

STUDY COPY WITH SELECTED RESULTS

THE EFFECT OF A PELVIC ORTHOSIS IN PATIENTS WITH CHRONIC SACROILIAC SYMPTOMS (SI JOINT SYNDROME)

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DISCUSSION

Circular compressive forces around the pelvis serve the therapeutic goal of increasing the force closure around the SI joint and also show a change in muscular activity [8]. An external circular compression of the pelvis aims to increase osseous and neuromuscular stability [7]. Under the influence of a circular compressive pelvic orthosis, the ligament structures in the SI joint region are mostly relieved. There is also a nutation movement of the sacrum. [9] A pelvic orthosis also has an influence on neuromuscular control circuits.

Patients with a chronic SI joint syndrome exhibit a changed gait with increased cadence and walking speed when treated with a pelvic orthosis [10]. This study shows that the experimental data of the aforementioned studies on osseous and neuromuscular stabilization of the pelvis also have clinical relevance for the affected patients. A higher physical quality of life (SF 36) with less pain and increased back stability mean that patients are better able to perform the activities of daily living with a pelvic orthosis than patients without this form of treatment.

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BACKGROUND

The sacroiliac joint (SI joint) is the cause of 15-30% of low back pain (LBP) in patients with non-radicular pain [1,2,3]. According to the guideline issued by the "International Association for the Study of Pain", SI joint dysfunction should not primarily be treated surgically [4,5,6]. Use of a pelvic orthosis is a conservative treatment option for SI joint pain [7]. The aim is to positively influence the biomechanics and statics of the pelvic locomotor system. At present, only a few studies outline the influence of a change in the biomechanics of the pelvis and the associated parameters. That is why the aim of the study was to demonstrate the effects of a pelvic orthosis on the pelvis based on a range of parameters. The study was conducted under the direction of Dr. C. Büttner, Dr. F. Sichtung, and Prof. T. Milani from the Movement Sciences Department at the University of Chemnitz.

STUDY DESIGN

Randomized, controlled prospective cross-sectional study

METHODOLOGY

Sample: n = 44 patients;
n = 22 with orthosis = IG = intervention group,
n = 22 without orthosis = CG = control group
Age: 43.5 ± 12.1 years, Height: 170.7 ± 8.6 cm,
Weight 76.0 ± 17.8 kg, Duration of pain: 8.1 ± 7.4 years

Test orthoses: SacroLoc (Bauerfeind AG)

Measurement systems: Centre of pressure (COP)

Test method: SF 36 (short form) questionnaire on quantifying quality of life in relation to health, numeric rating scale (NRS) quantifying SI joint-related pain symptoms

Investigation period: Six weeks (follow-up)

Inclusion criteria: Diagnostically verified chronic SI joint syndrome
At least three positive results in the following SI joint pain provocation tests: Thigh thrust test, Gaenslen's test, Faber test/Patrick test, distraction test, compression test, drop test, sacral thrust test
Adequate constitution and coordination for the measurements

Exclusion criteria: Restricted joint mobility and osteoarthritis in areas other than the SI joint
Arthritis, pathological joint positions, chronic pain in areas other than the SI joint, fractures, ligament injuries, muscle injuries, soft tissue damage, somatoform disorders

Subjective assessment regarding improvement in SI joint problems:

19 out of 22 test subjects in the orthoses group (IG) felt that wearing the pelvic orthosis during the intervention period led to an improvement in their SI joint symptoms. Two test subjects were unable to feel any improvement and one person did not provide any information (see Figure 1).

Improvement in SI joint symptoms by wearing an orthosis (long-term, six weeks)

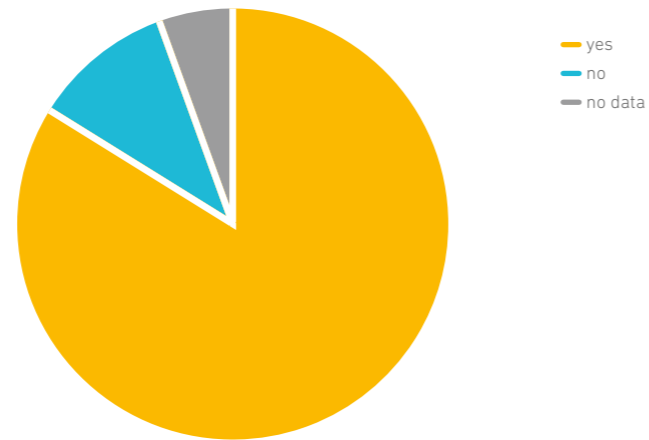


Fig. 1: Statement of the "orthosis-wearing group" about the improvement in SI joint symptoms during the intervention period as a result of wearing the pelvic orthosis

Evaluation of individual aspects of the orthosis:

Different aspects of the orthosis were assessed in IG patients using a "rating scale" on which 6 = completely inadequate and 1 = very good (Table 1). Looking at the frequency distribution (see Figure 2), it can be seen that the rating "good" was most frequently chosen by the test subjects for all aspects.

