

## Therapeutic massage effect in patients with bronchial asthma

### Efecto del masaje terapéutico en pacientes con Asma bronquial

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*Date of reception: October 18, 2020.*

*Date of acceptance: November 23, 2020.*

#### ABSTRACT

The need to look for therapeutic alternatives that lengthen the periods of crisis as ways to improve the quality of life of patients with bronchial asthma constitutes the starting point for this research that aims to assess the effect of therapeutic massage in patients with bronchial asthma. For this, theoretical, empirical and statistical methods were used, in addition, specific manipulations of therapeutic massage were used to stimulate the respiratory system. The results obtained show the effectiveness of massage for this disease as there was a significant difference of  $p = 0.00$  towards the end of the study.

**Key words:** Therapeutic massage; Bronchial asthma; Therapeutic alternatives; Respiratory system; Quality of life

#### RESUMEN

La necesidad de buscar alternativas terapéuticas que alarguen los períodos de crisis como vías para mejorar la calidad de vida de los pacientes con asma bronquial constituye el punto de partida para esta investigación que tiene como objetivo valorar el efecto del masaje terapéutico en pacientes con Asma bronquial. Para ello se utilizaron métodos teóricos, empíricos y estadísticos, además se utilizaron manipulaciones específicas del masaje terapéutica para estimular el sistema respiratorio. Los resultados obtenidos evidencian la efectividad del masaje para esta enfermedad pues existió una diferencia significativa de  $p=0,00$  hacia el momento final del estudio.

**Palabras clave:** Masaje terapéutico; Asma bronquial; Alternativas terapéuticas; Sistema respiratorio; Calidad de vida

## **INTRODUCTION**

Bronchial Asthma is a chronic disease of the respiratory system characterized by hyper reactive airways (i.e., an increased bronchial constriction response of the bronchial tree). The thinner airways occasionally and reversibly decrease by contracting their smooth muscles or by widening their mucosa as they become inflamed and produce mucus, usually in response to one or more triggers such as exposure to an inadequate environment (cold, damp or allergenic), exercise or exertion in hyper-reactive patients, or emotional stress.

Asthma causes symptoms such as wheezing, shortness of breath (polypnea and tachypnea), chest tightness, and unproductive coughing during the night or early morning. Exacerbations are interspersed with asymptomatic periods where most patients feel fine, but may have mild symptoms, such as being out of breath - after exercise - for longer periods of time than an unaffected individual, who recovers earlier.

Asthma symptoms, which can range from mild to life-threatening, can usually be controlled with a combination of drugs and environmental changes as airway constriction usually responds well to modern bronchodilators.

Asthma is under-diagnosed and under-treated, creating a substantial burden on individuals and families, and possibly restricting individuals' activities for life. Where about 300 million people worldwide currently suffer from asthma; estimates suggest that asthma prevalence increases globally by 50% each decade, predicting increases of another 100 million patients by this 2020.

Bronchial asthma is now recognized as the most common chronic condition in adults and children in the developed world, with an estimated 5% of the population in these industrialized societies suffering from bronchial asthma (Braman, 2003, pp.57-75; World Health Organization, 2004, pp.1-10). All over the world, according to (Beasley, 2002, pp. 20-30), approximately 250,000 deaths are attributable to asthma each year, in accordance with WHO estimates; in 2005, 255,000 people died from asthma.

Studies show prevalence in the United States and Northern European countries of 5%; Western Europe and Mediterranean countries of 1-4%; Australia and New Zealand of 6.8-9.7%. Meanwhile, in Latin America the figure varies from 5.7 to 16.5% (Vega, 2011, pp.18-20).

It is necessary to state that it coincides with what has been stated by several authors about the economic expense caused by this disease, since the economic costs can be expected to go from 1 to 2% of the health care budget in asthma. (Masoli, et al. 2004, pp.469-478).

All of the above makes this disease a serious health problem worldwide, which is why several researchers have made it an important target of research, among them stand out: (Beasley, 2002, pp.20-30), (Domínguez, 2007, pp.88-100) and (Vera, 2012, pp.10-15). All of them agree that the diagnosis of asthma begins with an evaluation of the clinical picture, family history and history of risk or previous crises taking into account the time of evolution of the picture and the crises.

Most cases of asthma are associated with allergic conditions, so diagnosing disorders such as rhinitis and eczema lead to a suspicion of asthma in patients with the correct symptoms: cough, choking and chest pressure.

