

Physiotherapeutic treatment Schedule for chronic low back pain: influence on pain, quality of life and functional capacity

Programa de tratamento fisioterapêutico para dor lombar crônica: influência sobre a dor, qualidade de vida e capacidade funcional

Mariana Regina Arins¹, Nicole Murara¹, Xayani Bottamedi¹, Juliano dos Santos Ramos¹, Simone Suzuki Woellner², Antonio Vinicius Soares¹

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ABSTRACT

BACKGROUND AND OBJECTIVES: Low back pain is a public health problem affecting population regardless of social and economic class. Segmental stabilization is a kinesiotherapeutic technique being considered treatment option for this disorder. Primary objective of this study was to evaluate the effects of a treatment schedule for low back pain based on segmental stability principles. The secondary objective was to propose and adaptation of Nottingham Health Profile, which is a tool to evaluate quality of life.

METHODS: This is a pre-experimental study involving 25 chronic low back pain patients of both genders, mean age of 50.5 years. The study consisted of 16 sessions of a segmental stabilization exercises program, carried out twice a week during six months. Measurement tools were: visual analog scale, Roland-Morris questionnaire and two versions of Nottingham Health Profile, namely translated and modified.

RESULTS: At treatment completion, all patients had significant improvement in variables controlled by the study. Modified Nottingham Health Profile version had strong and significant correlation with the translated version (r 0.88) and with functional incapacity level evaluated by Roland Morris questionnaire (r 0.85).

CONCLUSION: Proposed treatment schedule was beneficial for patients involved in the study. Modified version of Nottingham Health Profile may be used to evaluate quality of life perception especially of chronic low back pain patients.

Keywords: Chronic low back pain, Functional capacity, Physiotherapy, Quality of life.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A dor lombar é um problema de saúde pública que afeta a população independentemente da sua classe social e econômica, indiscriminadamente. A estabilização segmentar é uma técnica cinesioterapêutica que tem se destacado como opção de tratamento para esse distúrbio. O objetivo principal deste estudo foi avaliar os efeitos de um programa de tratamento para dor lombar crônica baseado nos princípios da estabilidade segmentar. O objetivo secundário foi propor uma adaptação do Perfil de Saúde de Nottingham, um instrumento para avaliar a qualidade de vida.

MÉTODOS: Trata-se de um estudo pré-experimental envolvendo 25 pacientes com dor lombar crônica, de ambos os gêneros com idade média 50,5 anos. Foram realizadas 16 sessões de um programa de exercícios de estabilização segmentar, com frequência de duas vezes por semana durante dois meses. Os instrumentos de medida foram: a escala analógica visual, o questionário de Roland-Morris e duas versões do Perfil de Saúde Nottingham traduzida e a modificada.

RESULTADOS: Ao final do tratamento todos os pacientes apresentaram melhora significativa nas variáveis controladas no estudo. A versão modificada do Perfil de Saúde Nottingham apresentou forte e significativa correlação com o da versão traduzida (r 0,88) e com o nível de incapacidade funcional avaliado pelo questionário de Roland Morris (r 0,85).

CONCLUSÃO: O programa de tratamento proposto mostrou-se benéfico para os pacientes envolvidos no estudo. A versão modificada do Perfil de Saúde Nottingham pode ser utilizada para avaliar a percepção da qualidade de vida direcionada especialmente para pacientes com dor lombar crônica.

Descritores: Capacidade funcional, Dor lombar crônica, Fisioterapia, Qualidade de vida.

INTRODUCTION

In industrialized countries, low back pain (LBP) incidence and prevalence are alarming. It is estimated that at least 70% to 89% of the population have or shall have this pain in some stage of life^{1,2}.

It is a public health problem affecting people regardless of their social and economic class^{3,4}.

In Brazil, approximately 10 million people become disabled by this disease⁵, which is considered the first

1. Faculdade Guilherme Guimbala, Departamento de Fisioterapia, Joinville, SC, Brasil.

2. Prefeitura Municipal de Joinville, Departamento de Fisioterapia, Joinville, SC, Brasil.

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Correspondence to:

Rua São José, 490, Centro

89202-010 Joinville, SC, Brasil.

