

SCIENTIFIC PAPERS

Lumbar corsets: compliance and effectiveness for lower back pain

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ABSTRACT

Aims: To assess whether lumbar corsets are being effectively prescribed to control lower back pain in our study group.

Methods: A postal questionnaire was sent to 130 consecutive patients who were prescribed lumbar corsets for control of back pain in a 2-year period; 102 (78%) patients responded. The Greenough and Fraser and visual analogue scoring systems were used to assess the physical and functional improvement of back pain.

Results: Of the 102 patients who responded, 64 were females (62.7%), and 76 (74.5%) patients had worn the lumbar corset for more than 1 year's duration. Ninety (88%) patients normally wore the corset all day or most part of the day. There were improvements in the total back pain outcome scores before versus after wearing the lumbar corset: Greenough and Fraser mean 30.02 up from 20.07 ($p<0.0001$); and visual analogue mean pain score down to 4.90 from 8.30 ($p<0.001$).

Conclusions: We conclude that lumbar corsets are being effectively prescribed and that there is good compliance and control of back pain in our study group.

Key Words: Low back pain; Lumbar vertebrae/physiopathology; Spinal injuries

中文摘要

背褸於治理腰背痛之使用及有效性

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目的：研究背褸能否有效地治理腰背痛。

方法：過去兩年共130位病者因腰背痛而選用背褸。我們以郵寄問卷調查所有病者，共102位（78%）回覆。以Greenough和Fraser法及視覺鑒別標度去評估生理性和功能的改善。

結果：回覆之病者中，64例（62.7%）為女性，76名（74.5%）病者用背褸多於一年。90名（88%）病者每天全日或大部份時間都使用背褸。以Greenough和Fraser法評核生活功能之影響，用背褸前平均得分為20.07，用後為30.02（ $p<0.0001$ ）。以視覺鑒別標度評核，用背褸前平均得分為8.30，用後為4.9（ $p<0.001$ ）。

結論：背褸能有效地減少腰背痛。病者一般也樂於選用。

INTRODUCTION

The problem of low back pain is well established in all industrialised communities. Various ergonomic, educational, and treatment methods have generally failed to control it. Although the exact origin of long-standing back pain is still unknown, there is increasing awareness of it, as well as mounting attempts to identify its causes.

Lumbar support corsets are widely prescribed for back pain. Despite many attempts to study them scientifically and the vast amount written about the effectiveness and indications for lumbar support corsets, there is no consensus regarding their value and little correlation between the pattern of their prescription, the degree of compliance by patients, and their effectiveness in control of back pain.

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Table 1 Low back pain (Greenough & Fraser) outcome scores.

Scoring Factors	Categories	Score	
Factors that score 9 points			
Current pain (visual analogue scale)	7-10	0	
	5-6	3	
	3-4	6	
	0-2	9	
Employment (housewives related to previous abilities)	Unemployed	0	
	Part time	3	
	Full time, lighter	6	
	Full time, original	9	
Domestic chores or odd jobs	None	0	
	A few but not many	3	
	Most or all but slowly	6	
	Normally	9	
Sports/active social (dancing)	None	0	
	Some, but much less than before	3	
	Back to previous level	9	
Factors that score 6 points			
Resting	Resting more than half the day	0	
	Little rest needed	4	
	No need to rest	6	
Treatment or consultation	More than once a month	0	
	About once a month	2	
	Rarely	4	
	Never	6	
Analgesia	Several times each day	0	
	Almost every day	2	
	Occasionally	4	
Sex life	Never	6	
	Severely affected (impossible)	0	
	Moderately affected (difficult)	2	
	Mildly affected	4	
Factors that score 3 points	Unaffected	6	
	Sleeping, walking, sitting, traveling, dressing	Severely affected (impossible)	0
		Moderately affected (difficult)	1
		Mildly affected	2
Unaffected		3	

We have attempted to study the effectiveness of lumbar corsets. A consecutive group of patients were identified as currently wearing corsets. This group was studied to see whether compliance in corset wearing is associated with any greater effectiveness in the control of lower back pain.

METHODS

We devised a postal questionnaire and then identified all patients who had been prescribed a lumbar support corset for back pain by the surgical appliance department. One hundred-thirty patients were found to have been prescribed a lumbar corset within a 2-year period and all of them were included in our study.