Such anguish and thirst for air may indicate a severe crisis that warrants immediate rescue treatment to reverse the bronchospasm before continuing with the detailed physical examination.

Inspection of the chest may show subcostal or intercostal retraction or pull. Chest dimensions in chronic asthmatic patients vary compared to non-asthmatic children, characteristic of costal flattening. Inspection may reveal details to the diagnosis, such as the discovery of allergic dermatitis, conjunctivitis.

The treatments used to rehabilitate this disease are numerous, since according to authors such as (Beasley, 2002, pp.20-30), these are directed towards the specific pharmacological recommended for patients with asthma in dependence that is the severity of their disease and the frequency in the appearance of symptoms.

The specific treatments for asthma are broadly classified into: preventive and emergency medicines. The EPR-2 report, a protocol for the diagnosis and management of asthma, as well as reports from other international societies are used and supported by many physicians.

There are also non-pharmacological therapies that are included here with physical agents such as ultrasound applied to the dorsal paravertebral from D1 to D12 and the

sixth and seventh intercostal spaces at a dose of 0.4 w/cm 2/3 min. The maneuvers of kinesiology, therapeutic physical exercise

In a bibliographic search, it could be stated that there are several authors who have systematized the Therapeutic Physical Culture (TPC) as a non-pharmacological treatment of bronchial asthma, where they stand out: (Barbosa, 2010, pp.20-28; Sánchez, 2010, pp.20-30 and Quevedo, 2019 pp.18-25). The novelty and relevance of these authors' proposals is recognized. However, their proposals have been focused on the use of different means of CFT as rehabilitation of the disease such as physical exercise, play and gymnastics. In their proposals, they do not refer to massage as a therapeutic tool, since the application of massage manipulations in the thoracic cage in the intercostal spaces makes breathing deeper, as proposed by I.M. Zarkizov-Serazini, quoted by (Quevedo, 2019, pp.18-25).

Moreover, the reflex links of the lungs with other organs represent a certain interest for the practice of therapeutic massage. Among such reflexes there are the pulmonary reflexes, proprioceptors of muscles and joints, as well as the thoracic and diaphragmatic reflexes that exert their action on the excitability level of the respiratory center. This is a proof of the potentialities of massage for patients with bronchial asthma.

All the mentioned above, evidences that there has been little systematic research on massage as a therapeutic means for patients with bronchial asthma, which, together with the reduced number of published review papers, justifies the need to carry out this research, with the aim of: identifying the effect of therapeutic massage in patients with bronchial asthma.

The hypothesis of the present study is that the analysis of the effect of therapeutic massage in patients with bronchial asthma will allow its inclusion as an alternative treatment in patients suffering from this disease.

## **MATERIAL AND METHODS**

In the present study, 30 patients from several cantons of Manta, Equadordia, diagnosed with bronchial asthma who met the criteria established by the doctor of the hospital of Manabí that attends this specialty, selected through a simple random

sample using the tombola technique, participated. They were between 9 and 12 years old, 11 of the male sex and 19 of the female sex.

This study was approved by the Ethics Committee of the University Laica Eloy Alfaro de Manabí, particularly the Nursing Faculty is in accordance with the guidelines of the Declaration of Helsinki where all investigated subjects gave their consent and received the information required for the study. (World Medical Association, 2013, pp. pp.2191-2194). Pre-experimental research was carried out following the steps proposed by (Sparkes, 1992, pp.29-33).

### **Instruments**

For the assessment of the subjects investigated, three specific tests were used which have been systematized by authors such as (Ramirez et al. 2020), these are

#### **Spirometry test**

Specific objective: To identify the pulmonary vital capacity of patients with bronchial asthma

Means used: a digital spirometer type FCS-10000 of Chinese manufacture was used, which allowed an evaluation of the CVP in liters (L). To do this, each patient was allowed three attempts to avoid the bias of poor patient familiarization with the media and the highest score was taken.

The evaluation scale applied is as follows:

Normal female sex: 3500 ml, less than this score is considered altered.

Normal male: 4000 ml less than this score is considered altered.

#### **Voluntary expiratory apnea**

Specific objective: to identify the time of voluntary apnea in expiration of the combatants of the provincial laboratory of criminalistics

Means used: it requires a room with adequate ventilation, real estate, is chairs of any kind but with a back to support the sword. In addition to a stopwatch, metric, scale and a whistle by the team conducting the test.