E-mail: provinicius.soares@gmail.com

reason for sickness allowance and the third reason for disability retirement⁶. Chronic LBP may be induced by inflammatory and degenerative diseases, cancer, congenital defects, muscle weakness, rheumatic predisposition, signs of spinal or intervertebral discs degeneration and others¹. There are many possibilities to manage this disabling condition and physiotherapy has several techniques to minimize LBP, including acupuncture, hydrotherapy, electrotherapy and therapeutic exercises⁷⁻⁹. With all these interventions, physiotherapy aims at minimizing pain, improving functional capacity and quality of life (QL) giving patients a new alternative to treatment involving the whole impaired structure^{10,11}. Among therapeutic exercise techniques, there is the concept of lumbar segmental stabilization (SS), characterized by low intensity isometrics and deep trunk muscles synchrony, aiming at stabilizing lumbar spine and at protecting its structure against excessive wear¹².

SS technique is a modern treatment approach based on kinesiology, which acts directly on lower trunk muscles, specifically on spinal anterolateral and posterior stabilizers. Other two muscles working in synchrony are transverse of abdomen and diaphragm, able to increase intra-abdominal pressure. Diaphragm also controls and prevents organs displacement. Adequate recruitment of these muscles aims at improving biomechanical stability of the lumbar segment and at protecting joint structures such as discs and ligaments against excessive tension and injuries^{13,14}.

So, this study aimed at evaluating the effects of a treatment schedule based on SS exercises associated to the Spine School, emphasizing aspects of pain, functional capacity and QL. This study also had as secondary objective the proposal of adaptation of a measurement tool for QL, the Nottingham Health Profile (NHP). Such tool is already translated into Portuguese and was the basis for the study of relevant population, that is, patients with chronic low back pain (CLBP).

METHODS

The first stage was an experimental study with therapeutic intervention (segmental stabilization associated to the Spine School) with pre and post-test measurements. The second stage was a descriptive correlation study using modified NHP versus NHP and Rolland Morris (RM). Participated in the study patients of the Basic Health Unit (BHU) of the Floresta district (Joinville, SC), with diagnosis of unspecific chronic low back pain.

Initially, 40 patients were sequentially screened from the BHU waiting list, making up a convenience sample. From these, 25 have met inclusion criteria, being 19 females and 6 males with mean age of 50.5±10.4 years. Inclusion criteria were patients of both genders, aged ≥18 years with diagnosis of idiopathic LBP for more than three months. Exclusion criteria were specific LBP (e.g., disc herniation, canal stenosis, postoperative period of tumors), and

patients who attended to less than 75% of the treatment program.

A chart was used to record patients' personal and historical data. Then, specific measurement tools were used:

- Visual analog scale (VAS) was used for pain intensity. This tool is characterized by a numerical ordinal scale varying from zero to 10, where zero means no pain, five is moderate pain and 10 means severe pain¹⁵;
- NHS, in its original translated and modified versions was used for self-perceptive evaluation of QL (Attachment 1) of patients with chronic low back pain. NHS is a questionnaire with 38 questions and its score may vary from zero (minimum) to 38 (maximum) being that NO will always score zero and YES will score 1¹⁶. In modified NHP applied in this study, four questions were included in a total of 42 questions regarding patients' perception of the QL. In presented items, score may vary from zero (minimum) to 84 (maximum). The answer NO is always scored zero, the answer SOMETIMES is scored 1 and the answer YES is scored 2.

In both translated and modified NHS the higher the score, the more severe the impairment of QL. Questionnaires evaluate the level of energy, pain, sleep, social interaction, physical skills and emotional reactions. Modified NHS includes four additional questions specific for pain, namely 7, 18, 20 and 30. Other questionnaire questions were maintained according to original NHS. This modified version was evaluated by three specialists experienced in managing patients with spinal pain, especially LBP^{17,18}.

Procedures

After receiving all information about evaluation and management procedures, participants have signed the Free and Informed Consent Term (FICT).

During pre-test, selected patients were interviewed to collect their data by means of a history chart, including socio-demographic and clinical data; major complaint, pain evaluation (VAS), history of current, previous and family disease, associated diseases, use of drugs and lifestyle.

Data were collected in two moments: in the pre-test, before starting the treatment schedule, and in the post-test, always collected by BHU physiotherapist.

Deep muscles strengthening exercises are applied by means of isometric contractions of trunk muscles, requiring further recruitment of tonic fibers of the muscle system, located along the spine, thus maintaining good support in the upright position^{19,20}. Muscle strengthening was developed according to continuous practice, recruiting an increasingly larger number of fibers due to static contraction²¹.

