Case Report

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Decreased Dyspnea in Post-COVID Patients After Instrumental Chiropractic Manipulation

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ABSTRACT

Introduction: Coronavirus disease 2019 (COVID-19) is an acute respiratory infection caused by the SARS-CoV-2 coronavirus. Symptoms usually appear mildly and gradually, and many patients can recover without the need for special treatment. However, some people may experience a worsening of the disease, developing breathing difficulties that can progress and lead to complications.

Objective: To evaluate the effectiveness of instrumental chiropractic manipulation in improving dyspnea in post-COVID patients.

Methods: Three patients with functional dyspnea underwent a four-week session of instrumental chiropractic manipulation. The assessment was performed before and after each session with spirometry, a 6-minute walk test. The following were obtained before and at the end of each test: SpO2, maximum HR, and Borg scale scores for dyspnea and leg fatigue.

Conclusion: The values of the scales scores and measurements showed a decrease in dyspnea in patients with post-COVID.

Keywords: A Case Study; Chiropractic Instrumental Manipulation; Dyspnea; Post COVID-19

Introduction

Coronavirus disease 2019 (COVID-19) is an acute respiratory infection caused by the potentially serious coronavirus SARS-CoV-2, with high transmissibility and global distribution [1]. It was first detected in Wuhan, China, in December 2019 and declared a pandemic by the World Health Organization (WHO) on March 11, 2020 [2]. Recent evidence suggests that the lungs are the organs most affected by COVID-19, with different pathophysiological events developing respiratory disease failure [3]. Over time, it was often observed that those infected had persistent respiratory symptoms (such as dyspnea, desaturation, cough, weakness, and fatigue), constituting what was called "post-acute covid-19 syndrome" or "Long. COVID" that potentially lasts for weeks or months [4]. The subject gains importance due to the growing number of diseases. The impairment of the post-COVID-19 physical and functional state can impair the ability to perform activities of daily living and functionality, alter professional performance and hinder social interaction [5]. In this scenario, health services need to readjust with strategies that provide the physical-functional recovery and social reintegration of these individuals through pulmonary rehabilitation [6].

Conventional pulmonary rehabilitation performed in outpatient clinics consists of a program with aerobic training and exercises with respiratory incentives (inspiratory and expiratory) to strengthen the muscles and bronchial hygiene (when necessary) [7]. A new procedure being performed with these patients is instrumental chiropractic manipulation or instrumental chiropractic therapy. This manipulation is performed with an instrument that produces a gentle impulse (vibration or micro impulse) that sends information to the nervous system [8]. The manipulation will be performed at specific points related to respiratory biomechanics in a safe, non-invasive,

and safe way for the patient [9]. This article presents three cases in which the manipulation was used during the period of pulmonary rehabilitation. Instrumental manipulation was performed on the C3-C5 cervical vertebrae, which are related to the diaphragm muscle (right and left phrenic nerves) and on the thoracic vertebrae, due to the thoracic nerves that are the origin of the intercostal nerves, responsible for innervating the internal intercostal musculature. These muscles are the accessory muscles of breathing. Along with the internal intercostal, they allow for forced expiration by lowering the ribs, thereby reducing the diameter of the chest cavity, and drawing air out of the lungs [10]. This instrumental manipulation in the vertebrae triggers a vibration in the nerve roots, which stimulates neuron conduction, recovering the function of lung compliance.

To assess the outcome of this therapy, we used the Medical Outcomes Study 36-item Short-Form Health Survey (SF-36) questionnaires, six-minute walk test (6 MWT) as well as completing the Epworth Sleepiness Scale (ESS), and manovacuometry to assess maximal inspiratory and expiratory pressures before and after each intervention with the TIQ. The SF-36 is a self-reported health status questionnaire. It consists of eight scalar scores, the weighted sums of the questions in each section. Each scale is directly transformed into a 0-100 scale under the assumption that each question has equal weight. Lower scores indicate greater disability. The SF-36 was translated and adapted for use in Brazil [11]. The ESS is a simple and reliable instrument that has been widely used to measure daytime sleepiness; we used the version of the ESS translated into Portuguese and adapted for use in Brazil [12]. Subjects are asked to rate the probability of falling asleep on an increasing probability scale (from 0 to 3) for 8 different situations that most people find themselves in during activities of daily living. The scores for the eight questions are added together to obtain a single number [13]. We measured the value of maximum inspiratory and expiratory pressures with the manovacuometry (Murenas Produtos para Saúde Ltda) with an adapted mouthpiece [14]. The 6MWT is a simple and practical standardized test for the assessment of exercise capacity. The distance covered in the 6MWT (6MWT) is defined as the distance that patients can quickly walk on a flat and rigid surface within six minutes [15]. The test was performed possibly from indoors, in a 30 m straight and flat corridor. Participants were instructed to walk as quickly as the end of the corridor to the other as often as possible. DTC6 was then measured. This study aimed to evaluate chiropractic instrumental manipulation as a supporting therapy in the physical-functional rehabilitation of patients with symptoms of dyspnea and fatigue in the post-covid period.

