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Effects of crochet technique associated with kinesiotherapy in patients with chronic low back pain

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ABSTRACT

Background: The chronic low back pain (LBP) had been considered an important occupational disorder with several strategy available to treatment, however, few studies had been evaluated the treatment combination. **Objectives:** The aim of present study was compared the effects of combination of crocheting associated to Kinesiotherapy treatment and Kinesiotherapy isolated treatment on function of lumbar spine and pain during achievement of daily life in patients with chronic LBP. **Methods:** Forty subjects were distributed randomly in two groups: Crochetagem + Kinesioterapy (C; n: 18; 47.5 ± 7.75 years) and Kinesiotherapy (K, n: 18; 45.3 ± 8.93 years). The C group was treated by crocheting technique associated with kinesiotherapy using therapeutic ball. The K group performed a kinesiotherapy treatment using just a therapeutic ball. The following parameters were evaluated: abdominal strength, articular range motion and the data of Rolland Morris and Oswestry Disability Index questionnaires were evaluated before and after 8 weeks of treatment. Both groups performed all therapeutic sessions for 50 minutes, three times a week. **Results:** Significant differences ($p<0.05$) were found just on time to trunk flexion and extension, right and left lateral trunk, pain and abdominal strength. However, significant differences on time ($p<0.05$) was found on Rolland Morris and Oswestry data questionaries parameters just on C group, additionally the values of C group were lower than K group after treatment. **Conclusion:** Both kinesiotherapy isolated and association of crocheting and kinesiotherapy were useful to improve functional parameters, however the data from Rolland Morris and Oswestry questionaries were lower just on crocheting associated to kinesiotherapy group indicating increment on function of lumbar spine and decrease on pain during achievement of daily life.

Keywords: Manual Therapy; Physiotherapy; Pain, Lumbar Spine; Treatment; Low back Pain.

INTRODUCTION

Chronic low back pain (LBP) can be defined as persistent or recurrent pain with duration greater than three months; is one of the most common musculoskeletal changes in industrialized societies, affecting 70% to 80% of the adult population at some point in the life, having a predilection for young adults, in an economically active phase[1]. It is characterized by sensory and emotional experience elicited by a tissue injury, real or potential[2]. A loss of lumbar and pelvic mobility may also be associated LBP[1,2]. One of the main difficulties in the study of LBP is related to its source. Some factors that make lumbar pain studies difficult are: the lack of a reliable correlation between clinical and imaging findings; be the segment lumbar spine innervated by a diffuse and intertwined network of nerves, making it difficult to with precision the place of origin of the pain, except in the radiculo-medullary affections; fur fact of muscle contractions, frequent and painful, do not accompany injury demonstrable histology; and, because they are rarely surgical, there are scarce and inadequate the anatomical and histological findings of compromised, making the interpretation of the painful phenomenon difficult[1-3]. According to Arguisuelas et al.[2] besides the lumbar fascia, other soft tissues are also related to LBP. Studies with images show asymmetries in the section area of the lumbar square muscle, psoas and multifidus in subjects with pain with asymptomatic individuals[2].

The recommendations for chronic pain management emphasize multimodal approaches: surgical, pharmacological and non-pharmacological[3]. Among the non-invasive techniques kinesiotherapy and electrothermotherapy are the most used by physiotherapists[4,5]. The manual therapy has also gained important space in clinical practice, it is different techniques involving the application of low pressure loads, with the objective of mobilizing and restore fascia and tissues, decrease pain and improve functionality[2,6]. Ajimsha et al.[7] affirm that under normal conditions the fascia and connective tissues tend to move with minimal restrictions. However,

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injuries resulting from trauma, injury repetitive stress and inflammation tend to decrease fascial tissue length and elasticity, resulting in restriction of movement. Crocheting is a technique of physiotherapeutic treatment still little known, both in its applicability and in its results and promotes a mechanical action in the adhesions of tissues, causing a release and allowing them to occur again between the tissue planes. The technique is based on the use of hooks or "Crochets". Its main objective is the rupture of fibrosis points, usually caused by the accumulation of calcium oxalate crystals in the aponeurotic planes, causing irritation[6]. The hypothesis that has been suggested is that the crochet technique can improve pain, and consequently the range of motion of patients with chronic LBP, this form being recommended as a resource in rehabilitation for this purpose. Therapeutic exercises are the main resources of physiotherapists to treatment of chronic LBP, considered gold standard[1]. Techniques of therapies are also part of the repertoire of these professionals, for the treatment of various disorders of the locomotor apparatus, such as, for example, injuries to the rotating sleeve[6], clinical results are very favorable, although there are few scientific studies with adequate methodological quality regarding the subject. In this way, the aim of present study was compared the effects of combination of crocheting associated to Kinesiotherapy treatment and Kinesiotherapy isolated treatment on function of lumbar spine and pain during achievement of daily life in patients with chronic LBP.

