

PREVENTION OF LUMBAR PAIN THROUGH APPLICATION OF KINESE THERAPY AND FOLLOWING THE ERGONOMIC PRINCIPLES

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(Original scientific paper)

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Abstract

Chronic lumbar pain, seen from a medical and psychosocial aspect is a complex issue, for which a multidisciplinary access is needed during treatment. The goal is to determine the impact of professional education to the outcome of the application of ergonomic principles and the practice of exercises for the lumbar area, in patients with lumbar syndrome. The study has covered 50 patients, who are receiving a therapy for the second time. The patients were randomly selected. They were asked to fill in a control questionnaire in order to make sure that they are following the instructions and to learn about the results from the previously prescribed ergonomic advices, and the practice of the acquired lumbar exercises. The patients were with an average age of 51.8 years, most of whom were females (62%), and average BMI of 22.8. 36(72%) of the patients were following the ergonomic advices, while 14(28%) did not. 16 patients exercised, 8 patients exercised occasionally, 18 patients exercised only in the beginning (after being advised), 3 patients did not exercise at all, while 5 patients did not exercise but engaged in physical activity. Contingents Coefficient indicates a relatively strong association between practicing the exercises and following the ergonomic advice ($p < 0.05$). In 28 of the patients, the symptoms never reappeared, 22 felt pain, 2 had lumbar pain, and 15 had leg cramps. X^2 -test indicates that there is no statistical importance between the observance of ergonomic advices and reappearing of the pain ($p > 0.05$). The application of the kinesitherapy methods, as well as the discipline while following the ergonomic advices addressed to lumbar pain provide satisfactory functional outcome and long term benefit.

Key words: low lumbar pain, kinesitherapy, ergonomic principles

Introduction

There are very few people, equally men and women, who at least once in their life have not faced problem with spinal column. In fact, there is no difference in the disposition of this ill-health condition according to the sex (1). Nearly 70% of the patients have more serious shapes of disorders of the lower back disc affecting the most productive middle years of adult life. In 70% of all cases of mechanical lumbar pain it owes to the degenerative changes in the discuses and facet joints. The degenerative changes in the lumbar intervertebral discus are accelerated under the influence of the genetic factors and constitutional weakness in the constitution of the discus, biochemical changes in its structure, the excessive biomechanical, static and dynamic pressures, among which are the excessive pressures related to the job, as well as the individual factors (age, nicotine, excessive body weight, weak bearing of the body, reduced level of fitness etc.) (2, 3).

Chronic pain is a complex problem from a medical and psychosocial point of view and requires a comprehensive and multidisciplinary approach to evaluation and treatment. The goals of treatment in an interdisciplinary center program are to reduce pain, improve function, and reduce the use of health care. These goals include reducing drug use, changing pain response, increased activity, and reducing 'painful behavior' (4). Recurrence of lumbar pain is high and ranges from 60% to 90%. Nevertheless, in 7% to 10% of the patients who had acute pain in the lower back, it is transferring into chronic pain and often accompanied by changes in the way of living of the patients and their behavior. These patients spend 80%

of the finances from the health, pension, invalid and the social funds as well as the finances from the insurance companies whose work relate to the lower back disorder. The disability caused by the chronic lumbar pain is benign condition with highest costs and losses in the developed industrial countries (5).

The aim of this paper is to determine the impact of professional education on the application of ergonomic principles and the practice of learned exercises for the spine in patients with lumbar pain in terms of recurrence of complaints.

Materials and Methods

The research is observational, descriptive and longitudinal. The study population consists of 50 respondents, patients with lower back pain (who come to therapy for the second time, after six months to a year) registered in the Center for Physical and Kinesitherapy, "Laser Med" from Skopje. The selection of patients was done randomly, using a random sample method from different municipalities. A Control Questionnaire was applied to determine if they adhere to and what are the results of the previously given ergonomic tips and the application of the learned exercises for the spine. The design and composition of the control questionnaire is based on anamnestic examination (epidemiological and demographic characteristics: gender, age, place of residence, profession and functional status); whether they adhere to ergonomic advice, have lumbar pain recurred, and exercise. Due to statistical processing and analysis of the obtained data, appropriate statistical methods were used. The statistical significance of the differences was established by use of appropriate statistical test: Pearson's X^2 test. The statistical significance was defined for $p < 0.05$. The study was prepared by using statistical program SPSS, version 14.

