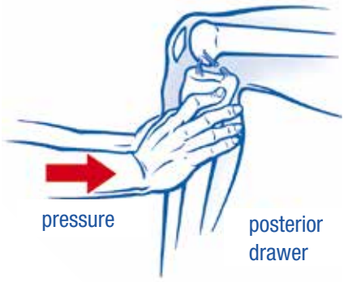


Indication:
- Anterior cruciate ligament injury
- Rupture of the collateral ligaments (medial/lateral collateral ligament)
- Meniscus injury and refixation
- Injury to the capsular ligament
- Cartilage reparations
- Early functional stabilization
- Knee endoprosthesis

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 for the permanent support in the version 'bilateral'.

Version **PCL**

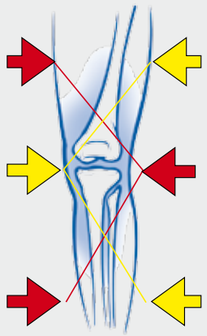


Indication:
- Rupture of posterior cruciate ligament
- Combination injury with participation of the posterior cruciate ligament

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 for the permanent support in the version 'PCL'.

Version **Geriatrics**

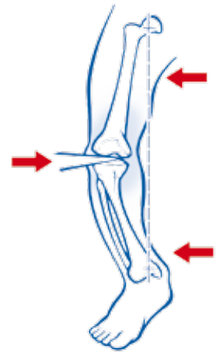


Indication:
- Knee joints arthrosis
- Pangonarthrosis
- Genu recurvatum

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 for the permanent support in the version 'geriatrics'.

Version **Varus**

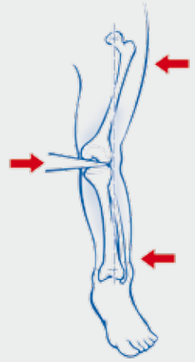


Indication:
- Varus gonarthrosis with axial malalignment

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 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 for the permanent support in the version 'valgus'.

Motocross / Off-road Support

The knee brace is made use of right where crashes are pre-programmed so as to avoid knee injuries, but is also used after tears to cruciate ligaments, operations or arthrosis. The perfect fit, the light weight, the optimal stability, and most especially its slip resistance is praised by amateurs and pros alike. The thin development guarantees a yet unmatched level of wearing comfort both under the motocross pants and under a supermoto leather combination. This allows for the knee joints to be protected or stabilized after an injury. For off-road sports, a specially designed knee cap protective piece is easily attached to the brace.

The patella protector can be adapted to every K-COM brace.

The functional legging should be worn under the knee brace.

Ski Support

For the International Ski Association (FIS), knee injuries are at the top of the list when it comes to injury statistics at the Ski World Cup. The consequences such as a tear of a cruciate ligament are extensive for athletes: Operations, month-long post-injury treatment, the hard battle to compensate for the loss of training, and to establish the form of competition. After injuries of this nature, K-COM knee braces are regularly made use of to stabilize the knee joints. What's important here is that the anatomy of the athlete's leg be precisely determined and the knee brace is optimally adjusted to it. As part of the fitting procedure, the length of the lower leg shells is coordinated to the height of the skiing boot to ensure that the knee brace does not inhibit the user.

Ice hockey Support

For ice hockey players, knee joints are their capital. Injuries to this part of the body can set an athlete back for months or even end a career overnight. Thanks to its very stable carbon-fiber materials, the K-COM knee brace protects this complicated joint in a targeted manner and allows for an athlete who has suffered an injury such as an ACL tear to return to action quickly. The K-COM knee brace has grown in popularity as a piece of protective equipment , since it's hardly noticeable under the equipment and doesn't prevent a player from playing this extremely fast team sport in any way. For a goalie, the K-COM knee brace can be designed in a lightly modified manner, a version known as the butterfly model.

Mountain bike Support

An individually manufactured carbon-fiber brace for mountain biking cannot create pressure nor can it afford to slide up and down the leg. Independent of whether mountain biking, riding downhill, BMXing or riding across terrain – a knee must be stable. After a tear to a cruciate ligament, an operation or arthrosis, the knee joint should be supported and relieved from the outside by a perfectly fitted brace. Excellent wearing comfort, a thin development, and a slip-and-slide-free wear are the attributes required for bike riders to be able to wear knee braces. With that, joints can be stabilized over a longer period of time, but also be protected and serve to ensure the user a safe journey both in the field of hobby and pro biking.

