

SUMMARY OF SELECTED RESULTS

INVESTIGATION INTO THE EFFECT OF KNEE ORTHOSES ON THE OUTCOME FOLLOWING KNEE JOINT SURGERY

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INTRODUCTION

The use of a knee orthosis is a fixed element of the treatment regime for certain injuries affecting the knee joint and the adjacent structures, whether this forms part of conservative treatment or part of the follow-up therapy after surgery.

The stabilizing properties of a hard-frame orthosis can be used for a wide variety of indications, such as in the treatment of collateral ligament injuries in the knee joint, following meniscus repair surgery or surgery to stabilize a dislocated patella, and both prior to and following anterior or posterior cruciate ligament reconstruction.

Alongside the active principle of four-point stabilization for femoro-tibial instability, an orthosis can be fitted and worn in order to limit the affected joint's range of motion. This prevents instability, especially during postoperative management, thus safeguarding the surgical outcome. The orthosis allows for flexibility in limiting the range of motion, meaning that it can be adapted to the injury profile and adjusted as healing progresses.

Satisfying these characteristics by means of a hard-frame orthosis is a key element as regards therapeutic success and a functional outcome.

The aim of the case series was to investigate the use of the SecuTec Genu knee orthosis in conservative and postoperative therapy for knee injuries. A number of parameters were investigated, including the fit and any slipping by the orthosis, joint stabilization, and pain levels.

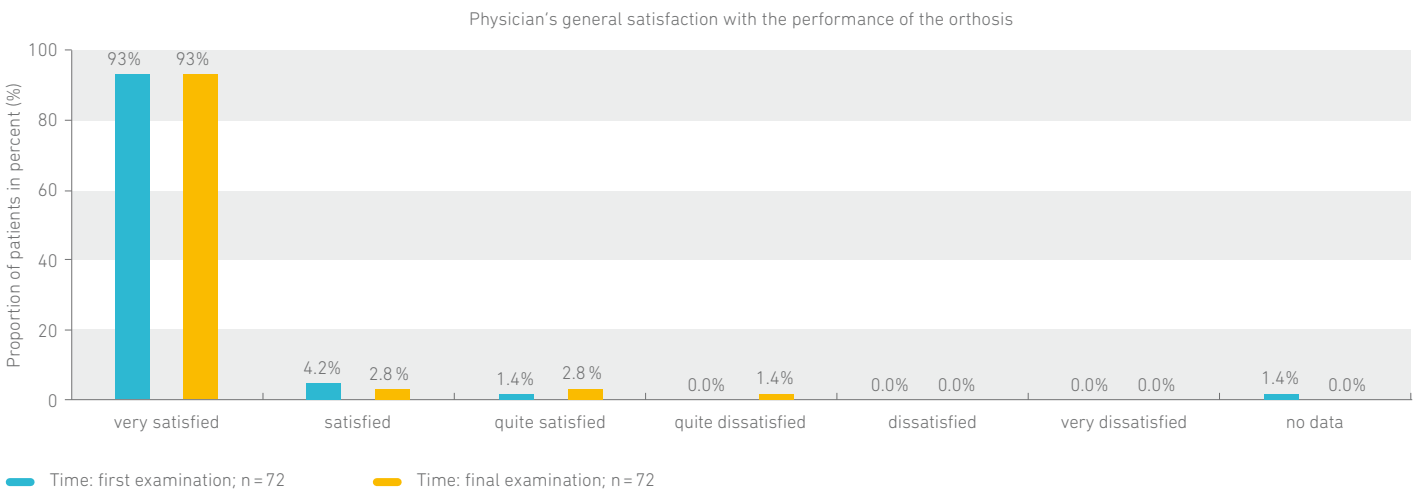
METHODS

Sample:	72 patients were given a knee orthosis (45 men, 27 women, age: 42 +- 18 years)
Indications:	27 x ACL tear, 11 x collateral ligament injury, 9 x patellar dislocation, 7 x quadriceps tendon tear, 6 x patellar fracture, 4 x instability in osteoarthritis of the knee, 3 x tibial plateau fracture, 3 x distal femur fracture, 1 x popliteus tendon rupture, 1 x instability following total knee replacement There was an almost equal division between the left and right knee.
Product:	SecuTec Genu (Bauerfeind AG)
Data collection:	December 2016 – May 2017 Documentation form completed by the physician, orthotist, and patient
Examination dates:	T0: conservative and postoperative (1–4 days postoperative) T1: postoperative (4–8 weeks postoperative) The intervals between the examinations were selected by the treating physician, based on the indication and the expected regeneration time.
Evaluation of data:	Descriptive statistics for the different points in time using the complete data
Inclusion criteria:	<ul style="list-style-type: none">• Patients regardless of age and gender• Patients with a knee injury or condition with a postoperative indication

