The Effectiveness of Lumbosacral Corset in Symptomatic Degenerative Lumbar Spinal Stenosis

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Abstract

Lumbosacral corset is a spinal support widely used for patients suffering from low back pain due to various conditions. To evaluate the effectiveness of the corset in symptomatic degenerative lumbar spinal stenosis, twenty one patients (mean age 62.5 ± 5.2 years) with neurogenic claudication (mean onset 9.0 ± 9.3 months) were recruited for and completed a self controlled comparative study (with and without a corset). Quantitative and qualitative assessment in terms of walking distance and pain score (0-10 point visual analog scale) in daily activities respectively, compared between wearing and not wearing the corset were measured. The outcome of the study showed statistically significant improvement in walking distance (393.2 ± 254.0 m and 314.6 ± 188.8 m) and decrement of pain score in daily activities (4.7 ± 1.4 and 5.9 ± 1.0) with and without corset dressing respectively. This result supports the positive effect of the lumbosacral corset in pain relief and functional improvement of the degenerative lumbar spinal stenosis condition.

Key word : Corset, Neurogenic Claudication, Spinal Stenosis

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Degenerative lumbar spinal stenosis is a common cause of disability in patients aged between 60 and 80 years[1,2]. The diagnosis of this condition is generally based on clinical symptom more than anatomical basis because of the poor specificity of imaging studies (plain film, computerized tomography, and magnetic resonance imaging)[3,4]. The classical clinical symptom is neurogenic claudication (thigh, calf or foot discomfort or all), and can be exacerbated by lumbar extension and relieved by

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lumbar flexion[5-7]. Neurologic examination in the lower extremities is generally normal, chronic nerve root compression is seen in advanced cases[8]. The major pathophysiology of spinal stenosis is mechanical instability and inflammatory change of the spinal segments[9]. Conservative treatment is mandatory and is successful in most of the cases [10]. Medications are used to treat the inflammatory process, whereas, spinal orthosis may be useful in modification of the biomechanic of the lumbosacral spinal segments[8,11-14]. The effectiveness of the corset has never been investigated. We therefore conducted a qualitative and quantitative study of the effectiveness of the lumbosacral corset in symptomatic degenerative lumbar spinal stenosis.

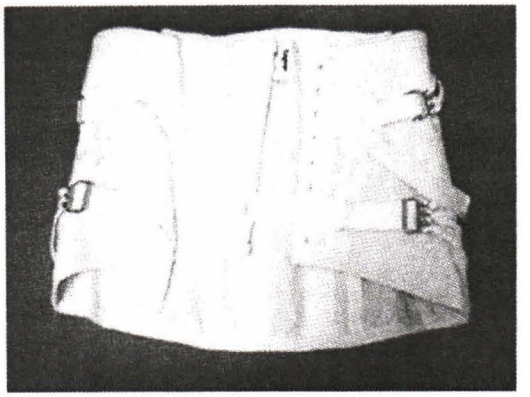

Fig. 1. Lumbosacral corset (CAMP®).

METHOD AND SUBJECT

The inclusion criteria for symptomatic degenerative lumbar spinal stenosis in this study were :

1. Age $\geq$ 50 years.
2. Had neurogenic claudication, reproduced by a certain distance of walking and relieved by sitting.
3. Degenerative lumbosacral spine documented by plain film of the lumbosacral spine.
4. No contraindications for treadmill exercise or wearing a lumbosacral corset.

From October 1997 to July 1999, outpatients in the department of physical medicine and rehabilitation, Siriraj Hospital, Mahidol University were surveyed and twenty one patients met the above criteria. All were assigned to wear a lumbosacral corset (CAMP® : A Bissell Health Company, USA) during the daytime for one week in order to get used to the corset before the first step of measurement.

Intervention

To assess the effectiveness of the lumbosacral corset, all subjects were assigned to measure the claudication distance as follows :

Step 1 : Without the lumbosacral corset, the subjects walked on the treadmill at a comfortable speed to the point of intoleration from neurogenic claudication.

Steps 2 : One week later, with the lumbosacral corset, the subjects walked on the treadmill at the same speed to the point of intoleration from neurogenic claudication.

Step 1 and 2 were repeated again twice.

Assessment of the outcome

To evaluate the effectiveness of the lumbosacral corset subjectively and objectively, a self controlled study to compare each subject (with and without) the corset was designed.

Qualitative assessment was measured in terms of pain intensity in daily activities by VAS (0 - 10 point visual analog scale).

Quantitative assessment was measured in terms of walking distance to the intolerable point of neurogenic claudication symptoms (claudication distance).

Data Analysis

A self controlled comparative study was applied to compare the values of VAS (Wilcoxon Signed Rank Test) and claudication distance (paired *t*-test) measured in the study with and without the corset. A point estimate was calculated and 95 per cent confidence interval obtained to measure the efficacy. A p value less than 0.05 was considered statistically significant.

RESULTS

Twenty one subjects, 17 females (80.95%) and 4 males (19.05%) met the above criteria and completed the study. One female was withdrawn from the study due to loss of follow-up.

The mean age and onset of symptoms were 62.5 $\pm$ 5.2 years and 9.0 $\pm$ 9.3 months respectively.

