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Case Report

The effects of dry needling on respiratory parameters in a patient with medium severity

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Abstract

COPD is expected to be third leading cause of death by 2030. We aimed to investigate effectiveness of dry needling in a patient with medium severity COPD in addition to respiration and posture exercises in relation to respiratory capacity.

Case report: Demographic information was gathered from patient along with his smoking history. Respiratory function, posture, muscle shortness, muscle strength, respiration, chest circumference, distance between thyroid cartilage and sternum, six-minute walking test were all recorded. Dyspnea was assessed according to modified Borg scale. Every two days, patient was given dry needling treatment and respiratory exercises, along with ten sessions of posture and stretching exercises. We found differences in FEV1/FVC values, saturation distance between thyroid and sternal notch, number of pushups and dyspnea. Patient complaints decreased.

We believe further study is required to ascertain effectiveness of dry needling method for quality of life and respiratory problems in patients with COPD.

Keywords: Chronic obstructive pulmonary disease; dry needling; dyspnea.

INTRODUCTION

Recent publications have declared that COPD affects 64 million people worldwide, and World Health Organization projections predict that it will be the third leading cause of death by 2030 (1). In patients with COPD, it is known that the one second forced expiratory volume (FEV1) affects morbidity and mortality. The disease is associated with poor health-related quality of life, dyspnea and fatigue in many patients. Due to muscle protein breakdown in chronic patients like patients with COPD, muscle mass decreases. This negatively affects respiratory and peripheral muscle function, exercise capacity and general health (2,3). These changes gradually cause a decrease in patients' respiratory functions and exercise tolerance, a deterioration in the quality of life and an increase in mortality (3). Hospitalization in the acute inflammation stage of the disease comprises the most important part of patient care and is related to increased mortality and high cost (3).

In recent years, even though important advances have been made with medical and surgical treatments, these attempts are mostly not remedial. Therefore, with the purpose of increasing the quality of life for all patients with respiratory problems, in particular with COPD, rehabilitation applications come to the fore. The importance of pulmonary rehabilitation programs which are applied for functional limitations caused by disease is increasing every day (4). Pulmonary rehabilitation has been shown to result in significant improvement in dyspnea, exercise capacity, psychological symptoms and quality of life (4). The cost per quality-adjusted life year (QALY) is essentially lower than for pharmacological treatment in pulmonary rehabilitation.

Dry needling may seem synonymous with traditional Chinese acupuncture (TCA); however, the two are quite different (5). It is considered that dry needling decreases regional and long-term pain, develops the range of movement, activates muscles and changes the chemical environment of trigger points. Dry needling has been observed to be effective in relation to peripheral nerves in trigger point treatment (5). In literature, acupuncture

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is applied to patients with asthma, which is a respiratory system disease, as an alternative treatment method. Dry needling has become a popular treatment technique in manual physiotherapy, but studies are largely restricted to the musculoskeletal system (5). Dry needling for respiratory problems is a new issue and there are currently no studies in the literature. We therefore aimed to investigate the effectiveness of dry needling in a patient with medium severity

CASE REPORT

The male patient, aged 49 years, works as a farmer. He was diagnosed with COPD about six years ago due to his respiratory problems. He smoked about two packets of cigarettes a day for 40 years and quit 2.5 years ago, but he has experienced problems climbing and descending the stairs, with sputum in the mornings and expectorating. The sputum's color was white, and about one cup. This male farmer patient did not have any other systemic disease. He had never had physiotherapy before. After the diagnosis, he began to use four doses of Ventosal inhaler twice a day and two doses of Spiriva inhaler once a day.

RESULTS

The results of respiratory function tests and respiratory parameters are listed in Tables 1 and 2 respectively.

Table 1. Respiratory Function Test able 1. Respiratory Function Test

Evaluation Parameters	Prior to the Treatment			After the Treatment		
Respiration Function Test	Predicted	Best	Predicted%	Predict	Best	Predict%
FVC (lt)	3.69	2.60	71	3.92	3.88	99
FEV1 (lt)	3.04	1.42	47	3.21	2.29	71
FEV1/FVC (%)	78.6	54.7	70	78.6	59.1	75
FEF 25-75 (lt)	3.76	0.73	19	3.84	1.14	30
PEF (lt)	7.97	3.59	45	8.22	5.76	70