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RESULTS FROM 72 PATIENTS SUPPLIED WITH THE PRODUCT

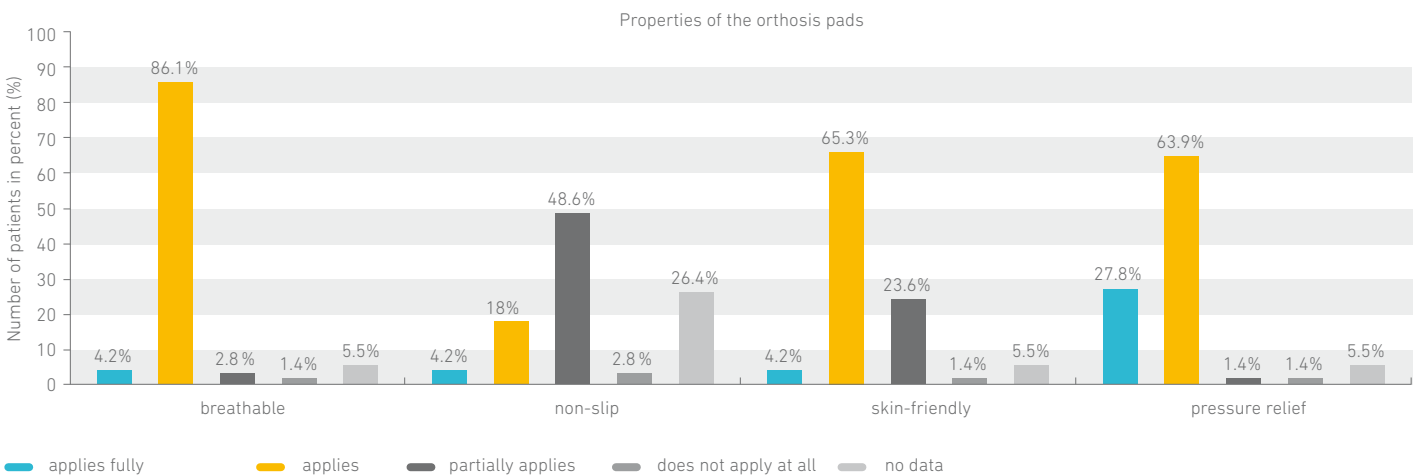
Fig. 1: Treating physician's assessment of the orthosis



The treating physician was very satisfied with the performance of the orthosis during the follow-up therapy in 93% of all 72 cases. The performance of the orthosis includes the characteristics of pain reduction, stabilization of the knee joint, and restoration of the mobility of the knee joint. The rapid mobility of the patient due to the orthosis was referred to as particularly positive. In five cases, use of the orthosis meant that an operation was successfully avoided during the time frame of the study.

52 patients were also receiving physiotherapy at the time of the follow-up examination, while 29 patients were being given drug therapy. According to the survey conducted by the physician, 97.2% of the 72 patients were very satisfied with the knee orthosis at the time of the follow-up examination (no diagram).

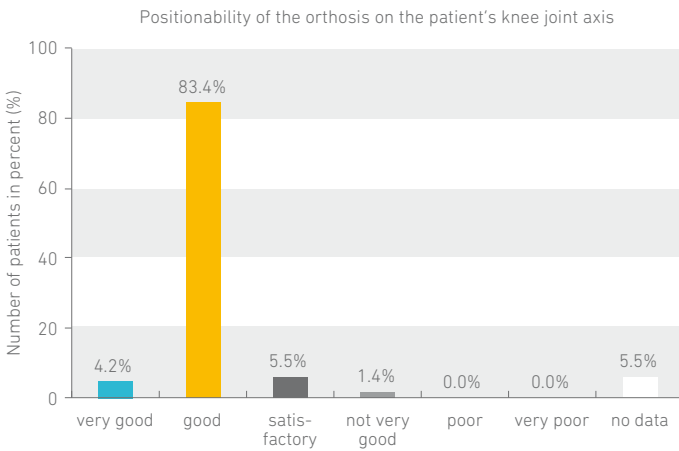
Fig. 2: Orthotist's assessment of the orthosis pads



The orthotist rated the orthosis on the basis of the product supplied to the patient and by inspecting the SecuTec Genu at the times of the examinations. Good breathability of the pads was documented in 90.3% of cases. In 22.3% of cases, the non-slip behavior was rated as good, while this was rated as partially applicable in 48.6% of cases.