It consists in determining the time in seconds that the subject is kept in those states, normal, of maximum expiration in sitting position.

Average.

Normal

Female sex: 30 seconds or more normal state

Male: 40 seconds or more normal state

Voluntary Apnea in Inspiration

Specific objective: to identify the time of voluntary apnea in inspiration of the combatants of the provincial crime laboratory

Means used: it requires a room with adequate ventilation, real estate, is chairs of any kind but with a back to support the sword. In addition to a stopwatch, tape measure, scale and a whistle by the team conducting the test.

It consists of determining the time in seconds that the subject is kept in those states, normal, of maximum inspiration in a sitting position.

Scale

Normal

Female sex, between: 50 - 60 sec.

Male sex, between: 70- 80 seconds

### **Treatment scheme through therapeutic massage**

Objective: to activate the respiratory system in patients with bronchial asthma.

Means used: Massage table and oils

Type of massage: Local, this is done in a certain part or segment of the body.

Application area of the body: the back

Body position: Prone

Description: methodological order for the application of therapeutic massage in the back of patients with bronchial asthma. It should be noted that in each therapeutic massage session when the different manipulations are to be carried out, a friction should be applied between each one of them and these should be in the following order:

Manipulation:

1- Friction, in its Simultaneous variety

2- Rubbing: varieties, Circular with the fingertips, Circular with the knuckles, (Both are done with two hands). Then it is performed again:

3- Friction: variety Simultaneous

4- Kneading: varieties, Simple, Simultaneous, Alternating, with the tear region and the thumb

5- Friction: Simultaneous variety

6- Percussion: varieties, Slap, Box, Finger (Any of its two forms)

7- Friction: Simultaneous variety

8- Shaking: variety Flat

9- Friction: Simultaneous variety

Frequency: three times a week with a time of 20 to 30 minutes per session and a general duration of 23 weeks of treatment.

### **Statistical analysis**

The statistical analyses were performed with SPSS v. 20 software (SPSS Inc, Chicago, IL, United States). The data for the descriptive statistics will be presented below using frequency distribution. The inferential statistics, the non-parametric test of Wilcoxon's sign ranges was used to compare the results before and after the application of the treatment with massage, this last one was used because there were data that were not normally distributed according to the results of the Kolmogorov-Smirnov test.

### **RESULTS**

The following describes the design of a pre-experiment, for a group with pre-test and post-test. For which the steps described by (Sparkes, 1992) will be followed, which are illustrated below.

1-Defining the scientific problem, the hypothesis and the objectives

Problem: How does the therapeutic massage influence patients with bronchial asthma?

Hypothesis: If there is a significant difference between the pre-test and the applied post-test, then the effect of the massage can be evaluated positively in patients with bronchial asthma.

2. To state the statistical hypotheses that respond to the proposed objectives

Statistical hypothesis:  $H_0: = 0$

$H_0$ : The patient with bronchial asthma of the selected sample remains the same after the treatment with the therapeutic massage is applied.



H1: 0

Ha: The patient with bronchial asthma of the selected sample changes significantly after the treatment with the therapeutic massage is applied.

3-Selection of experiment design and number of repetitions.

It was established a pre-experiment design with a single group with an initial test and a final test, to ensure internal validity, it was established the control of the concomitant variables of greater influence on the relevant variables, within them are those related to the researchers, who were the same in both measurements, with the same instruments and means and in the same conditions (laboratories and schedules); it was guaranteed the standardization of material resources through the preparation of the actors responsible for implementing the proposal developed in this research, as well as the control of the necessary means. The process of validation of therapeutic message manipulations as treatment for patients with bronchial asthma.

In order to know the significance of the results in each one of the selected tests, a statistical treatment was applied to the data with the use of the basic system of IBM SPSS v 20, for this purpose:

First: the Kolmogorov-Smirnov test was applied with the hypotheses:

Ho: The population where the sample comes from is normally distributed.

H1: The population from which the sample comes is not normally distributed (the latter was the one that prevailed after data processing)

Second: set the confidence level of  $\alpha=0.05$  equivalent to 95% reliability.

Third: interpretation

Being the null hypothesis that the population is normally distributed, if the p-value is less than alpha (confidence level) then the null hypothesis is rejected (it is concluded that the data do not come from a normal distribution).

If the p-value is greater than alpha, the hypothesis is not rejected and it is concluded that the data follow a normal distribution.