The mean comfortable speed was 1.67 $\pm$ 0.62 km/h.

The roentgenographic study, plain film of lumbosacral spine showed degenerative change in

Table 1. Subject data.

No. of Subjects	Sex		Age (yr.)	Onset (month)
	Female	Male	Mean ± SD	Mean ± SD
21	17	4	62.5 ± 5.2	9.0 ± 9.3

Table 2. Outcome assessments.

Measurements	without corset mean ± SD	with corset mean ± SD
Walking distance (m)	314.6 ± 188.8	393.21 ± 254.0
VAS	5.9 ± 1.0	4.7 ± 1.4

all subjects, degenerative lumbar scoliosis in 4 subjects (19.05%), grade I spondylolithesis in 7 subjects (33.33%), 6 at the level L_4/L_5, and 1 at the level L_5/S_1.

Eight out of the twenty one (38.95%) had neurological deficit of chronic nerve root(s) compression.

The mean claudication distance with and without the corset was 393.2 ± 254.0 m. and 314.6 ± 188.8 m. respectively. The walking distance with the corset showed a statistically significant increment ($P<0.05$).

Thirteen out of twenty one subjects (61.90%) reported less pain in daily activities with the corset. Six subjects (28.57%) reported no variation of pain, while 2 subjects (9.52%) experienced more pain in daily activities with the corset. The mean VAS when wearing and not wearing the corset was 4.7 ± 1.4 and 5.9 ± 1.0 respectively. This decrement was statistically significant ($P<0.05$).

DISCUSSION

The results of this study support the positive effects of the lumbosacral corset in symptomatic degenerative lumbar spinal stenosis patients in both quantitative and qualitative measurements, which means that pain and disability still existed, but to a lesser degree. Regarding the mechanism of the lumbosacral corset[13,14], postural correction will decrease excessive lumbar cordosis leading to widening of spinal and the intervertebral foramen, supporting the lumbar spine will improve the stability of the spine, and decreasing intradiscal pressure will indirectly widen the intervertebral foramen. These may be the reasons for the positive effect of the corset in lumbar spinal stenosis.

In this study, the diagnostic criteria of the subjects were based on the symptom of neurogenic intermittent claudication, age, and roentgenographic change of the lumbar spine. Regardless of the severity of the stenosis, eight subjects with chronic nerve root compression, and common co-existing findings[8], seven subjects with grade I spondylolithesis, and four subjects with degenerative lumbar scoliosis were included. Three of the subjects with co-existing spondylolithesis were operated on later due to progress of the disease. For this reason, a future study with a larger sample size and an individual group of co-existing findings is recommended in order to obtain results for more specific groups.

In conclusion, the outcome of this study showed the benefits of the lumbosacral corset in symptomatic degenerative lumbar spinal stenosis patients in improving walking distance and decreasing pain in performing daily activities to a certain degree.

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ประสิทธิผลของเฝือกอ่อนพยุงเอวต่ออาการของช่องประสาทไขสันหลังบริเวณเอวแคบจากภาวะกระดูกสันหลังเสื่อม

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เฝือกอ่อนพยุงเอวเป็นกายอุปกรณ์พยุงหลังที่นิยมใช้ในผู้ป่วยที่ทนทุกข์จากอาการปวดหลังในหลายสาเหตุ เพื่อที่จะประเมินผลของเฝือกอ่อนพยุงเอวในการรักษาอาการของช่วงประสาทไขสันหลังบริเวณเอวแคบจากภาวะกระดูกเสื่อม ผู้ป่วย 21 ราย (อายุเฉลี่ย 62.5 ± 5.2 ปี) ที่มีอาการ นิวโรเจนนิก คลอดิเคชั่น (ระยะเวลาที่มีอาการเฉลี่ย 9.0 ± 9.3 เดือน) ถูกรวบรวมมาทำการศึกษาเปรียบเทียบ (ใส่เฝือกอ่อนกับไม่ใส่) ประเมินผลเชิงปริมาณและคุณภาพจากระยะทางที่สามารถเดินได้และระดับความรุนแรงของอาการปวด (0–10 คะแนน) ในการประกอบกิจวัตรประจำวันตามลำดับ เปรียบ–เทียบระหว่างเมื่อใส่เฝือกอ่อนพยุงเอวกับขณะที่ไม่ใส่ ผลการศึกษาครั้งนี้พบว่ามีนัยสำคัญทางสถิติในการเพิ่มขึ้นของระยะทางที่ผู้ป่วยสามารถเดินได้ (393.2 ± 254.0 ม. และ 314.6 ± 188.8 ม.) ความรุนแรงของอาการปวดในการประกอบกิจวัตรประจำวันลดลง (4.7 ± 1.4 และ 5.9 ± 1.0) เมื่อเปรียบเทียบขณะใส่เฝือกอ่อนและไม่ใส่ตามลำดับ ผลลัพธ์นี้สนับสนุนว่าเฝือกอ่อนพยุงเอวมีผลในการบรรเทาอาการของช่วงประสาทไขสันหลังบริเวณเอวแคบจากภาวะกระดูกเสื่อมในระดับหนึ่ง

คำสำคัญ : ช่องประสาทไขสันหลังแคบ, อุปกรณ์พยุงหลัง

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