Case Presentation

This was a 4-week study with three patients (64±7 years) with dyspnoea and fatigue selected to assess the effect of chiropractic instrumental manipulation on dyspnoea and fatigue. This study was carried out from September 2022 to November 2022 and performed by physical therapists from Institute LIVTA in São Paulo, Brazil. Participants were patients diagnosed with COVID-19 by laboratory test PCR (Polymerase Chain Reaction) and serological tests (antibodies present in the blood), with dyspnoea and fatigue after one month, and instructed to continue their normal daily activities and medication during the investigation.

Inclusion Criteria

Patients of both sexes aged 40 years and over, with post-covid and respiratory sequelae and with a positive laboratory diagnosis for COVID.

Exclusion Criteria

Patients without a diagnosis confirmed by laboratory tests and without respiratory sequelae.

Primary Results

This investigation considered the findings related to the parameters evaluated before and after a four-week protocol involving chiropractic instrumental manipulation. Before the first session, the results were performed in sequence, answering the questionnaires and the scales. After the last session, the evaluations were carried out in the same way.

Intervention

A. Before the first treatment session with the TIQ, patients were instructed to continue their normal daily activities and medication during the investigation. All patients confirmed at the end of the study that the instructions were followed.

B. Before and after each session, we measured blood pressure (BP) with the OMRON device model: HEM-7320, we checked oxygen saturation and heart rate (HR) with the G-Tech digital oximeter, model Oled Graph (MD300C23) and respiratory rate (Fr).

C. Patients underwent manovacuometry with three measurements of maximal inspiratory and expiratory pressures before the first session and after the last session, using the highest value obtained for analysis through manovacuometry.

D. They answered the SF-36 and ESS questionnaires and completed the DTC6.

E. The patient was placed in the prone position with the forehead resting on the stretcher, arms stretched along the body, and feet out, with the support of the positioning roller under the distal region of the tibia. We used the stainless steel TIQ instrument (Figure 1) from LIVTA Tecnologia em Saúde Ltda to perform instrumental chiropractic manipulation.

F. The protocol was conducted in 4 weeks (2 sessions per week, making a total of 8 manipulations with an interval of 48 hours between applications).

G. The location of the instrument application: Spinous process

of cervical vertebrae C3-C5 (Figure 2) and spinous process of thoracic vertebrae (T4 and T6) (Figure 3) one application every 3 seconds for a total of 30 seconds in each anatomical process. Strength: 16kg. TIQ angulation: Thoracic 900, and cervical nine hundred about the floor.

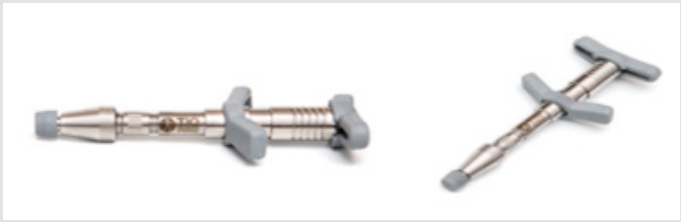

Figure 1: Instrumental Chiropractic.

Figure 2: The spinous process of thoracic vertebrae.

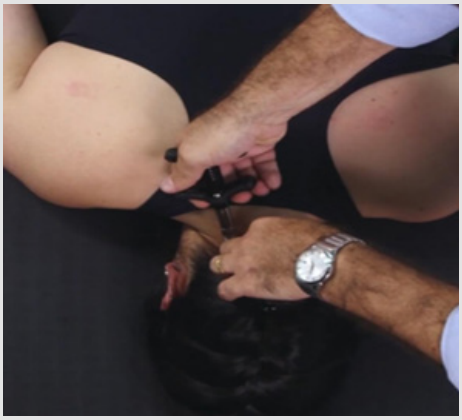

Figure 3: Spinous process of cervical vertebrae..

Results

This case study article selected three patients (2 men and 1 woman) with respiratory sequelae (fatigue and dyspnea) from COVID-19. As described in the methodology, we used chiropractic manipulation with the instrument to assist in the pulmonary rehabilitation of these patients. In Table 1, we show the characteristics of the study participants: gender, age, weight, and height. The results of the measurements: Oximetry, blood pressure, respiratory, heart rates, and the scores of the ESS questionnaire and the walk test before and after 4 weeks of manipulation are presented in Table 2. Manovacuometry with the values of maximal inspiratory and expiratory pressures before and after they are in Table 3, and in the Table 4 are the domains of the SF-36 questionnaire with the respective results [16-18].

Table 1: Characteristics of the study patients, presented as mean and standard deviation.