The few negative responses could be traced back to three test subjects. This means consistent results in the "good" category for all activities, which also results in a "good" overall evaluation for the pelvic orthosis. The stabilization aspect was rated highest.

	Pelvic orthosis by the IG wearing comfort	Handling	Stabilization	Pain relief	Improvement in mobility	Position security when moving	Position security at rest	Overall evaluation
AV ± SD	2.6 ± 0.9	2.3 ± 0.8	1.7 ± 0.6	2.3 ± 0.6	2.5 ± 0.6	2.5 +/- 0.7	2.3 ± 0.9	2.3 ± 0.3
MED	2	2	2	2	2	2.5	2	2

Table 1: Average (AV), standard deviation (SD), and median (MED) for evaluation of individual aspects of the pelvic orthosis by the IG

Evaluation of individual aspects of the pelvic orthosis

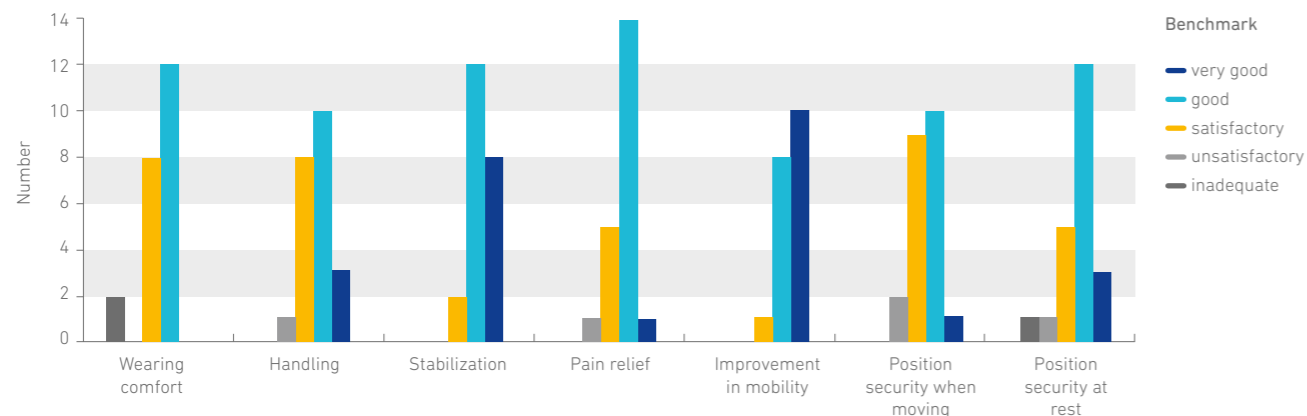


Fig. 2: Frequency distribution in the evaluation of individual aspects of the pelvic orthosis by the IG

Restrictions in selected activities:

In the pre-questionnaire, the restrictions in selected activities in relation to SI joint symptoms were recorded on a scale of 0 to 10. 0 = no impairment and 10 = full impairment. The results of the pre- and post-investigation are illustrated in Table 2 as well as in the following diagrams (Figure 3 and 4).

	Walking		Standing		Sitting		Lying down		In everyday private life		In everyday working life	
	IG	CG	IG	CG	IG	CG	IG	CG	IG	CG	IG	CG
Before	2.5	3.0	6.0	5.0	4.5	5.0	2.5	3.0	4.0	4.0	6.0	4.5
After	1.5	1.0	2.5	4.0	1.5	4.0	1.5	2.0	2.5	3.5	3.0	4.0

Table 2: Median (MED) activity restriction split into IG and CG as well as before and after measurement, 0 = no impairment, 10 = full impairment



Fig. 3: Restrictions when standing split into IG and CG as well as before and after measurement, 0 = no impairment and 10 = full impairment



Fig. 4: Restrictions in everyday working life split into IG and CG as well as before and after measurement, 0 = no impairment and 10 = full impairment

The restrictions in everyday activities are reduced after the six-week intervention period in the patient group with the orthosis (IG) as well as in the patient group without the orthosis (CG) with regard to all categories. The degree of improvement in everyday activities for the patients in

the IG is the same or higher in terms of the characteristics compared to the patients in the CG (with the exception of walking). In conclusion, patients with an orthosis feel significantly less restricted in the everyday activities asked about after the intervention period than patients without an orthosis.

Back pain:

The study conducted here shows that the perceived pain in the IG between pre- and post-examination after six weeks of treatment with SacroLoc significantly decreased from 4.5 to 2.0 on the NRS pain scale (control 4.0 to 3.5 NRS scale) (Fig. 5). This effect can be attributed to treatment with the SacroLoc.

