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THE EFFECT OF THE SWEDISH BACK SCHOOL IN CHRONIC IDIOPATHIC LOW BACK PAIN

A Prospective Controlled Study

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ABSTRACT. A prospective controlled study of the effect of the Swedish Back School in chronic idiopathic Low Back Pain was conducted. Forty-eight patients entered the study. There were no significant pre-treatment differences between the experimental group members who attended the four lessons of the Back School, and the control group who received four detuned shortwave applications to the low back. Forty-three patients (21 in the experimental and 22 in the control group) completed the study. Subjects were repeatedly tested for one year. The following assessments were made: 1) subjective scores of pain and functional capacity, and 2) objective measurements of spinal mobility. After one year, no statistically significant differences between the two groups were observed. Given the proven efficacy of the Back School in (sub)acute Low Back Pain, it should be administered when it is most beneficial, i.e. in the early phase of Low Back Pain.

Key words: **Low back pain, Back School, outcome study**

Idiopathic Low Back Pain (LBP) is a disabling condition, which is reported to affect up to 80% of the population (8). During the last decade, several instructional programs for low back pain sufferers have been developed. The Swedish Back School (11) has gained general acceptance in Europe (9, 13) and was followed by Back Education units in other parts of the world (4, 6, 12). The Swedish Back School is an audiovisual series which provides information about the natural course of idiopathic LBP and teaches ergonomic principles. It seems logical to expect this program to prevent chronicity of back pain and to reduce the amount of disability resulting from LBP. Bergquist-Ullman & Larsson (1) reported good results of the Back School in a controlled study of patients with acute or subacute low back pain.

The management of chronic LBP presents great difficulties. Hence, a study of the effect of the Back School in chronic LBP was justified. In 1977 we introduced a slightly modified version of the Swedish Back School in our Institute. The first step in our research program to assess the efficacy of the Back School in chronic LBP was the development of a sensitive set of measurements and to study the objectivity and repeatability of the tests. The results of this preliminary study have been reported previously (5). Subsequently a controlled prospective study of the effect of the Back School in chronic idiopathic LBP was undertaken.

Our hypotheses were: (A_1) Subjective scores of pain and functional capacity will show transient improvements in both groups (as a result of the expectations created by a new treatment period for a chronic condition); (A_2) After one year, pain and disability will be less in the Back School than in the control group; (B) Objective measurements of spinal mobility will show no differences at one year after treatment in both groups (Fig. 1).

METHODS

Patients

Forty-eight consecutive patients, fulfilling the following criteria, entered the study: idiopathic low back pain (LBP) of more than 6 months' duration, not responding to conventional physiotherapy. Exclusion criteria were: 1) Inflammatory or other specific disorders of the spine, such as ankylosing spondylitis, Paget's disease, and vertebral collapse; 2) abnormal relexes, sensory loss, or significant muscle weakness; 3) scoliosis of more than 15°; 4) spondylolisthesis of more than 1 cm. Patients showing only degenerative changes of the lumbar spine on X-ray examination without signs of nerve root compression were included in the study.

Treatments

Patients in the experimental group attended the four lessons of the Back School in the course of 2 weeks. Patients in the control group received four detuned pul-

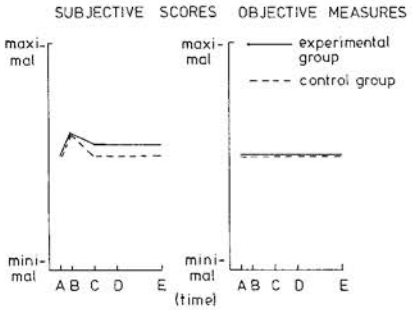

Fig. 1. Graphical representation of the hypothesis. A: before treatment; B: immediately after treatment; C, D, E: 3, 6, 12 months after treatment respectively.

sating shortwave applications to the low back in a period of 2 weeks. It is of course self-evident that patients were aware of the type of treatment they were to undergo, but all were told that they were participating in a study and that they were to receive a relatively new type of therapy whose efficacy was not yet well established. For this explanation to the patient a standard formula was used in order to avoid the induction of differing degrees of expectation in the experimental vs. the control group.

Allocation of patients to treatments

The Back School is a group treatment. In case of random allocation the formation of a Back School group of 6 patients would have taken too much time. For practical reasons we decided that the first 6 consecutive patients would enter the experimental group, the 2nd and 3rd sextet the control group, the 4th and 5th sextet the experimental group, and so on. The problem of possible selection bias was met by strictly including all patients meeting the eligibility criteria.