Table 2.Respiratory evaluation parameters

Evaluation Parameters		Prior to the Treatment	After the Treatment
Distance between thyroid cartilage and sternum		7 cm	6.2 cm
Respiration Frequency		21	19
Standing Up SpO^2		91	95
Sitting Down SpO^2		88	96
6 minute walking test		160	160
Modified Push Ups(second * time)		21 x 13	30 x 15
Modified Borg Scale		5	0
Neck Flexors Muscle Test		4	5
Sputum existence		1 cup	1 tea spoon
Chest expansion Measurement Deep Inspiration Deep Expiration Difference	Axilla	3.5 cm	6.5 cm
	subcostal	1 cm	4.5 cm
	epigastric	2 cm	3 cm

We found that there was shortness in the pectoral, teres major and latissimus dorsi muscles, in shoulder adductors and internal rotation muscles, and in the shoulder abductor external rotation muscle at pre-treatment. Post-treatment, there was no shortness in the pectoral, teres major and latissimus dorsi muscles or the shoulder abductor external rotation muscle. Pre-treatment, this male farmer patient had a problem with orthopnea; post-treatment, he had no orthopnea problem. There were orthopnea problems before the treatment but after the treatment the patient declared that there was no such problem.

Physiotherapy Choices

The patient was informed about his disease and warned not to expected definite results. He was also informed that he should not quit his treatment under any condition. This male farmer patient was asked to sign the ethical board approval form. Every two days, he was given 10 sessions of dry needling treatment with stainless steel needles of 5, 13 and 40 inches. He also performed respiration exercises, posture exercises and stretching of short muscles.

For an upper extremity endurance increase, he did weight lifting with a one kilogram weight. In addition, postural drainage was applied to the apical region after vibration together with manual tapping. Dry needling was applied to the seventh region of our patient related to respiration (Figures 1, 2, 3 and 4).

Figure 1. M. pectoralis application

Figure 2. M. SCM application

Figure 3. M. trapezius Application

Figure 4. Cervical application

DISCUSSION

COPD is a preventable and treatable disease. When the pulmonary rehabilitation group was compared with the training group, a significant change was observed in exercise endurance, complaint of dyspnea during exercise and depression score. In Yüksel et al.'s study, a six- month pulmonary rehabilitation activity was evaluated, there was no significant difference in respiratory function test (RFT) values. In our patient, there was no complaint of orthopnea after the dry needling treatment and a difference was observed in RFT value after the treatment (FEV1/FVC=75) in comparison to prior to treatment (FEV1/FVC=69) (6) .

Although there are no data about dry needling or acupuncture treatment applied to individuals with COPD, acupuncture treatment is an alternative treatment method for patients with asthma, another respiratory system disease. In a study involving acupuncture treatment of 20 patients with asthma, treatment and control groups were determined randomly and significant differences were observed in expiration values and FEV1 prior to acupuncture and 30 minutes after acupuncture treatment (7).

Dry needling was performed on the phrenic nerve at levels C3–C5; this stimulates the diaphragm, which is primarily responsible for respiration. It was seen that the patient did not complain of dyspnea and orthopnea in daily activities in our patients.

It is possible to prevent permanent damage, decrease symptoms and increase exercise tolerance with rehabilitation attempts performed in the early stages of the disease. In addition, rehabilitation applications shorten patients' hospitalization duration and reduce the need for medication. Faager, Stahle and Larsen (8) stated that pursed lip exercises applied to medium and high intensity COPD patients caused an increase in patients' oxygen saturation rates. As in all chronic patients, COPD increased worries about the future and caused hopelessness and anxiety in patients due to factors such as continuous medication use and addiction to hospitals,

besides the organ dysfunctions seen (9). Since muscles which move arms and stabilize the body are attached to the rib cage, chest wall impedance is increased during arm movements and limits the ability to increase tidal volume. As a result of the problems seen in these muscle groups that affect breathing, patients with COPD have reduced arm movements and upper limb muscle weakness compared to healthy people (10). Our patient was able to perform a modified push-up evaluation, which determines upper extremity endurance, for 21 seconds and 13 times prior to the treatment; he was able to perform it for 30 seconds and 15 times without rest after flexing of the muscle shortness and arm exercises with a one kilogram weight post-treatment.

CONCLUSION

In our patient, a decrease was observed in dyspnea according to the modified Borg scale. It was seen that the patient's complaints decreased and his motivation increased with the alternative treatment method, which supports the pulmonary rehabilitation process during the ten-day treatment. We believe that further study is required to comment on whether the dry needling method improves quality of life and the symptoms of respiratory problems in patients with COPD.

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