

Scientific Summary – Latest news from science

## Use of a knee support shows an immediate positive effect in patients with patellofemoral pain syndrome

Kölle et al. Immediate effects of an elastic patellar brace on pain, neuromuscular activity and knee kinematics in subjects with patellofemoral pain. Arch Orthop Trauma Surg 2020;140(7):905-912.

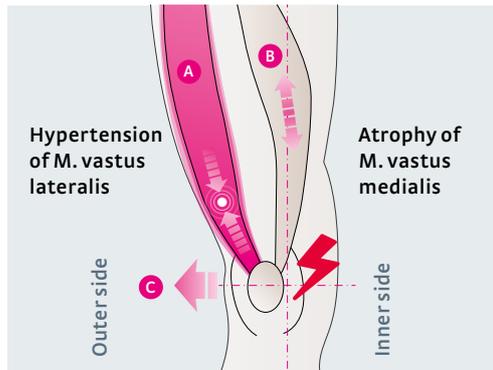
#03

# Knee supports have an immediate effect on pain, neuromuscular activity and knee kinematic in patients with patellofemoral pain syndrome

Patellofemoral pain syndrome (PFPS) is a collective term for pain in the anterior part of the knee joint that is experienced e.g. while jumping, running, and climbing stairs. It has been demonstrated that 46 % of all knee injuries are due to PFPS.

The overall prevalence of PFPS is approx. 23 %. Women are more affected than men.

The impact of PFPS on people affected is massive because it prevents them from doing pain-free sport activities, other physical activities as well as job-related work.<sup>1-3</sup>



- A** Hypertension of M. vastus lateralis
- B** Atrophy of M. vastus medialis
- C** Lateralization of patella  
→ Perception on joint pain

The pathomechanism of PFPS is not yet conclusively defined, but Wilson et al. demonstrated in a clinical study that a patellar lateralization can be observed due to muscular dysbalance in patients with PFPS that might trigger the anterior knee pain.<sup>4</sup>

Further, it was shown that a reduced activation as well as an atrophy of the M. vastus medialis occurred in these patients.<sup>5,6</sup>

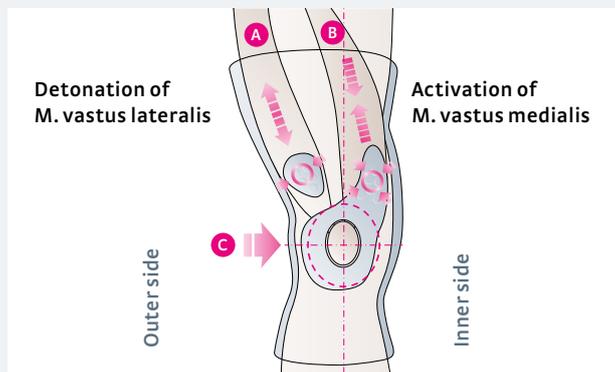
Fig. 1: Pathomechanism of patellofemoral pain syndrome (schematic diagram, ventral view, right leg)<sup>3-5</sup>

## Overview of the clinical trial<sup>7</sup>

In a randomized, controlled trial, Kölle et al. demonstrated the positive effects of the **knee support Genumedi® PT** on the parameters pain, neuromuscular activity as well as knee kinematic.

Patient baseline characteristics	
	<b>50 patients with patellofemoral pain syndrome</b> ♂ n=21 / n=29 ♀ Age: 24.0 ± 3.5 years
Inclusion criteria	Exclusion criteria
<ul style="list-style-type: none"> <li>• Pain &gt; 3 months</li> <li>• Pain during at least one of the following activities: prolonged sitting, squatting, jumping, stair ascent / descent, kneeling, or running</li> </ul>	<ul style="list-style-type: none"> <li>• Surgery of the lower extremity or an injury of the knee joint in the past 12 months</li> <li>• Rheumatoid, neurological, or degenerative diseases</li> <li>• A past history of patellar dislocation or with structural changes / abnormalities of the patellofemoral joint</li> </ul>
Endpoints	Results
<ul style="list-style-type: none"> <li>• Changes in perceived pain</li> <li>• Changes in neuromuscular activity</li> <li>• Changes in knee joint angle</li> </ul> <p>  <b>during the following activities – in each case performed intraindividually WITH or WITHOUT knee support Genumedi® PT:</b>                      ascending and descending stairs, hopping, standing up from and sitting down on a chair, and walking on a treadmill                 </p>	<p><b>WITH the knee support Genumedi® PT it appeared...</b></p> <ul style="list-style-type: none"> <li> ...a <b>significant pain reduction of 33 – 56 %</b> during all activities.</li> <li> ...a <b>significant earlier onset of M. vastus medialis by about 56 ms</b> in the subgroup of subjects activating M. vastus lateralis prior to M. vastus medialis.</li> <li> ...a <b>significant increase of the knee joint angle</b> in the sagittal plane for two activities.</li> </ul>

## Restoring the muscular balance with the Genumedi® PT knee support



- A** Detonation of M. vastus lateralis by a lateral pad
- B** Activation of M. vastus medialis by a medial pad
- C** Muscular balance, guidance of the patella, and pain reduction

Fig.2: Mode of action of the knee support Genumedi® PT (schematic diagram, ventral view, right leg)

### Authors' conclusion:<sup>7</sup>

„**Patellofemoral bracing** results in an **immediate decrease of pain**, an **earlier onset of vastus medialis** and an **inverted vastus medialis / vastus lateralis ratio** and **altered knee kinematics**.“

<sup>1</sup> Crossley KM et al. 2016 Patellofemoral pain consensus statement from the 4th International Patellofemoral Pain Research Retreat, Manchester. Part 1: Terminology, definitions, clinical examination, natural history, patellofemoral osteoarthritis and patient-reported outcome measures. Br J Sports Med 2016;50:839–843.

<sup>2</sup> Taunton JE et al. A retrospective case-control analysis of 2002 running injuries. Br J Sports Med 2002;36(2):95-101.

<sup>3</sup> Dey P et al. A questionnaire to identify patellofemoral pain in the community: an exploration of measurement properties. BMC Musculoskelet Disord 2016;17:237.

<sup>4</sup> Wilson NA et al. In Vivo Noninvasive Evaluation of Abnormal Patellar Tracking During Squatting in Patients with Patellofemoral Pain. J Bone Joint Surg Am 2009;91(3):558-566.

<sup>5</sup> Cowan SM et al. Delayed onset of electromyographic activity of vastus medialis obliquus relative to vastus lateralis in subjects with patellofemoral pain syndrome. Arch Phys Med Rehabil 2001;82(2):183-189.

<sup>6</sup> Patty E et al. Vastus medialis obliquus atrophy: does it exist in patellofemoral pain syndrome? Am J Sports Med 2011;39(7):1450-1455.

<sup>7</sup> Kölle et al. Immediate effects of an elastic patellar brace on pain, neuromuscular activity and knee kinematics in subjects with patellofemoral pain. Arch Orthop Trauma Surg 2020; 140(7):905-912.