Measurements

The Jan van Breemen Institute set of measurements for the quantification of LBP was used (5). This test assesses 1) six aspects of back pain during the past week, resulting in a Mean Pain Score (0: no pain; 10: unbearable pain); 2) degree of disability experienced during the last week as a result of the back pain, resulting in a Mean Functional Capacity Score (0: minimal functional capacity; 10: maximal functional capacity); 3) spinal mobility (tests of flexion, extension and lateral bending of the low back, expressed in cm and active straight leg raising, expressed in degrees of angle). In a previous study (5) it was found that objectivity and repeatability of the set of measurements were good.

Measurements were performed before, immediately after and 3, 6 and 12 months after the treatment period. A long follow-up was chosen, because it may be expected that patients suffering from a chronic condition initially respond well to any new therapy. This placebo response or reactive effect is likely to fade away quite soon. The lasting effect of a therapy, as measured up to 12 months after treatment, must be considered the most important.

Independent observer

Measurements were made by an independent observer. No attempt was made to imitate blind assessment of outcome. When patients receive clearly differing types of treatment, the observer will on repeated testing, even unintentionally, realize whether a patient was in the experimental or the control group. To compensate for this lack of observer blindness the independent observer adhered strictly to standardized questions and instructions of the measurement protocol.

Statistical methods

Data obtained from the repeated measurements of both groups were analysed by an analysis of variance (10) using the model with repeated measures on one factor. Statistical significance between group means was tested by an analysis of the simple effects in the analysis of variance model (10) and also by Student's *t*-test.

Questionnaire at follow-up

After 3 months the Back School group was asked to answer the following questions: 1) What is your opinion about the effect of the Back School: positive, absent, or negative? 2) Do you practise the psoas position daily, as recommended in the Back School?

RESULTS

The experimental and the control group were comparable for age, sex and duration of back pain (Table I). Also pre-treatment scores of the subjective and objective variables showed no significant differences (Table II). Three persons in the experimental group and 2 persons in the control group failed to complete the one-year study, because they refused at some stage of the study to come to the Institute for measurements. In the remaining 43 patients no complications of treatment were observed. During the one-year period neither of them was found to develop any specific cause of LBP as listed under 'exclusion criteria'.

Time course of effect variables

The results (Table II and Fig. 2) show minor changes during the one-year period in both groups. The

Table I. *Age and sex distribution of the groups; duration of back pain history*

	Experimental group	Control group
Age	50.4±7.9 years	51.4±10.7 years*
Sex	9 men, 12 women	10 men, 12 women*
Duration of back pain	6.8±5.5 years	6.0±5.2 years*

* $p>0.25$.

Table II. *Time course of the variables in the experimental and the control group*

Variables (see "Methods")	E = Experimental group C = Control group	A Before treatment	B After treatment	B−A *t*-Test	C After 3 months	D After 6 months	E After 12 months	E−A *t*-Test
Pain	E mean	6.2	6.0	n.s.	5.9	6.2	5.6	n.s.
	SD	1.3	1.4		2.4	2.1	2.3	
	C mean	6.2	6.8	**	6.5	5.8	6.5	n.s.
	SD	1.5	1.5		1.7	1.9	1.5	
Functional capacity	E mean	4.6	4.6	n.s.	4.7	4.9	5.0	n.s.
	SD	1.4	1.1		1.9	1.7	1.5	
	C mean	4.5	4.0	*	4.7	4.9	4.6	n.s.
	SD	1.5	1.5		1.6	1.6	1.2	
Flexion, extension, lateral bending	E mean	5.3	4.9	**	4.8	4.6	4.7	**
	SD	0.9	0.8		1.2	1.1	1.2	
	C mean	5.2	4.8	*	5.0	5.0	4.9	*
	SD	0.8	1.0		1.0	1.1	1.2	
Active straight leg raising	E mean	56	50	**	49	49	47	**
	SD	23	26		27	27	27	
	C mean	56	52	**	50	58	58	n.s.
	SD	24	27		27	27	28	

* $p<0.05$.
** $p<0.01$.

analysis of variance of the time course of the variables for both groups taken together showed 1) no significant changes of reported back pain, 2) a small but significant increase in functional capacity ($p<0.01$), and 3) a small but significant decrease in spinal mobility ($p<0.01$), and active straight leg raising ($p<0.05$).

Changes in the effect variables immediately after treatment

To test the hypothesis of the transient improvement in subjective scores, measurements before and immediately after the Back School or placebo treatment were compared, using Student's *t*-test. Neither in the experimental nor in the control group a positive reactive effect on the subjective scores was found (Fig. 2). On the contrary, in the control group immediately after the treatment course an increase in reported pain ($p<0.01$) and a decrease in functional capacity ($p<0.05$) was observed (Table II). The objective measurements all showed unexpected negative reactive effects in both the Back School and the control group.