Fourth: decision If Ho is fulfilled, t' students is applied

If H1 is met, the Wilcoxon non-parametric test of the ranges with sign (2 measurements) is applied, the latter being met since data that were not normally distributed were found.



#### 4- Population and sample

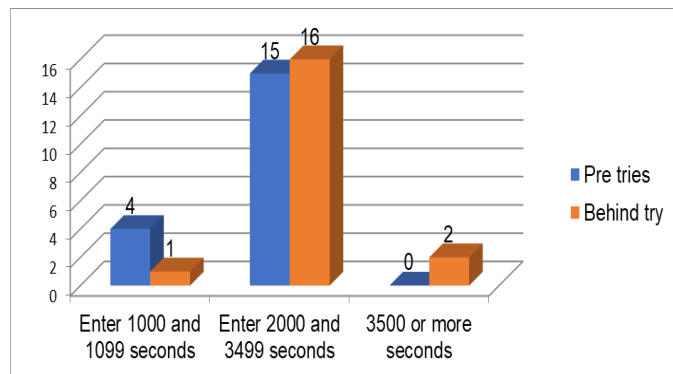
For the validation of the study, the sample described above in this research was taken into account.

#### 5- Analysis of the results and validation of the proposal

##### Spirometry test results in female patients

When analyzing the results of Graph 1, it can be seen that between the range of 1000 to 1099 the lowest range of the scale was found 4 female patients and in the range of 2000 to 3499 a medium range is found the remaining 15. It is necessary to clarify that these two ranges are of respiratory alteration and are catalogued with evaluation of alteration, since the normal range for this sex is 3500 or more where no patient is located.

After applying the massage techniques, it can be stated that there was a positive transformation in the members of the sample, since it was disseminated to only one patient in the minimum range, and it was increased to 16 in the intermediate range. Most notably, two patients were kept in the normal range, important aspects for being patients with bronchial asthma.



**Figure 1.** Spirometry test results in female patients

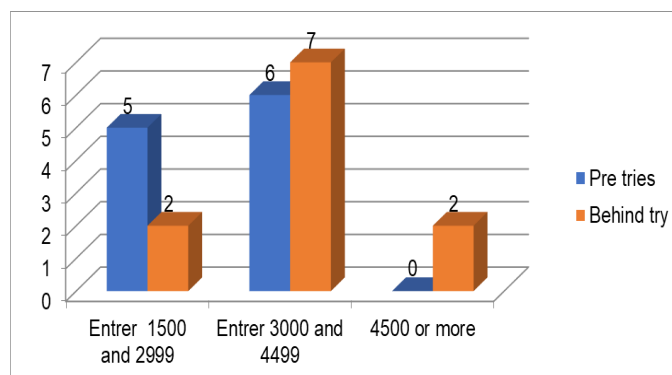
**Source:** Own elaboration

##### Spirometry test results in male patients

The graph shows the results of the spirometry test for male patients, where before applying the massage techniques it was observed that 5 patients for 45.4% are in the minimum range of score for this test, the remaining in the intermediate 7 for 63.6% is necessary to clarify that none is in the normal ranges of the test.

After applying the massage techniques, it can be observed that there was a transformation in the patients under study. As it was reduced to only 2 in the minimum

range and it was achieved that 2 reached the normal range score, being patients with bronchial asthma the effectiveness of the techniques used becomes evident.

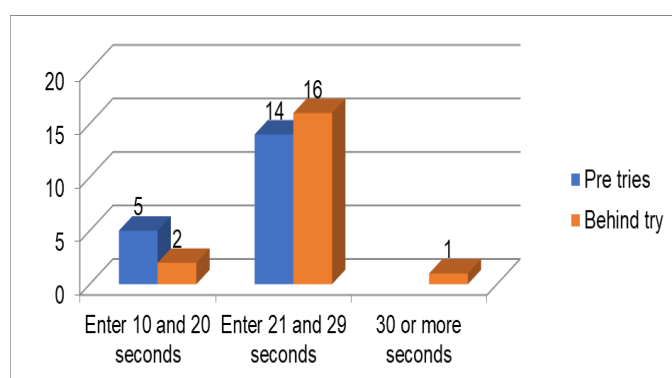


**Figure 2.** Spirometry test results in male patients

**Source:** Own elaboration

### Results of apnea time on female expiration

Graph 3 shows the results of the expiration apnea test for female patients, where it was obtained that 5 patients for 26.4% are in the minimum range of the scale and the remaining 14 for 73.6% in the middle, being these values lower than those systematized by the literature as normal. Once the massage techniques were applied, an improvement was observed in most of the patients participating in the study, since it was reduced to only 2 patients with the minimum scale and it was possible for 1 to obtain the normal scale.