Selected physiotherapeutic intervention for patients was based on the SS technique. Along treatment, 11 exercises were performed, divided in three levels, according to patients' evolution. These levels were classified as easy, in a total of 7 exercises, moderate 2 and difficult also 2. During 16 sessions (twice a week, lasting approximately

60 minutes) therapeutic exercises were performed aimed at stretching ischiotibial muscles and paravertebral muscles. Both were performed twice lasting 30 second in the beginning of each session and twice lasting 30 seconds at the end of the session.

Then exercises based on SS were performed, with isometric strengthening: 1st stage (first 6 sessions) with four easy exercises. In the 2nd stage (7th to 12th session) all easy exercises were performed plus 2 moderate exercises. Finally, in the 3rd stage (13th to 16th session), patients concluded with the 11 exercises, demanding abdominal, multifidus, erector spinae and transverse of abdomen muscles, including bridge, four supports and trunk elevation^{22,23}. Symmetrically, 10 repetitions were performed and asymmetrically 5 repetitions. Posture was started with prolonged inspiration, maintaining concentration for 5 seconds. Exercise was ended with expiration and return to original position^{13,24}.

Statistical analysis

The program GraphPad Prism 5[®] was used for data tabulation and analysis. Descriptive statistics data were obtained, such as mean and standard deviation. To test differences between pre and post-test measurements, paired Student *t* test was used with significance level of 95% (p<0.05). To observe the relationship among studied variables (Modified versus Translated NHP, Rolland-Morris questionnaire and VAS) Pearson Correlation Test was used with significance level of 95% (p<0.05).

This study was approved by the Human Research Ethics Committee, Associação Educacional Luterana Bom Jesus/ IELUSC, number 427.648.

RESULTS

There has been predominance of females (76%). Eleven patients were active and regularly working and 14 were on medical leave and/or retired. Twenty patients were using drugs before treatment and 5 had no analgesic drug. After the treatment period, just two continued using regular drugs and 18 have interrupted or decreased their use.

Our results are shown in table 1 by means of descriptive statistical analysis and significance level between pre and post-test of all controlled variables.

Table 1 shows that all patients have improved in all measurements of this study.

Table 2 shows correlation analysis between modified NHP and other measurement tools used in the study.

Table 2. Correlation of modified Nottingham Health Profile versus other measurements of the study.

MNHP	NHP	RM	VAS
r	0.88*	0.85*	0.31*
p value	<0.0001	<0.0001	0.0296

MNHP = Modified Nottingham Health Profile (0-84); NHP = Nottingham Health Profile (0-38); RM = Roland Morris (0-24); VAS = visual analog scale (0-10); *significant correlation coefficient (p<0.05).

Table 2 shows that Modified NHP had good correlation with all other measurement tools of the study. Especially, there is very strong and positive correlation with translated NHP and RM. With VAS, correlation is weak, although significant.

Modified NHP is useful for the relevant population. The possibility of grading patients' answers in YES, SOME-TIMES and NO, provides further sensitivity to the tool to evaluate quality self-perception of these patients. This version was evaluated and validated by three specialists, experienced in the clinical practice in spinal disorders. Unanimously, they considered it adequate to be applied to low back pain patients.

DISCUSSION

Participants of the study have shown significant improvement in all measurement tools used for variables control.

According to details of study participants, it was observed higher incidence of females. This is compatible with other studies already carried out in Brazil¹. This predominance might be explained by cultural issues involving female in home tasks and professional responsibilities, being more susceptible to chronic diseases and due to biomechanical differences as compared to males^{1,25,26}.

In a randomized clinical trial by Korelo et al.¹⁴, with 12 sessions, patients improved pain already in the first SS treatment day and also during intervention, maintaining a stable level of pain. So, the intervention made that, at the end of treatment, no major VAS changes were found. However, there has been pain improvement. In our study, patients submitted to SS have improved according to VAS when pre and post-test evaluations were compared.