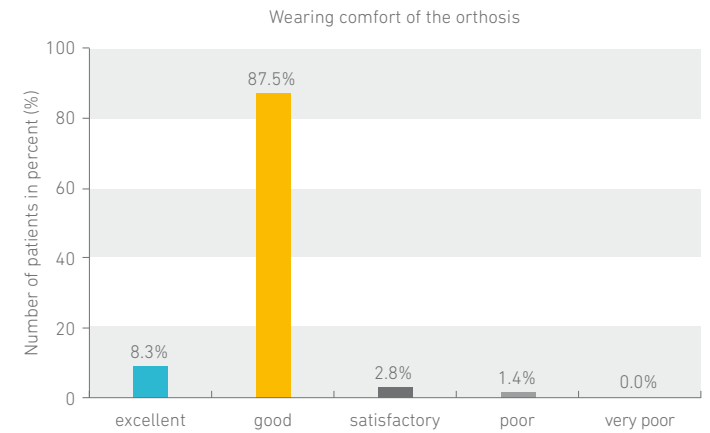
Inadequate muscles may be mooted here as a possible cause. The skin-friendliness of the pad material and the pressure relief provided by the pads were rated as good to very good in 69.5% and 91.7% of cases respectively.

Fig. 3: Orthotist's assessment of the individual adaptability of the orthosis



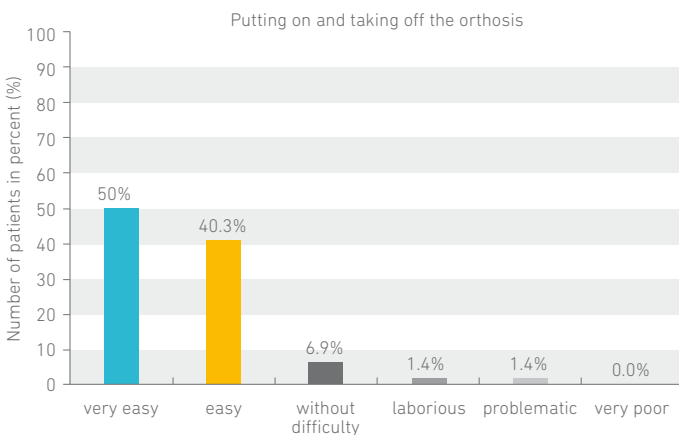
The orthotist rated the positionability of the orthosis and, therefore, the adjustability of the orthosis hinges to the patient's individual compromise axis of rotation as good to very good in 87.5% of cases.

Fig. 4: Wearing comfort at the time of the follow-up examination



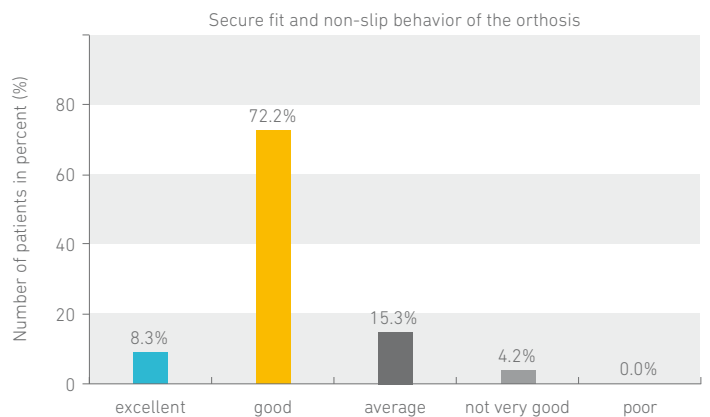
95.8% of patients rated the wearing comfort as good to very good. Wearing comfort is one of the aspects that determine good patient compliance. An orthosis can only be effective if it is actually worn.

Fig. 5: Assessment of the handling of the knee orthosis at the time of the follow-up examination



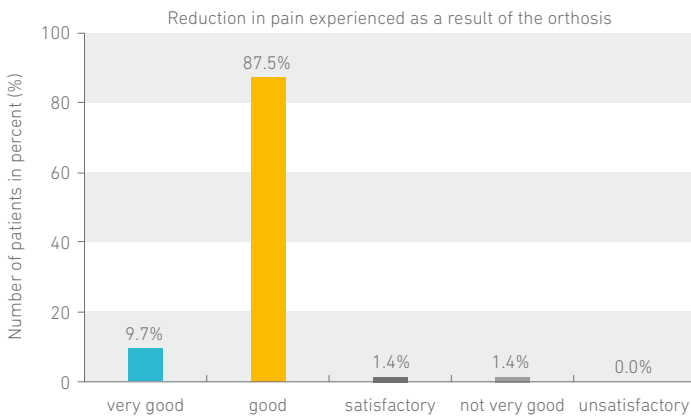
90.3% of patients described the orthosis as easy or very easy to handle. This aspect plays a role in the straightforward use of the orthosis on an everyday basis. The fact that the orthosis can be placed on the knee joint from the front means that there is no need to bend the leg sharply.