American Football Support

In this intensive team sport, knee joints often suffer injuries. The speed, the long joint lock, and the dynamics of this sport demand a lot of a knee brace construction. For this, titanium joint braces are casted in high-strength carbon-fiber to live up to the needs and demands of these athletes. With that, the athlete's performance may not be delimited by the knee brace. Optimal wearing comfort, a slide-resistant fit, and the protection of the joints from one or more renewed injuries are the prerequisites that have to be fulfilled. In addition, the volume of muscle possessed by the well-built athletes places a high demand on the orthopedic technicians.

Kitesurfing / Wakeboarding Support

Often underestimated is the strain incurred when surfing, wakeboarding or kiting, as these activities are extremely demanding of the knee joints and their structures when colliding with the surface of the water. Injuries caused by this to the cruciate ligaments, collateral ligament- and meniscus structures have an incredibly delimiting effect on the athletes. For this reason, the use of very well-fitted knee braces that can be worn on the leg without sliding around or worn under the wetsuit so as to stabilize the knee joint have increased considerably. With the K-COM, many pros and dedicated hobby water sport athletes can once again take high leaps and do bold tricks.

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.

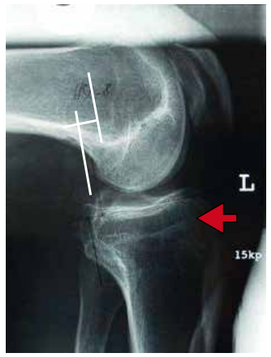
Gonarthrosis Support

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.

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.

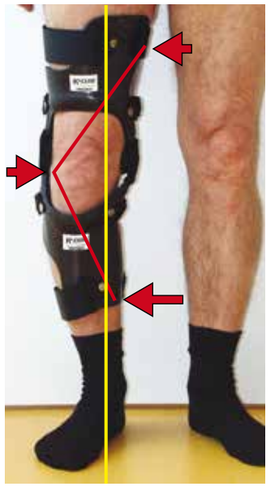
The knee braces guide the joint and relieve the rotational movements. The patient wears the brace during physical strain and when playing sports (Alpine skiing).

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.

Foot Section Support

If there are very voluminous leg formations with strong conical outlines, a corresponding foot section can be adapted for a slide-free positioning of the K-COM knee brace. This can be applied medially or laterally. The position is determined individually. For a peronaeus paralysis, the foot section can be designed in the form of a peronaeus brace.

New preventive concept for skiing sports

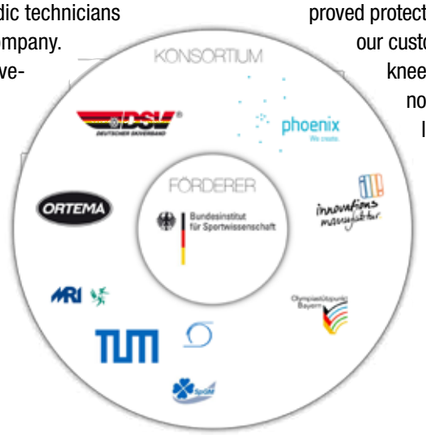
PrävenThese

In the international FIS Ski World Cup the knee joint is the most frequently injured body region with a share of 36%. A project group which is supported by the German Federal Institute for Sports Sciences (BISp) and coordinated by the Munich InnovationsmanufakturCorporation is made up of scientists and physicians of the Technical University Munich, experts of the Bavarian Olympic base in Munich, engineers of the Phoenix Corporation such as Orthopaedic technicians of the ORTEMA Company. This group has developed a new knee brace concept – the PrävenThese.

The aim was to develop a brace system that does not impede the (pro) athlete`s subjective perception, offers optimal protection for the knees and is additionally attuned to meet the requirements of alpine skiing.

A novel Carbon knee brace with polycentric Titanium joints was constructed which stabilizes the knee without restricting movement.

The PrävenThese combines the well-proved protective elements of our customized K-COM knee brace with a novel concept of linking a brace to the leg.