According to Sakamoto et al.²⁷, there has been pain and

Table 1. Descriptive statistics of studied variables

	VAS Pre	VAS Post	RM Pre	RM Post	NHP Pre	NHP Post	MNHP Pre	MNHP Post
Mean	3	0.7	7.4	3.4	14	8,5	23	11
SD	2.3	1	5.2	3.5	6.9	8,2	14	10
p value	< 0.000		< 0.000		< 0.000		< 0.000	

VAS = visual analog scale (0-10); RM = Rolland Morris (0-24); NHP = Nottingham Health Profile (0-38); MNHP = Modified Nottingham Health Profile (0-84); SD = standard deviation.

functionality improvement in a group of 13 individuals (3 males and 10 females), submitted to SS exercises after 12 sessions performed three times a week. In the study by Pereira, Ferreira and Pereira²⁸, sample was made up of 10 female patients submitted to 12 SS treatment sessions, twice a week, to manage pain and improve functional capacity of chronic low back pain individuals. These results are in line with our study, where 16 sessions were performed twice a week with 25 patients, being 19 females and 6 males. In our study, although with higher number of patients and a large part being made up of females, it was possible to observe improved pain in patients with CLBP, even with a mild difference in frequency of sessions.

As to QL aspects evaluation, it is known that it is impossible to accurately measure them, however it is important to collect information on how patients perceive their QL. So, a measurement tool such as NHP, which is a generic tool to evaluate QL, might be useful²⁹. Our study presents

an adapted version for LBP patients. This NHP adaptation includes more answers options and also some specific questions to detect the influence of LBP on QL of this special population. In fact, LBP is a very common and in general disabling disorder. Negative effects of this disease are expressed by the strong relationship of incapacity level and negative perception of QL of patients³⁰.

CONCLUSION

The program of exercises based on SS principles has resulted in significant benefits to involved patients. There has been pain, functional capacity and QL perception improvement. Proposed modification to NHP was sensitive to detect changes in QL perception of these patients. Specific questions about pain inserted in the tool and a change in answers range with regard to frequency of chronic LBP-induced changes might have contributed to good results found.

Attachment 1. Self-perceived evaluation of quality of life in chronic low back pain. Modified¹⁶

Personal data		Date:			
Name:	Age:	Gender	Time diag.	Weight:	Height:
Occupation:	Work time:	Company:			
Treatment type and duration:	Pain evaluation (analog visual scale)				
Drugs:	Pain intensity: (1 2 3 4 5 6 7 8 9 10)				
Questions	Answers			Domain	
	Yes (2)	Sometimes (1)	No (0)		
1. I am tired all the time				EL	
2. I feel pain at night				P	
3. Things are leaving me discouraged/depressed				ER	
4. My pain is unbearable				P	
5. I take drugs to sleep				S	
6. I forgot how to do things that please me				ER	
7. I feel pain during exercises (waking, running, cycling, others)				P	
8. I am extremely irritated ("with nerves on edge")				ER	
9. I fell pain when changing position				P	
10. I feel lonely				SI	
11. I am only able to walk at home				PS	
12. I have difficulty to bend down				PS	
13. I feel pain to bend down and pick objects on the floor				P	
14. Everything for me demands lots of effort				EL	
15. I wake up at night and can no longer sleep				S	
16. I am unable to walk outdoors				PS	
17. I feel difficult to make contact with people				SI	
18. Pain impairs my leisure activities				P	
19. I have difficulty to go up and down ladders or steps				PS	
20. I feel pain during sexual activity				P	
21. I feel pain to pick things on top				PS	
22. I feel pain when walking				P	

Continued...

Attachment 1. Self-perceived evaluation of quality of life in chronic low back pain. Modified¹⁶ – continuation

23. Currently I lose temper very easily	ER
24. I feel that there is no one close in whom to trust	SI
25. I stay awake most part of the night	S
26. I feel as if I were losing control	ER
27. I feel pain in the upright position	P
28. It is difficult to dress myself	PS
29. I lose energy very easily	EL
30. I feel pain when urinating or defecating	D
31. I have difficulty to remain standing up for a long time	PS
32. I take a long time to get to sleep	S
33. I feel myself as a weight to other people	SI
34. Concerns are keeping me awake at night	ER
35. I feel that life is not worth living	ER
36. I sleep badly at night	S
37. I have difficulty in relating to other people	PS
38. I need help to walk outdoors (crunches, stick or someone supporting)	PS
39. I feel pain to go up and down ladders or slopes	P
40. I wake up feeling depressed	ER
41. Days seem too long	ER
42. I feel pain when I am sitting	P

EL = energy level; P = pain; ER = emotional reactions; S = sleep; SI = social interaction; PS = physical skills.

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