

A woman with dark hair tied back is running on a paved path. She is wearing a blue long-sleeved shirt, light-colored shorts, and black running shoes. She has a white and blue knee brace on her right knee. The background shows a grassy area with trees and a utility pole.

GenuTrain®

For better movement.

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- Alleviates knee pain
 - Relieves the knee
 - Improves the gait*

GenuTrain's double strategy

Musical knees

Very few people know the effect of supports on motion sequences as well as Prof. Dr. med. Albert Gollhofer. Although the results confirmed his assumptions, the head of the Institute of Sport and Sport Science at the University of Freiburg was still surprised by what the current study revealed.

Biomechanics were the main focus of the cross-sectional study. Why?

Prof. Dr. Gollhofer: The laws of biomechanics are the foundation of every movement. Going against them can lead to chronic complaints. People with typical bandy legs (extra-large varus angle) are very likely to develop medial compartment osteoarthritis. The higher knee adduction angle places more strain on the medial joint segment than on the lateral segment. When you succeed in straightening the knee with the help of a support to regain a symmetrical gait pattern, you can slow down the development of deformities.

How can a support influence the gait?

Prof. Dr. Gollhofer: One way is through its proprioceptive effect. That is, through the mechanical stimuli it exercises on the soft tissue during movement. This creates feedback which is sent to our central nervous system and causes the muscle actions to change. The aim is a functional result. In the present case, the magnitude of the effect surprised me, although I was aware of the potential of the GenuTrain due to previous studies.

Proprioception requires the relevant receptors to be stimulated. There are many of these in the joint, the connective tissue, the muscles...

Prof. Dr. Gollhofer: We are concentrating on the mechanoreceptors. These are mainly located in the muscles around the knee and in the capsular ligaments. We play these proprioceptors together like an orchestra and "a good sound" is created when they coordinate the muscle contraction process appropriately and functionally. Injuries can cause particular problems at this point, however. We know that pain is conducted via the pathways of what we call group III afferents. These pain pathways strongly disturb the "good sound," the rapid intermuscular interaction. Yet if we can improve the guidance of the joint by using supports, these afferents will send fewer



Prof. Dr. med. Albert Gollhofer, Albert Ludwig University of Freiburg.

signals, which restricts the pain. And this has an immediate effect on the gait.

To what degree are these rapid reactions only psychological?

Prof. Dr. Gollhofer: Only to the extent that the central nervous system knows: I am not alone. Reflexes in the peripheral areas are constantly regulating muscular control, every fraction of a second. This can be seen in the leg swing and stance phases, for example. Even before the body weight bears down, that is at the end of the swing phase, neuromuscular control ensures that the leg extensors are pre-activated in order to immediately provide for the necessary stability in the stance phase.

“This cross-sectional study proves that the GenuTrain has cross-joint effects.”

(Prof. Dr. med. Albert Gollhofer)

This also involves the ankle...?

Prof. Dr. Gollhofer: Of course, the ground reaction vector works from below. If the force is incorrectly introduced into the system, the possibility of counter-reactions in the knee is decreased, which is even worse further above. A stable gait comes from the bottom up. It makes sense to think about a bottom-up strategy using an ankle orthosis together with the GenuTrain, for example, for general instabilities. This cross-sectional study proves that the GenuTrain has cross-joint effects. The biomechanical influence of the support on the knee joint also causes significant changes to the hip.

Can the results of the study actually be transferred to real situations?

Prof. Dr. Gollhofer: When you measure specific effects in laboratory conditions, you ask yourself: How long will the effect last in everyday life? That’s exactly what we are trying to establish with a long-term GenuTrain study. Of course, we also know that all externally introduced changes to ingrained conditions will encounter a biomechanical state that has been established over years.

The original on the knee: GenuTrain

Shaping functionality

The active support consists of an anatomically-shaped compression knit with a ring-shaped, functional cushion, the Omega pad. The pad relieves pain by transferring the therapeutic pressure of the support from the kneecap to the soft tissues of the knee region. Two nubs on the lower edge of the pad, the Hoffa pads, exert regulated pressure on the infrapatellar fat pad and stimulate the sensorimotor receptors located there. This supports the pain-relieving effect. Furthermore, direct pressure on the kneecap is relieved. The lateral wings of the pad form an omega symbol (Ω). Their role is to ensure that the meniscus parts are held in an anatomical position, which also reduces pain.

Secure hold for the knee joint

When walking or running with the GenuTrain, the muscular contractions cause the pressure exerted by the support to increase and decrease, resulting in an effect similar to an intermittent compression massage. This stimulates the metabolism and helps reduce swelling and effusions of blood more quickly. In addition, wearing the support stimulates the proprioceptors in the soft tissue of the knee and on the skin. The surrounding muscles are activated and long-term stabilization for the joint is achieved.

High level of comfort

The material and shape of the GenuTrain knee support have a functional design for



GenuTrain: Active support for relief and stabilization of the knee.

optimal effect and a high level of wearing comfort. The breathable, skin-friendly knit adapts to your every movement, without constricting or slipping. The material is soft and elastic at the edges of the support and in the sensitive area at the back of the knee. Lateral spiral stays ensure that the knee support keeps its shape during movement. Integrated donning aids make the supports easy to put on with little effort. ➤

A patient who has an extreme varus deformity in the knee joint has adapted to a specific pattern with their ligaments, muscles and tendons. We can’t change that all at once. Patterns of movement and long-term adaptations in the soft tissues can only be coupled to new conditions over a long period of time. We also expect this from a support system.

Ideally, the long-term study will show that constantly wearing the support over a long period of time causes the tendon and muscle lengths to return to a biomechanically balanced state. This would convince patients in everyday life. The initial results of our long-term study actually seem to confirm this type of effect. ➤