METHODS

Sample

After Research Ethics Committee of Ibirapuera University approbation (nº 405/08) 40 individuals with referral and medical diagnosis of chronic LBP of Ibirapuera University Physiotherapy clinic participated voluntarily in this study. The following criteria inclusion were adopted: age between 40 and 60 years; at least in two of the special tests (Laségue test, Milgran test, Valsalva maneuver, test of bilateral Thomas, bilateral piriformis test), not make use of continuous drugs for LBP; previous spine surgeries; do not present medical restriction to practice physical exercise or if they presented any limitations in lower limbs that physical exercises. All subjects were distributed randomly in two groups: Crocheting + Kinesiotherapy (C; n: 18; 47.5 ± 7.75 years) and Kinesiotherapy (K, n: 18; 45.3 ± 8.93 years). The C group were treated by crocheting technique associated with kinesiotherapy using therapeutic ball. To the K group performed a kinesiotherapy treatment using just a therapeutic ball.

Treatment

Both groups performed all therapeutic sessions for 50 minutes, three times a week and a total period of 8 weeks. Kinesiotherapy treatment was performed using a therapeutic ball therapy kinesiotherapy protocol were performed weekly. For 1º to 4º weeks: stretches in chains: anterior, posterior and lateral performed at the beginning and end of the sessions; paravertebral strengthening in isometry; abdominals (straight anterior and oblique) concentric and eccentric, all performed on the therapeutic ball with increasing time and repetitions progressively. For 5º to 8º weeks: stretching exercises were repeated first month, increasing the degree of difficulty. Strengthening exercises have evolved for isotonic (concentric and eccentric) exercises, with increasing degree of difficulty. The technique of crocheting at the site of pain and adjacent to the sacral region, lumbar spine and piriformis muscle. In ventral decubitus, the patient was positioned with a pillow in the region the friction was performed with the hook, sliding from distal to the sacral region to the thoracic region five times in both sides.

Parameters evaluated

Anthropometry

Height was measured using a Cardiomed stadiometer (Cardiomed® stadiometer Curitiba, PR, Brazil) with a 0.1 cm accuracy. Body mass was measured using a Filizola scale, Personal Line Model 150 (Filizola® digital scale, Curitiba, PR,

Brazil), capacity of 180 kg, with an accuracy of 0.1 kg. Body mass index (BMI, kg / m2) was calculated according to the formula: BMI = weight / height$^{(2)}$).

Articular range motion

The articular range motion evaluation of trunk flexion, extension and lateral inclination was performed with a Fleximeter performed standing in an anatomical position avoiding the anterior slope (pelvis forward)[8].

Muscular strength

The abductor muscle strength was performed according to previously study[9]. Briefly, the one-minute test was applied, having as their initial position the individuals placed in dorsal decubitus on a with the feet fixed and positioned on the ground, the heels being joined with 30 to 45 cm distance from the hip, with the fingers of the hands intertwined behind the head. The elbows should touch the knees in the anterior flexion of the spine and each repetition was counted when the subject returned to the initial position. The maximum number of repetitions performed correctly in 1 minute.

Questionaries

The questionnaires Rolland Morris[10] and Oswestry Disability Index[11] were performed to evaluated function and pain in the activities of daily life and functional evaluation of the lumbar spine, incorporating measures of pain and physical activity respectively.

Statistical analysis

Statistical analysis was performed using the SPSS software for Windows (version 21, SPSS Inc., Chicago, Illinois, USA). All data were expressed as mean ± standard deviation. The D'Agostino-Pearson test was used to evaluate sample distribution. Comparisons between groups in relation to the beginning and the end of the intervention were carried out by the 2-way ANOVA with repeated measurements, followed by the post-hoc Bonferroni test or T test conform necessary. The effect sizes (ES) were calculated, and evaluated based on the following criteria: < 0.50 trivial, 0.50 to 1.25 small, 1.25 to 1.9 moderate and > 2 large. Statistical significance was set at p <0.05.

RESULTS

As seen in Table 1, no changes in anthropometric parameter were observed between groups. As showed on Table 2 significant differences (p<0.05) were found just on time without interaction (p> 0.05) to trunk flexion and extension, right and left lateral trunk, pain and abdominal strength. However, significant differences on time (p<0.05) was found on Rolland Morris and Oswestry questionnaires parameters just on C group, additionally the values of C group were lower than K group after treatment.