Developed by scientists, physicians, engineers and Orthopaedic technicians

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

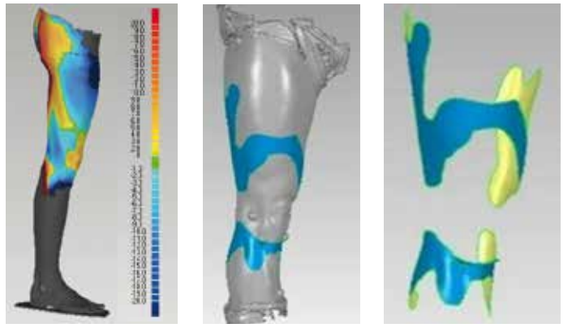
Stefan Luitz, National-kader DSV

Individual to the smallest detail

By performing 3D surface scans in different angles of the knee joint zones can be calculated on the thigh and lower leg which show little change in volume and shape when undergoing muscular activity. The cut of the PrävenThese´s Carbon frame follows the individual lines of these supporting areas. By doing this the muscular contraction is not impeded despite the stabilization. The brace can be fitted to additionally prevent slipping with specifically designed compression sports pants (Lones-pants). Due to the individual 3D customization a new way of fitting and fixing a brace to the leg has been developed which offers a maximum of safety combined with excellent wearing comfort. Modelling the leg requires us to perform surface scans to calculate the Anovocs (frame design) such as a plaster cast of the leg.

Return to Sport

The PrävenThese enables injured athletes a short-term return to their sports specific training which has been verified scientifically in different test series. Here a bilateral bracing with preventive stabilization of the non-injured side seems to be sensible.



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.

Manufacturing of the PrävenThese

1. 3D surface scan of the leg in different angularity is the basis to compute the Anovocs.

2. The 3D surface scan of the leg in angularity with the positioned markers.

3. The plaster cast is the most accurate method to copy the leg. Anatomical features are covered to 100%.

4. The perfect fit of the brace requires individual positioning of the centre of motion and exact manual modelling.

5. The joints are made of Titanium. These are manually integrated in the extremely tough but light carbon-fibre construction.

6. The PrävenThese is fitted by experienced orthotists and adapted to meet the individual needs.

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.

IPOMAX Customized 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

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.

Adjusted quickly and easily

Warmed up with hot air

Deformation in the plastic state

Adjusting on the leg

Function test on the patient

Stand: 05/2015

1. **ORTEMA - Orthopedic-Technology, Medical Supplies & Sport Protection**
2. **OKM - Orthopädische Klinik Markgröningen**
   Specialized clinic for Sports Orthopedics, Endoprosthetics, Neuroorthopedics and Hand-surgery
3. **ORTEMA - Rehabilitation & Therapy, Medical Fitness & Health**

ORTHOPEDIC TECHNOLOGY	REHABILITATION & THERAPY	MEDICAL FITNESS & HEALTH	SPORT PROTECTION
- Orthopedic shoes	*- Ambulatory rehabilitation*	*- Medical Fitness*	*- Development*
- Insoles	*- Physiotherapy*	*- Health courses*	*- Protection & prevention*
- Bandages	*- Ergotherapy*	*- Aqua fitness*	*- Motobike*
- Spinal braces	*- Medical training therapy*	*- Operational health management*	*- Hockey*
- Prosthetics	*- Rehabilitation sports*	*- Performance diagnosis & training plan*	*- Skiing*
- Orthotics	*- Follow-up treatment*	*- Wellness massages*	*- Ball sports*
- Knee braces	*- Exercise pool*		*- Bike*
- Sports orthopedics			*- Handicaped sports*

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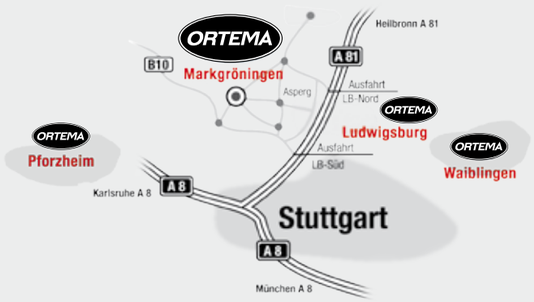
edirtarenaWest powered by KTM
53619 Rheinbreitbach / Nähe Bonn



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