Patients	Number of Patients	Gender (M/F)	Age (Mean± SD)	Heights (Mean± SD)	Body Mass (Mean± SD)
	3	2/1	64±7	1,67±0,09	71,33±16,86

Table 2: Patient assessment results before and after TIQ. O2 Sats: Oxygen saturation; HR: Heart rate; RF: Respiratory frequency; BP: Blood pressure; SF-36: Medical Outcomes Study 36-item Short-Form Health Survey; ESS: Epworth Sleepiness Scale; 6MWT: 6 Meters Walk Test.

	Patients Before Manipulation Instrumental			Patients After (4 weeks) Manipulation Instrumental		
Patients	A	B	C	A	B	C
O2Sats	92%	94%	96%	94%	97%	98%
HR	80bpm	75bpm	78bpm	76bpm	72bpm	75bpm
BP	14x10mmHg	14x9mmHg	13x9mmHg	13x8mmHg	12x8mmHg	11x9mmHg
RF	28bmm	23bmm	27bpm	23bmm	21bmm	24bmm
ESS	12	8	10	8	7	8
6MWT	22″10	24″05	23″15	20″05	22″12	21″09

Table 3: Manovacuometry result. MIP: Maximum inspiratory pressure; MEP: Maximum expiratory pressure.

	Patients Before Manipulation Instrumental			Patients After (4 weeks) Manipulation Instrumental		
Manovacuometry	**A**	**B**	**C**	**A**	**B**	**C**
MIP (cmH_2O)	110,5	101,7	76.59	112,9	109,1	79,62
MEP (cmH_2O)	111,03	109,94	59.71	113,1	110,3	75,22

Table 4: BP, Bodily Pain; GH, General Health Perceptions; MH, Mental Health; PF, Physical Functioning; RE, Role Limitations due to Emotional Functioning; RP, Role Limitations due to Physical Functioning; VT Vitality; SF, Social Functioning.

	Patients Before and after (4 weeks) Manipulation Instrumental					
SF-36 Domains	**A**	**B**	**C**	**A**	**B**	**C**
BP	12	9.4	12	12	12	12
GH	5.4	4.0	5.4	4.0	3.0	4.0
MH	11.18	11.18	10.4	16.0	16.0	15.0
PF	24.0	26.0	23.4	22.6	22.6	22.6
RE	14.4	14.4	17.8	13.2	13.8	13.8
RP	25.0	24.4	23.4	26.6	23.8	23.8
VT	23.4	23.4	25.4	25.0	28.0	24.0
SF	3.4	3.4	3.4	2.0	2.0	1.0

Discussion

This article shows instrumental chiropractic manipulation being used punctually according to the anatomical points that interact with respiratory biomechanics, and not using the protocol and the Leg Checking test for dysfunctions as the technique was developed. This specific model to treat systemic problems has already been used for cases of Sinusitis by physical therapist Henrique Baumgarth in Brazil with excellent results. The results of this study with patients in the post-covid phase showed promise. Patients after four weeks of treatment with the manipulation instrumental, eight sessions, reported less dyspnea and consequently less fatigue. This result can be seen, by not only the measurements, manovacuometry, and tests but also the functional improvement in the life of each one of them. All vital signs after four weeks improved, as did maximal inspiratory and expiratory pressures. The sleep and quality of life tests and questionnaires obtained a very satisfactory score in comparison with the score obtained before chiropractic instrumental manipulation.

Simpson JK, et al. 2020 [17] in their article, state that chiropractic care does not improve the body's immune functions with spinal subluxation adjustments. It turns out that in this study that we did, there was no manipulation in subluxations, we did not use manual chiropractic, and much less had the intention of altering a process as complex as the patient's immune function. Here in Brazil, the National Health Council (CNS) approved on 05/22/2020 the inclusion and dissemination of Integrative and Complementary Practices in Health 18 we performed the instrumental manipulation procedure within the criteria established by the country's ministry of health. So far, there is not a considerable number of articles on instrumental or manual chiropractic and COVID-19, which leads us to believe that this case study is one of the pioneers in this area. This case study with the three patients will serve as a discussion about instrumental chiropractic. Will there always be a need to do the Leg Check and the entire protocol? Alternatively, can we, through knowledge of the pathophysiology and symptom, act only on the specific anatomical points related? In any case, more studies with this technique are necessary to be able to analyze it better.

Conclusion

Pulmonary rehabilitation is recommended to favor the physical-functional recovery of post-covid patients. For this purpose, it is necessary to carefully consider the needs of each patient, detected through a comprehensive assessment. To date, there is still no solid body of evidence on the characteristics, and effects of specific interventions for post-COVID-19 patients. Instrumental chiropractic manipulation with the TIQ can be an alternative technique in this rehabilitation process.

Availability of Data and Materials

The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

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