Results

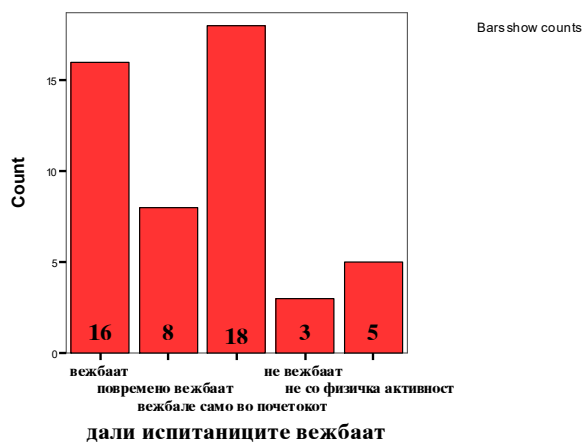
In the analysis of the frequency distribution of the respondents, out of a total of 50 respondents, 31 (62%) are women and 19 (38%) are men. The average age of the respondents is 51.8 years. The analysis of the variable body mass index in patients gives data that the average body mass index in patients is 22.80, with standard deviation 3.938 and standard error 0.394. Out of a total of 50 respondents, who were coming to therapy for the second time, who had previously been educated for ergonomic counseling: 36 (72%) patients followed the ergonomic advice, while 14 (28%) patients did not follow the advice given by therapists. It can be concluded that the percentage of patients who accepted the advice of the therapists and followed the ergonomic advice is twice as high (Graph 1).

Graph 1. Distribution of the frequencies of the respondents from the control group in relation to the adherence / non-adherence to the ergonomic advice



It can also be concluded that the percentage of patients who adhered to the given advice for exercise and physical activity is high. Out of a total of 50 respondents, 16 (32%) patients exercised, 8 (16%) patients exercised occasionally, 18 (36%) patients exercised only in the beginning (after being advised), 3 (6%) patients did not exercise at all, while 5 (10%) patients did not exercise but engaged in physical activity (Graph 2).

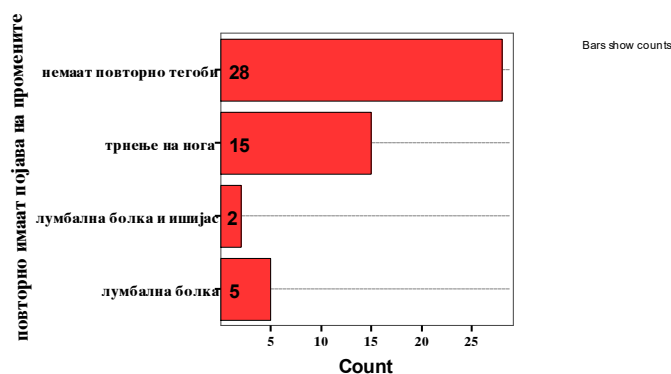
Graph 2. Distribution of the frequencies of the respondents from the control group in relation to the variable advice by the physiotherapist for adherence to exercise



On the same group of 50 patients who were randomly selected from the group of respondents and a survey was conducted in terms of adherence to exercise, the following results were obtained: 16 patients exercised, 8 patients exercised occasionally, 18 patients exercised only in the beginning (after they were given advice), 3 patients did not exercise at all, while 5 patients did not exercise but exercised physical activity.

When analyzing the frequencies of the respondents on the same control group of 50 patients, in terms of the variable recurrence of symptoms of the spine, the following results were obtained: in 22 (44%) patients recurrence of symptoms, in 5 (10%) patients recurrence of lumbar pain, in 2 (4%) patients recurrence of lumbar pain and sciatica, in 15 (30%) patients recurrence of leg cramps, in 28 (28%) patients no symptoms reappeared (Graph 3).

Graph 3. Distribution of the frequencies of the respondents from the control group in relation to the variable recurrence of symptoms



The association between the variables of adherence to ergonomic advice given by physiotherapists and the recurrence of symptoms in patients belonging to the control group shows that: Of 36 (72%) patients who adhere to ergonomic advice, 3 (8.3%) patients recurrence of lumbar pain, 1 (2.8%) patient recurrence of lumbar pain and sciatica, 12 (33.3%) patients have leg pain, while 20 (55.6%) patients have no recurrence of symptoms. Out of 14 (28%) patients who do not adhere to ergonomic advice, 2 (14.3%) patients have lumbar pain again, 1 (7.1%) patient has lumbar pain and sciatica again, in 3 (21.4%) patients experienced recurrence of the leg, 8 (51.7%) patients no recurrence of symptoms (Table 1).