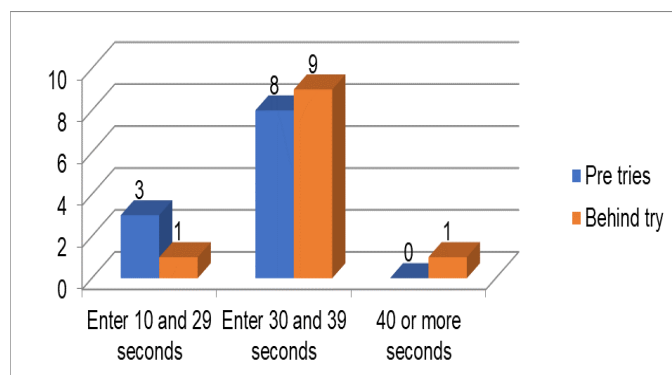
**Figure 3.** Results of the female expiratory apnea time test

**Source:** Own elaboration

### Results of apnea time on male expiration

The results of graph 4 show a comparison between before and after the application of the massage techniques where a transformation towards the final moment is evident, since the decrease of 2 patients from the minimum value was achieved and one

reached the score of the normal range, this demonstrates that the techniques for this sex have been effective.

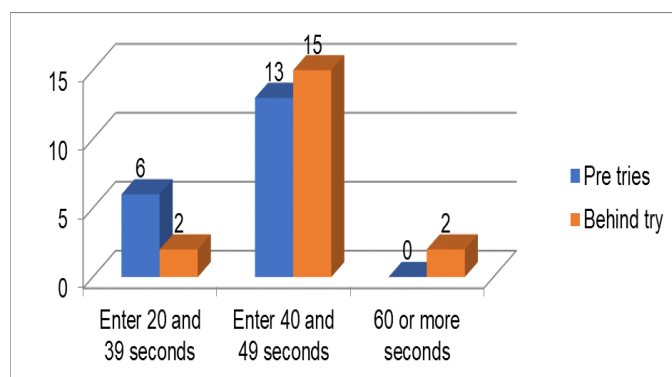


**Figure 4.** Male expiration time apnea test results

**Source:** Own elaboration

### Female Inspiration Apnea Time Results

When evaluating the results of graph 5, it can be seen that before applying the massage techniques, there were several patients in the minimum range of the scale (6 for 31.6%) and the rest in the intermediate range (13 for 68.4%). However, once the massage techniques were applied, the results were improved, since only 2 patients were reduced to the minimum scale and 2 obtained scores on the normal scale, which shows the effectiveness of the proposal presented in this study.



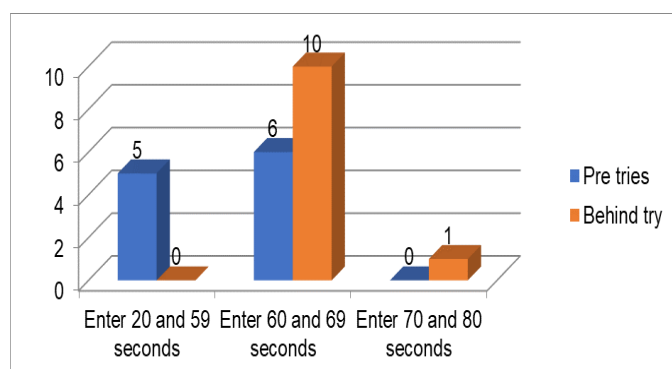
**Figure 5.** Results of apnea time in inspiration for the female sex

**Source:** Own elaboration

### Results of apnea time in male inspiration

By evaluating the results of this test and tabulating them, we obtain graph 6 which illustrates the results described below. At the time of the initial test, 5 patients were in the minority range for 45.4% and the remaining 6 for 54.6% in the intermediate range and none in the normal range. After applying the techniques, none of them were in the

initial range of the score and most of them were 10 for 90.9% in the intermediate range. In addition, 1 reached the score of normal, aspects that make evident the positive aspect of the techniques used.