Fig. 6: Secure fit of the orthosis during movement at the time of the follow-up examination



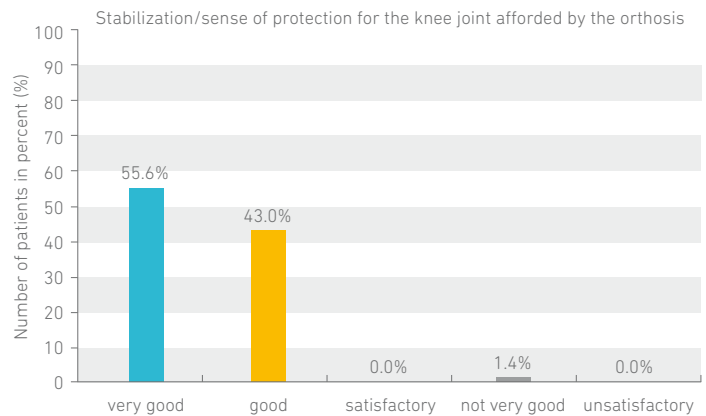
80.5% of patients rated the secure fit and precise position of the knee orthosis as good or very good. This has a positive effect on the experience of wearing the orthosis and helps to avoid stress on the cruciate ligaments.

Fig. 7: Reduction in pain effected by the orthosis at the time of the follow-up examination compared to the initial examination



The reduction in pain effected by the orthosis was rated as good or very good by 87.5% and 9.7% of patients respectively.

Fig. 8: Stabilization and sense of protection afforded by the orthosis at the time of the follow-up examination compared to the initial examination



The SecuTec Genu provides reliable stability and gives the patient a strong sense of protection. This was confirmed by 98.6% of patients. These factors are important for the early mobilization of patients. They help to prevent dystrophy and promote the build-up of muscle during the follow-up treatment phase.

SUMMARY & DISCUSSION

In the largest number of cases, the SecuTec Genu was used in this non-interventional study postoperatively following cruciate ligament surgery (n = 27).

The orthosis was used in the case of a further 19 operations that also treated various soft tissues in the knee joint. This accounts for a much larger proportion of the postoperative use cases compared to the use cases following surgery on bony parts (including cartilage) of the knee joint (n = 23).

The aim of postoperative knee orthosis use is to safeguard the surgical outcome over a period of up to nine months, and longer in certain situations such as at work or when playing sport, to boost the sensorimotor system, and support the build-up of muscle.

In the case of ligament reconstruction, for example, this is essential for the healing processes and the morphological restructuring processes of the new ligament [Rupp et al 1998; Janssen et al. 2011].

Stabilizing knee orthoses such as the SecuTec Genu enable activities to be performed within a range of motion (ROM) that prevents both pain and harmful movements. In addition, orthoses help to promote the economy of movement processes [Kamada et al. 2017].

As both physician and patient surveys and clinical studies show, knee orthoses can reduce the risks of reinjury and ensure mechanical and neuromuscular joint stability [Strutzenberger et al. 2012].

The reduction in pain achieved by wearing a knee orthosis helps considerably in the rehabilitation process and boosts the patient's mobility.

In view of the properties described, knee orthoses are a useful element of postoperative follow-up care.

Source:

Biomechanische Grundlagen der Rehabilitation nach VKB-Ersatzplastik
Deutsche Zeitschrift für Sportmedizin, special edition 1, Volume 49, 1998
Rupp, R. Seii, B. Möller, D. Kohn

Janssen R.,P.,A.; van der Wijk, J. ; Fiedler, A.; Schmidt, T.; Sala, H.,A.,G.,M.; Scheffler, S.,U.
Remodelling of human hamstring autografts after anterior cruciate ligament reconstruction
Knee Surg Sports Traumatol Arthrosc (2011) 19:1299-1306 DOI 10.1007/s00167-011-1419-y

G. Strutzenberger, M. Braig, S. Sell, K. Boes, H. Schwameder
Effect of Brace Design on Patients with ACL-Ruptures
Int J Sports Med 2012; 33: 934-939

Conf Proc IEEE Eng Med Biol Soc. 2017 Jul;2017:942-945. doi: 10.1109/EMBC.2017.8036980.

Efficacy of a knee orthosis that uses an elastic element.
Kamada I, Uemura M, Hirai H, Miyazaki F