Changes of the effect variables after one year

To test the hypothesis of improvement in the subjective variables in the Back School group after one year, pre-treatment scores were compared with scores after one year in each group. Subjective scores showed no significant changes in either group, but objective measurements showed small but significant decreases (Table II), except for active straight leg raising in the control group. When the data of the Back School and the control group were compared, no statistically significant differences were observed between any of the subjective and objective variables.

Questionnaire at follow-up

The distribution of the opinions of the patients about the Back School after 3 months was: positive

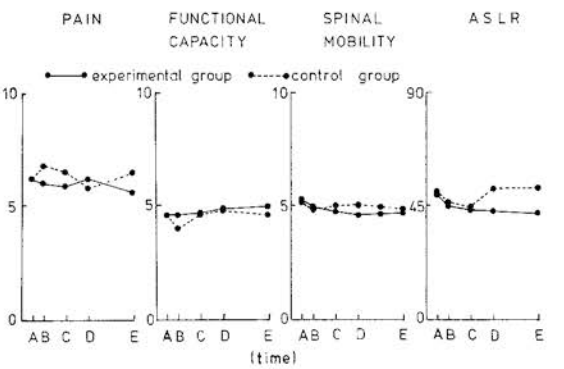

Fig. 2. Graphical representation of the results. Time course of the group means of the variables in the experimental and the control group. A: before treatment; B: immediately after treatment; C, D, E: 3, 6, 12 months after treatment respectively.

effect: 9; no effect: 9; negative effect: 2. Twelve out of 20 patients reported that they still practised the psoas position at least once a week. The data of one patient are missing.

DISCUSSION

Adequacy of the set of measurements and the research design

The set of measurements used in this study seems to constitute a valid test for outcome studies of low back pain patients, since the most important aspects of the patient's back problems (subjective scorings of pain and disability and objective measurements of spinal mobility) are contained (3). Objectivity and repeatability of the tests have previously been shown to be good (5). The test is also sufficiently sensitive to detect the small changes which can be expected in this group of chronic sufferers.

To exclude any contaminating effects of changes due to the natural history of idiopathic LBP, a true experimental design, using a control group, was chosen (7). Patient follow-up was continued until one year after treatment, since long-term effects of treatment are far more important than possible transient short-term effects. The above-mentioned aspects are stressed because they are often neglected when reporting clinical trials (2).

Another aspect, frequently hardly mentioned (14) that needs to be discussed, is the statistical power of the study. Given the number of patients in the experimental and the control group, the statistical power of this study was sufficient to permit meaningful differences between the two groups to reach statistical significance within the frame of the study. An increase in the group numbers would hardly enhance the statistical power. If, for instance, the actual results (means, standard deviations) had been found in a study with 100 patients in each group, the analysis of variance still did not yield statistically significant differences between the Back School and the control group.

Interpretation of short-term effects of treatments

The expected transient improvement of subjective variables was not found. It is unlikely that the difference between the measurements before and immediately after the treatment can be attributed to the effect of repeated testing, since our previous study (5) has shown that period and sequence effects of the set of measurements were insignificant.

The absence of a transient improvement in the Back School group and the transient deterioration in the control group may perhaps be explained by the fact that the initial phase of hope, brought about by a new therapy, has already faded away after four treatments and is replaced by deception, which in the control group is not compensated for by the information and instruction received.

Interpretation of the long-term effects

In this group of chronic LBP patients after one year, no positive effect of the Back School could be observed as compared with the control group. This is in contrast to the findings of Bergquist-Ullman & Larsson in (sub)acute LBP (1). The results of our study also contradict the findings of Zachrisson Forssell (13), who reported positive answers of three-quarters of 140 patients who had completed the Back School course between 9 months and 8 years previously and most of whom were said to suffer from chronic lumbar pain. However, this was a retrospective, uncontrolled study. The uncontrolled part of our study, i.e. the opinion of the patients about the Back School after 3 months, gives the impression that the Back School has benefitted almost 50 % of the participants. This impression is considerably modified by the results of the controlled prospective study.

A comparison of the results of the prospective controlled study of Bergquist-Ullman & Larsson (1) in (sub)acute LBP and the present study in chronic LBP suggests that the Back School is of little value in the chronic phase of LBP and that all efforts should be directed towards the prevention of chronicity of LBP. The Back School is likely to give the greatest benefit in the early phase of idiopathic LBP.

The long-term follow-up study permitted an interesting observation of the development of pain, functional capacity and spinal mobility in the whole group of 43 patients. In the period of one year, spinal mobility showed a slight but significant decrease, but functional capacity showed a slight but significant increase, while pain showed no significant change. This inverse relationship of spinal mobility and functional capacity warrants further study.

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