To ensure that all patients had a well-fitting and firm

corset, our fitter in the surgical appliance department measured all patients at their initial assessments. Patients were reassessed with the lumbar corset at a second appointment. A third appointment was made for the necessary adjustments and to make the final fitting of the corset, if required. All patients were advised to wear the corset as long as they could. The corset was made of Courtell (breathable) material, with two vertical steel rods at the back. Small flexible plastic bones are attached to the sides that limit rotary movement.

The indications for prescribing lumbar corsets varied from defined orthopaedic (eg, spondylolisthesis), medical (eg, osteoarthritis), to unspecified lower back pain. All patients who had had back surgery were excluded. An initial trial of nonsteroidal anti-inflammatory drugs

Table 2 Age group distribution of the patients wearing the lumbar corsets.

Age group, years	No. of patients	
	Male	Female
21-30	2	1
31-40	6	2
41-50	4	2
51-60	8	7
61-70	10	17
71-80	2	14
81-90	3	20
91-100	3	1
Total	38	64

(NSAIDs) and physiotherapy was instituted if deemed necessary. All patients who had failed to respond to the above measures were then included in the study.

In the questionnaire we collected data on age, compliance, pattern of usage of the corset, and on the effectiveness of both pain control and function by adopting the low back pain outcome score of Greenough and Fraser.⁸ This system was chosen as the method of rating each patient's severity of symptoms before and after fitting the corset. It includes 13 factors: pain, employment, domestic chores, social/sporting activity, rest, medical consultation, analgesia, sex life, sleep, walking, sitting, travelling, and dressing (Table 1). A total of 130 questionnaires were sent out in two batches to all patients identified.

RESULTS

One hundred-two (78%) completed forms were returned. Of these, 64 (62.7%) were women and 38 (37.3%) were men. Of the 28 (22%) patient questionnaires that were not answered, 6 (5%) went to patients who had since died, 3 (2%) to patients who refused to comply, 8 (6%) were returned "unknown at address", and 11 (8%) were not returned at all (verified by phone). The results of the questionnaire are described below.

Age distribution of patients

Table 2 shows the age distribution of all patients. Most of the patients were older than 61 years ($n = 70$, 69%) and most of them were females ($n = 52$, 74%).

Total duration of wear

Only four (3.9%) patients did not wear the lumbar cor-

Table 3 Duration of wear of the lumbar corsets by patients.

Duration	Number of Patients
Never	4
<6 weeks	14
6 weeks to 3 months	2
3 months to 1 year	6
>1 year	76
Total	102

Table 4 Duration of lumbar corsets worn during a whole day's time.

Pattern	Number of Patients
All day	62
Part of day, most days	28
Only when engaged in strenuous activity	8
Only occasionally	4
Total	102

set at all, and 14 (13.7%) patients wore the corset for less than 6 weeks. Three-quarters of the patients ($n = 76$) wore the lumbar corset for more than 1 year. A breakdown of total lumbar corset wear is shown in Table 3.

Pattern of wear

Table 4 shows the different patterns of length of wear of the brace. Most of the patients ($n = 62$, 61%) wore the corset all day, whereas another 27% of patients ($n = 28$) wore it for most of the day.

Low back pain

The low back pain score was assessed on a visual analogue scale, marked from 0 to 10, before and then after the lumbar corset was worn. The patients recorded this at the time of answering the questionnaire by memory. Before wearing the corset all patients had a minimum score of 4, with the maximum number of patients in this study, 43, having a score of 10. After wearing the lumbar corset, the scores ranged from three to eight, with only two patients having a score of 10. Mean pain score decreased significantly to 4.90 from 8.30 after wearing the corset. The visual analogue score breakdown is shown in Table 5.

Low back pain outcome score (Greenough and Fraser):

Our results from the Greenough and Fraser scoring

Table 5 Visual analogue scale scored by all patients before and after wearing the lumbar corsets.

	Visual analogue scale											Mean*
	0	1	2	3	4	5	6	7	8	9	10	
Before	-	-	-	-	3	12	10	2	17	15	43	8.3
After	3	7	14	7	6	22	15	12	14	-	2	4.9

* $p < 0.001$.

system showed that total score before wearing the corset was 2047 (mean, 20.07); total score after wearing the corset was 3062 (mean, 30.02). Statistical analysis using the Wilcoxon paired signed rank test was made: sum of total positive ranks = 4205, sum of total negative ranks = 355, and z statistic = 7.15; probability of difference being not significant, $p < 0.0001$.