DISCUSSION

Both groups improve articular range motion and pain after treatment, this can be attributed to which in addition to breaking the cycle of pain and disuse. According to Oliveira et al.[12] the ß- endorphin (endogenous opioid) acts as an acting mechanism in the pain control of chronic pain through the exercises that interact as a modulator of the unpleasant aspect of pain by psychological cortex, of the autonomic nervous system through action of dopamine and liberated opioids, of the descending mechanisms (noradrenaline, serotonin and opioid peptides) and the spinal cord (opioids and GABA). Significantly improved was found on abdominal strength in both groups. In fact, there are two theories to explain increased muscle strength; the first is that both groups were submitted to abdominal strengthening exercises and consequently improve the muscular condition (better recruitment and increase of force)[7,13]. To Pinto et al. [13] the decrease in trunk muscle strength (abdominal) is related to promote a global body imbalances. The weakness of this muscle is related to overload in the lumbar region, thus compensating for the paravertebral and squat musculature low back. Directly linked to LBP and muscular spasm of these musculature and piriformis muscle, causing the pain radiated to the lower limbs by compression of the sciatic nerve. The second is that due to fear related to pain there is decreased flexion Therefore, it is suggested that the volunteers did not perform the movements properly in the initial evaluation, because the pain causes restriction of movements, muscle[7] spasms and postural changes, and functional limitations are also common in the activities of daily life and practical life, besides the restriction in the participation of the individual in society[7,13].

In the final comparison between the groups, there was a significant improvement in pain and disability, assessed by the Rolland Morris to the study of Ketrekoukias et al.[14], according to the authors these results can be explained by the theory of sluices for pain control, since mobilization of the active spine of the vertebral joints, whose stimuli are carried by myelinated to the posterior horn of the spinal cord, causing blockage of the stimuli from the nociceptors of the same area. In addition, mobilization involves with skin that may potentially influence the activity of nociceptors. Still as According to Ajimsha et al.[7], all massage techniques have the analgesic

Table 1. Anthropometric parameters

	Crochetagem + Kinesioterapy	Kinesioterapy	Significance
Body mass (kg)	68.42 ± 7.3	66.32 ± 5.8	= 0.66
Height (m)	1.66 ± 7.2	1.68 ± 6.3	= 0.72
BMI (kg/m^2)	27.31 ± 3.5	26.92 ± 3.1	= 0.89

Note: BMI: body mass index. Values expressed in mean ± standard deviation.

Table 2. Effects of different treatments on functional parameters in patients with chronic low back pain.

Parameters	Crochetagem + Kinesioterapy			Kinesioterapy		
	Before	After	ES	Before	After	ES
Trunk flexion (°)	67.7 ± 26.2	78.0 ± 22.2	0.39	52.9 ± 23.8	71.4 ± 17.3*	0.77
Trunk extension (°)	26.1 ± 11.4	33.0 ± 13.8*	0.60	22.1 ± 8.5	32.3 ± 9.5*	1.20
Rigth lateral trunk (°)	22.7 ± 7.9	29.4 ± 11.2*	0.84	18.2 ± 5.5	26.4 ± 9.6*	1.49
Left lateral trunk (°)	24.1 ± 8.6	29.1 ± 11.7	0.58	19.1 ± 6.9	25.8 ± 9.5*	0.97
Pain	6.1 ± 2.7	3.0 ± 1.3*	1.14	7.1 ± 2.0	4.2 ± 2.0*	1.45
Abdominal strength	17.0 ± 8.2	31.3 ± 10.2*	1.74	14.8 ± 7.7	27.6 ± 9.6*	1.66
Rolland Morris	10.0 ± 4.4	6.0 ± 3.4*#	0.90	12.4 ± 5.4	11.2 ± 6.3	0.22
Oswestry	41.8 ± 17.0	34.0 ± 14.6*#	0.45	47.8 ± 18.3	44.8 ± 20.4	0.16

Note: ES: effect size. *p< 0.05 vs. before. #p< 0.05 vs Kinesioterapy group. Values expressed in mean ± standard deviation.

effect of be attributed to the stimulation and excitation of the afferent Delta fiber, which may cause pain through the activation of the descending systems of inhibition of pain. In addition, we also note the importance of group activity. Patients who complained of pain, depression, and physical disabilities, when interacting with others who presented the same problems, leave at the end of therapy, more enthusiastic. They reported the end of the sessions that had less complaints and less depressed, data already described in the literature[6]. The findings of the present study do not support that the crochet technique is effective in treatment of chronic LBP, in isolation. Special multimodal interventions addressing psychosocial issues, exercises, medications appear to be more efficient in treatment of chronic pain in general[1,15], however this therapy may be one more beneficial component in the treatment of pain and / or for subgroups with chronic LBP. Some limitation should be mentioned such sample size and chronic pain diagnostic due to fact to be considered as multifactorial model with many interrelated predictive variables, which makes treatment difficult.

CONCLUSION

Both kinesiotherapy isolated and association of crocheting and kinesiotherapy were useful to improve functional parameters, however the data from Rolland Morris and Oswestry questionaries were lower just on crocheting associated to kinesiotherapy group indicating increment on function of lumbar spine and decrease on pain during achievement of daily life.

AUTHOR'S CONTRIBUTION

ACA, MFN, FDA, MORS, CP and ASS collaborated with the practical part, collecting and performed the analyzed the data the data. ACA, RLR, LSB, WAB and ASS and assisting in the writing of the methods, discussion. GCB and DSB had done the final revision and edited the article.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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