In the control group (CG), which did not wear an orthosis for six weeks, a significant reduction in pain can also be observed when using the SacroLoc selectively at each measuring date. These results indicate both an immediate effect of the intervention with the orthosis and a sustained long-term effect.

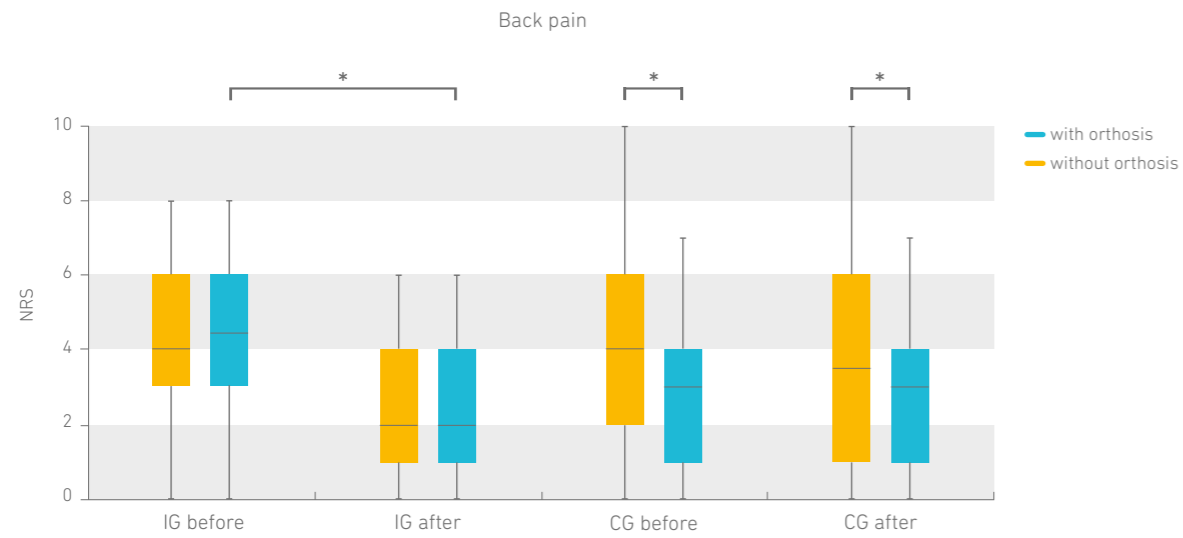


Fig. 5: Boxplot on back pain split into IG and CG for the before and after measurement, *p<0.0125

Back stability:

The feeling of stability improves significantly in the patient group with the orthosis (IG) in the pre-measurement between the condition without and with an orthosis from 5.0 to 7.0 NRS points. After six weeks, the feeling of stability of the IG remained high at 7.5 NRS points (Fig. 6). There are no "significant" changes in the CG, but a tendency for

an immediate effect of the SacroLoc with respect to higher back stability can also be observed in this group. The results indicate that the stabilization effect on the SI joint is acutely perceptible through form and force closure after the application of the orthosis and that back stabilization is also maintained over the measured period of six weeks after the application of the orthosis.

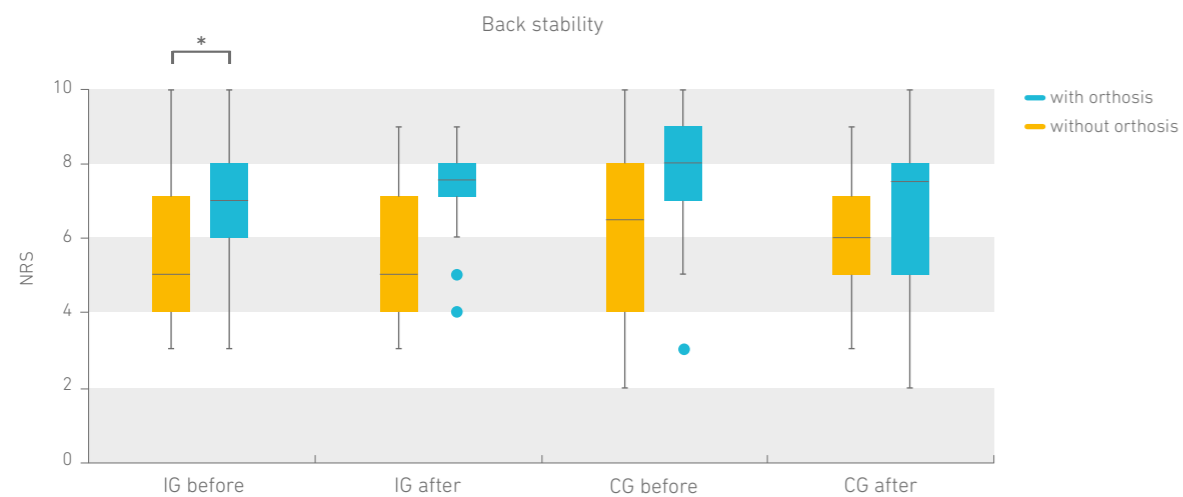


Fig. 6: Boxplot on back stability split into IG and CG for the before and after measurement, *p<0.0125