DISCUSSION

The following can be concluded from our results.

First, there is a predominantly elderly group, mainly of woman, who use the lumbar corset. This correlates with the findings of previous studies in this area.^{1,12}

Second, there was a high compliance in wearing lumbar corsets in our group of patients. Seventy-six patients (74.5%) wore the corset for over a year, with 90 patients (88%) wearing it all day or for most of the day. This compares with compliance rates previously reported by Willner et al²⁰ that were around 51% effective and accepted by patients. While McKenzie et al¹² found a 50% acceptance of corset by patients, with 75% wearing the braces regularly, according to Ahlgren et al.¹

The relatively increased compliance found in our study may be due to several factors. These include correct prescribing habits, accurate assessment by the fitter in the surgical appliance department, as well as some patients becoming reliant on lumbar corsets over a period of time. Studies have shown that female gender, being elderly, and accurate fitting are associated with greater compliance.¹ Other series, eg, trial of plaster jacket,⁴ and even a trial of a specially devised adjustable test corset,¹⁹ have been advocated to improve the prescribing accuracy and compliance among patients.

Third, a large majority of patients in this study showed improved pain control (visual analogue mean score from 8.30 to 4.90) as well as an improvement in func-

tional symptoms (Greenough and Fraser). Patients' evaluations of the effectiveness of corsets had previously been sought. One study after a postal questionnaire-based follow-up in Helsinki reported that 37% of patients rated subjective relief from the corset as excellent or good and 49% found slight relief.² It also emphasised the importance of sufficient time and adequate information to increase the effectiveness of wearing the corsets. Furthermore, traditional care plus graded activity progress with behaviour therapy under the guidance of a physical therapist have shown improvements that cannot be explained by the time recovery effect.¹¹

Other studies have shown little difference between the efficacy of corsets, physiotherapy, analgesics, and manipulative therapy.^{5,7} A Cochrane systemic review by Jeleema and Nachemson et al¹⁰ in 2001 confirmed the difficulty of conducting such studies and found moderate evidence to support the argument that lumbar corsets had some role in primary and secondary prevention. A study involving 90 male warehouse workers in Texas, however, showed that prophylactic bracing was effective in preventing lower back injury and reducing time loss in the workplace.¹⁸ It is perhaps not surprising that these results conflict, as there is no common agreement regarding the mechanism of action of the braces.

One suggested mechanism of action of corsets is spinal restriction, proposed by Million et al,¹³ who found rigid braces to be more effective than soft, elastic support. Yet, it has also been shown that lumbar sagittal movement was unaffected by rigid corsets.¹⁷ Another suggestion involved increased abdominal pressure¹⁴—certainly tight fitting corsets have a measurable effect in unloading the lumbar spine^{3,15,16}—but whether this is significant has been questioned. Proprioceptive stimuli, local temperature elevation, and an increased feeling of safety have all been proposed as possible mechanisms.⁴

A great deal has been written about the indications for prescribing corsets for back pain, but there is no consensus on this issue. Some go so far as to maintain that there are no indications,⁹ but others have attempted to define the indications (eg, 80% good results in spondylolisthesis, but only 15% in unspecified lower back pain). This study also reported that 49% of prescribed corsets failed to provide any benefit.²⁰

Finally, we do understand the limitations of this study in not being prospective, and in not having a randomised blind control group. The difficulty of conducting controlled blind trials has been emphasised in other studies, and few attempts have been made to assess variables such as prescriber, work type, time spent in explanation, and time spent with fitter.⁶ Nevertheless, we have tried to gain a prospective view by asking patients about their pain before the use of lumbar corsets, and we have also tried to redress the lack of a control group by using a scoring system that is highly comprehensive. The Greenough and Fraser system incorporates existing scoring systems, such as the Oswestry Disability Score and the Waddell Physical Impairment Rating, and this system is not only more detailed and discriminating but also very suitable for postal surveys.

CONCLUSION

Firm fitted lumbar support corsets seem to have been effectively prescribed in our study of patients, and we have found good compliance and control of lower back pain. We conclude that auditing of corset prescription, compliance in use, and effectiveness is a worthwhile exercise that will help maximise the benefits of using the lumbar corset for more patients.

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