Table 1. Association between the variables adherence to ergonomic advice given by physiotherapists and recurrence of symptoms in patients in the control group

			repeated symptoms				total
			lumbar pain	lumbar pain and sciatica	leg stiffness	have no symptoms again	
adherence to ergonomic advice	yes	number	3	1	12	20	36
		% in relation to adherence to ergonomic advice	8,3%	2,8%	33,3%	55,6%	100,0%
		% in relation to the repeated symptoms	60,0%	50,0%	80,0%	71,4%	72,0%
		% of the total	6,0%	2,0%	24,0%	40,0%	72,0%
		no	number	2	1	3	8
		% in relation to adherence to ergonomic advice	14,3%	7,1%	21,4%	57,1%	100,0%
		% in relation to the repeated symptoms	40,0%	50,0%	20,0%	28,0%	28,0%
		% of the total	4,0%	2,0%	6,0%	16,0%	
total		number	5	2	15	28	50
		% in relation to adherence to ergonomic advice	10,0%	4,0%	30,0%	56,0%	100,0%
		% in relation to the repeated symptoms	100,0%	100,0%	100,0%	100,0%	100,0%
		% of the total	10,0%	4,0%	30,0%	56,0%	100,0%

The association between the variables adherence to ergonomic advice given by physiotherapists and the recurrence of symptoms in patients belonging to the control group X^2 -test shows that there is no statistical significance of the differences in the control group ($p > 0.05$).

Discussion

Although most of the patients are female, according to the studies where subject to analysis is the lumbar syndrome encompass different indicators in terms of the sex, but yet it can be concluded that in fact there is no evidence of disposition for the health disorder in terms of the sex (6). The patients with lumbar syndrome are usually at age when they are professionally most productive. The average age of occurrence of the first attack of lumbar pain is 37 years (7). In the different studies of the outcome of the conservative treatment of the patients with lumbar syndrome, the average age of patients was from 35 to 40.6 years (7,8). According to the analyses of the BMI of patients with lumbar syndrome, most authors establish that the greater part of the patients were with excessive body weight. Böstman O.M. in his study of preoperative BMI and standard body height of 1,128 patients, compared to the control group of general population, has concluded that the increased BMI of taller patients led to serious discus hernia which requires operative intervention (9).

Ergonomic counseling of a patient with lumbar pain is a very important measure in preventing recurrence of discomfort. The patient, through ergonomic advice, is trained to perform and apply the protective movements and positions of the spine that are important in everyday life and at work. It is about creating new patterns and habits in performing movements in the vertebral dynamic segment and establishing a high degree of self-discipline. A spine care program is needed which is based on the models of the so-called "Cross schools" and spine stabilization exercises, which is a complex education program to prevent recurrent microtraumas of the spinal structures responsible for pain and degeneration, in which people learn proper lifting techniques, body mechanics techniques in accordance with the latest accepted ergonomic principles (10).

Most authors have shown that the program of "The active school for the spine" (with intensive kinesitherapy) over a long period of time significantly reduces the incidence of recurrent episodes of lumbar pain, prolongs the time to the first recurrence of lumbar pain and significantly reduces the duration of illness

in the group of patients who took the program, compared with the control group (11). Bendix A. F. et al. performed a prospective randomized trial of 123 patients with chronic lumbar pain. After 4 months of treatment the results showed that the intensive multidisciplinary program (active physical and ergonomic training and psychological control of pain) is superior to less invasive programs regarding return to work (11,12). Koes et al. concluded that there were major methodological deficiencies in most of the studies that evaluated the effect of 'Spine schools'. The studies with the highest methodological scores indicate that "Spine schools" can be more effective when implemented in the workplace (13).

Application of kinesiotherapy for lumbar pain is an important method in the treatment of these patients and is based on the use and application of biomechanical principles in order through strictly controlled, moderate movement to affect decompression and improved disc nutrition, strengthening of hypotrophic muscles, acceleration of the segment or general healing by reducing mechanical stress as well as stabilizing and preventing recurrence of difficulties (14, 15). Nelson B.W. et al. for a period of 16 months followed 46 patients with degenerative changes in the lumbar spine, implementing a program of invasive resistance exercises. The results showed that a large proportion of patients avoided surgical intervention. Due to the partial success and high cost of surgical treatment, they are very important non-invasive treatment strategies (16). Burton C.V. points out that although attention is focused on the cost of invasive procedures, the real savings will be realized through the means of prevention, such as: specific discipline, effective non-operative therapy, post-therapy program for maintaining the health of the spine and the application of ergonomic advice.