**Figure 6.** Inspiration time results for the female

**Source:** Own elaboration

### Pre-experiment validation

In order to know the level of significance of the results obtained, the Wilcoxon non-parametric test of the signed ranges was used, since the data are not normally distributed, when obtaining what is processed by SPSS for Windows. Once the data were tabulated, the results of both moments (initial moment (MI) and final moment (MF) were compared.

The ranges of signs show a level of statistical significance below 0.05 after comparing the results  $MF \geq MI$ , with 100% of the patients analyzed Table 1. This denotes that there was a change of sign in each of the cases studied, when evaluating the Test Statistic (Z), it expresses a favorable position higher than the final moment, from a bilateral significance (Table 2), based on negative ranges, so the null hypothesis is rejected ( $H_0$ ).

In accordance with the above, it is accepted that the patient with bronchial asthma in the selected sample changes significantly after treatment with therapeutic massage is applied, which evidences the functionality of the proposal.

**Table 1.** Test results of Wilcoxon's non-parametric test of the ranges with

Ranges				
		N	Average range	Add up of
CVP after – CVP before	Negative ranges	0 <sup>a</sup>	,00	,00
	Positive ranges	29 <sup>b</sup>	15,00	435,00
	Ties	1 <sup>c</sup>	-	-
	Total	30	-	-
Apexp after – Apexp before	Negative ranges	0 <sup>d</sup>	,00	,00
	Positive ranges	27 <sup>e</sup>	14,00	378,00
	Ties	3 <sup>f</sup>	-	-
	Total	30	-	-
Apisp after –Apisp before	Negative ranges	0 <sup>g</sup>	,00	,00
	Positive ranges	28 <sup>h</sup>	14,50	406,00
	Ties	2 <sup>i</sup>	-	-
	Total	30	-	-

**Source:** Own elaboration

**Table 2.** Significance level of Wilcoxon non-parametric test of signed ranges

Statisticians of contrast <sup>a</sup>			
	CVP after – CVP	Apexp after	Apisp after –
Z	-4,786 <sup>b</sup>	-4,595 <sup>b</sup>	-4,733 <sup>b</sup>
Statistical significance (Bi- tinsmithl)	,000	,000	,000
a. Try of the ranges with sign of Wilcoxon			
b. Based in the negative ranges.			

**Source:** Own elaboration

## DISCUSSION

The therapeutic massage is applied with the purpose of recovering or helping the patient's recovery, allowing him/her to become useful and social in his/her environment. In all cases the type of injury presented is evaluated. In the case of bronchial asthma, the subject investigated is directed towards strengthening the

smooth pulmonary musculature in accordance with the mechanism of formation of the conditioned reflexes and thus contribute to improving the patient's breathing.

This is a topic that has little systematized work, a sample of which is what was previously proposed. The therapeutic massage is now being included in the treatment protocols. Aspects to which this research contributes.

In accordance with the above, previous studies are based on the premise that integral treatment is an important factor in the rehabilitation of this illness. For example: (Pino, Rodríguez and Valier, 2017, pp.34-41), those who deepened the treatment of chronic bronchial asthma with Natural and Traditional Medicine, which included some manipulations of tuina massage combined with other techniques of NTM, in the case studied presented similar improvements to the subjects investigated in this study. Although in the cited study there was influence of other therapeutic procedures.

On the other hand, the study by (Garlobo, 2018, pp.32-39), in his work Combined exercise and therapeutic massage in asthmatic students, this one also used massage combined with other means of CFT, its results were positive and very similar to those presented in this study. However, they were not validated by statistical inference.

In the program of the asthmatic patient of the Ministry of Public Health of Cuba, it is described in detail the means and ways of treatment, although it approaches that massage can be a nature way. This document does not make explicit the manipulations to be used.

This study offered to the professionals who work with this disease a therapeutic tool of low economic cost, which offers good results and is very stimulating for patients. In addition, it offers the functional tests that make it possible to evaluate the results of the patients in a concrete way.

The theoretical and methodological study related to therapeutic massage in patients with bronchial asthma, allowed identifying the need to deepen in the study of this problem, because the Ecuadorian reality makes evident that this means is not part of the treatment protocols of this disease. The interpretation of the results, by means of the application of the descriptive and inferential statistics, allows knowing that there was a significant difference after applying the massage techniques in patients with bronchial asthma; therefore, the effectiveness of the proposal is confirmed.

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