SF 36 score:

The values of the physical and mental total scale are based on the standard values of a US sample. The values of the US sample are given with an average (AV) of 50 points and a standard deviation (SD) of ±10. Values below 40 on the total scale are classified as below average and values above 60 are considered above average. Looking at the patients of the IG of this sample, their physical total scale is reduced and below average (38.0 points) upon initial

measurement, while the mental total scale, at 51 points, corresponds to the standard value of the reference collective. After the intervention, the physical total scale rose towards the healthy reference collective to an "average" level with an AV of 44.6 points. The mental total scale is still "average" with an AV of 50.4 points.

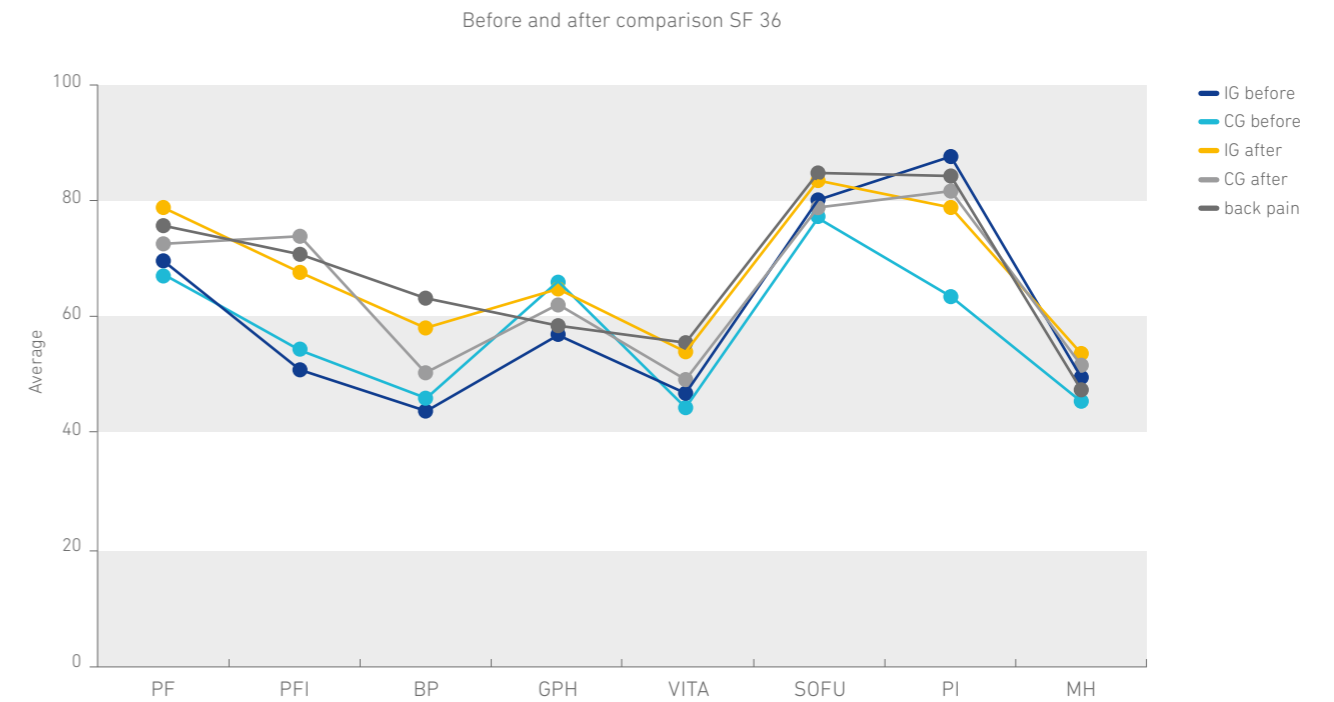


Fig. 7: SF 36 score, data was obtained for pre- and post-examination in patients with an orthosis (IG) and in patients without an orthosis (CG). back pain: Average collective of the American population; Patients with chronic back pain

- PF: Physical functioning
- PFI: Role behavior due to physical functional impairment
- BP: Bodily pain
- GPH: General perception of health
- VITA: Vitality and physical energy
- SOFU: Social functioning
- PI: Role behavior due to psychological impairment
- MH: Mental health