Conclusion

The application of ergonomic advice regarding lumbar pain and kinesiotherapy methods, as well as the introduction of programs: "schools for the spine" in the community, where the patient will be educated, how to treat his pain, will reduce the use of drugs and "painful behavior" in patients with lumbar pain. In doing so, changes in the biomechanics of the body and the regular application of exercise must become an integral part of a person's lifestyle, where it will be achieved good functional, social and professional outcome, as well as providing long-term benefit.

References

1. Bloodworth D, Calvilio O. Chronic pain syndromes: evaluation and treatment, In Physical medicine and rehabilitation, second edition, Eds. Braddom R.L, W.B.Saunders Company, Philadelphia, 913-933,2000.
2. Bendix AF, Bendix T, Lumd C. Comparison of three intensive programs for chronic low back pain patients: a prospective, randomized, observer-blinded study with one-year follow-up. Scandinavian Journal of Rehabilitation Medicine, 29: 81-89, 1997.
3. Nordeman L, Nilsson B, Möller M. Early access to physical therapy treatment for subacute low back pain in primary health care: a prospective randomized clinical trial. Clin J Pain. 2006 Jul-Aug; 22(6):505-11.
4. Joncas J, Labelle H, Poitras B, et al: Dorso-lumbal pain and idiopathic scoliosis in adolescence. Ann Chir. 1996;50(8):637-40. Medline: 9035437
5. Atlas SJ, Chang Y, Kammann E: Long-term disability and return to work among patients who have a herniated lumbar disc: the effect of disability compensation. The Journal of Bone and Joint Surgery, 82-a (1): 4-15,2000.
6. Kjaer P, Wedderkopp N, Korsholm L, Leboeuf-Yde C. Prevalence and tracking of back pain from childhood to adolescence. BMC Musculoskelet Disord. 2011 May 16;12(1):98. PubMed: 21575251
7. Bogduk N. Innervation and pain patterns of the lumbar spine. In Physical therapy of the low back, Eds. Twomey L.T., Churchill Livingstone, 93-103, 2000.
8. Rubinstein SM, van Middelkoop M, Assendelft WJ, et al. Spinal Manipulative Therapy for Chronic Low-Back Pain: An Update of a Cochrane Review. Spine (Phila Pa 1976). 2011 Jun 1;36(13):E825-E846. PubMed: 21593658
9. Zitzmann NU, Chen MD, Zenhäusern R. Frequency and manifestations of back pain in the dental profession. Schweiz Monatsschr Zahnmed. 2008;118(7):610-8. Medline: 18720645
10. Birkmeyer NJ, Weinstein JN. Medical versus surgical treatment for low back pain: evidence and clinical practice. American College of Physicians, Effective Clinical Practice, Sept-Okt, 2:218227, 2002.
11. Butterman GR. Lumbar disc herniation regression after successful epidural steroid injection. J. Spinal Disord. tech., Dec; 15(6):446-76, 2002.
12. Vandergrift JL, Gold JE, Hanlon A, Punnett L. Physical and psychosocial ergonomic risk factors for low back pain in automobile manufacturing workers. Occup Environ Med. 2011 May 17. PubMed: 21586759
13. Crawford CM.: Management of acute lumbar disk herniation initially presents as mechanical low back pain. J.Manipulative Physiol., May; 22(4); 235-44, 1999.
14. Buchner M: Epidural corticosteroid injection in the conservative management of sciatica. Clinical Orthopaedics and related reserch, 375, 149-156, 2000.
15. Swenson R, Haldeman S. Spinal manipulative therapy for low back pain. J Am Acad Orthop Surg. 2003 Jul-Aug;11(4):228-37. Medline: 12889861

16. Dvorak J, Dvorak V, Schneider W, Tritschler T. Manual therapy in lumbo-vertebral syndromes. *Orthopade*. 1999 Nov;28(11):939-45. Medline: 10602830
17. Daltroy LH, Iversen MD, et al. A controlled trial of an educational program to prevent low back injuries. *The New England Journal of Medicine*, 337:322-8, 1997.