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https://doi.org/10.5281/zenodo.1412109 **Research Article**

The Effects of Respiratory Physiotherapy in Pneumological Patients

Healthcare

Keywords: respiratory physiotherapy, postural drainage, pneumology.

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Abstract

Introduction: Respiratory physiotherapy includes rehabilitation techniques such as percussions, vibrations, postural drainage, autogenic drainage, ETGOL, Huffing & Puffing. The treatment protocol is used in patients with pulmonary disease, intensive therapy, cardiopathy, neurological diseases and damage to the locomotor apparatus, which change the rhythm and the respiratory balance. Objective: The main objective of the study is to identify the effects of respiratory physiotherapy in patients with pneumological problems in enhancing vital capacity and improving the patient's overall condition. Methodology: The study is a prospective, experimental type, realised over a six-month period from January to June 2017 at the Vlora Regional Hospital and Fizio Life Clinic with 40 patients in the pneumology and pediatric ward. Treated diseases include bronchial asthma, bronchitis and pneumonia. The rehabilitation protocol used is the postural and autogenic drainage techniques 2 times a day for 20 minutes; and 30 minutes Huffing & Puffing for children. The measurement is used with spirometry for vital capacity and BORG scale for dispnea. Results: Of the patients studied, the most affected are children 50% of the cases, and the highest prevalence is in males with 60% of cases. After physiotherapy, respiratory frequency normalization, increased vital capacity, and reduction of hospital stay were observed. Conclusions: Postural and autogenic drainage regulate the respiratory cycle, improve ventilation, aspirate secretions, and normalize the general condition of the patient. Huffing & Puffing techniques are ideal in treating pediatric patients with pulmonary problems.

Introduction

Respiratory physiotherapy includes rehabilitation techniques such as percussions, vibrations, RMT, postural drainage, autogenic drainage, ETGOL, Huffing & Puffing, ACBT. The treatment protocol is used in patients with pulmonary disease, intensive therapy, cardiopathy, neurological diseases and damage to the locomotor apparatus, which change the rhythm and the respiratory balance.

Respiratory Muscle Training (RMT) can be defined as a technique that aims to improve function of the respiratory muscles through specific exercises. It consists of a series of exercises, breathing and other, to increase strength and endurance of the respiratory muscles and therefore improve respiration. RMT is normally aimed at people who suffer from asthma, bronchitis, emphysema and COPD. However, many people adopt RMT as part of their sports training as this training is designed to strengthen the muscles used for breathing. Studies have shown that regular RMT can increase a person's endurance during cardiovascular exercise or sports activities such as running and cycling. RMT may consist of inspiratory muscle training (IMT) or expiratory muscle training (EMT) or a combination of both. [1] Forms of RMT are: Resistance training and Endurance training. [2] Resistance training is described as the most versatile due to the fact

that it is the least time consuming and it results in a dual conditioning response (strength and endurance improvements). [3]

Respiratory physiotherapy can change effort related responses, metabolic related responses, respiratory muscle fatigue, breathing pattern, heart rate and oxygen uptake kinetics. The Active Cycle of Breathing Techniques (ACBT) is an active breathing technique performed by the patient to help clear their sputum the lungs. The ACBT is a group of techniques which use breathing exercises to improve the effectiveness of a cough, loosen and clear secretions and improve ventilation. [4] ACBT consists of three main phases: Breathing Control, Deep Breathing Exercises or thoracic expansion exercises, Huffing OR Forced Expiratory Technique (F.E.T). Additionally, a manual technique (MT) or positive pressure can be added if and when indicated, to create a more complex cycle to help improve removal of secretions on the lungs. [5]

Objective

The main objective of the study is to identify the effects of respiratory physiotherapy in patients with pneumological problems in enhancing vital capacity and improving the patient's overall condition.

Methods

In total 40 patients hospitalised in Vlora Regional Hospital between January to June 2017 fulfilled the inclusion criteria: they were with pneumological problems, who did not suffer from other serious illness and had the capacity to perform the protocol evaluation tests properly.

All patients were informed about the objectives of the study and signed a formal, free and explanatory consent form. The experimental protocol was approved by the director of Vlora Regional Hospital. From then on, the patients were considered to be volunteers.

The 40 volunteers were divided into 2 groups based in the ward where they were observed: pneumology and pediatric ward. The volunteers who took part in the study were evaluated two times. To avoid any bias in the results, all measurements were taken by a researcher who was blinded as to which group a given volunteer belonged.

The measurement is used with spirometry for vital capacity and BORG scale for dispnea. The Borg RPE scale is a numerical scale that ranges from 6 to 20, where 6 means "no exertion at all" and 20 means "maximal exertion." When a measurement is taken, a number is chosen from the following scale by an individual that best describes their level of exertion during physical activity. [6]

The rehabilitation protocol used in the first group include RMT, postural and autogenic drainage techniques. It is applied 20 minutes each therapy, twice daily in hospital for five days, and the maintenance is made in "Fizio Life" Clinic, for a week. The pediatric group is treated with ACBT 30 minutes each therapy, twice a day, five days in the hospital and the maintenance in "Fizio Life" clinic.

The analysis is made with IBM SPSS, version 20.0.

Results

Forty subjects completed the study. Of the patients studied, there is an equal affected group: pediatric ward 50% of the cases and pneumology 20 patients too. The highest prevalence is in males with 60% of cases, and the most common pathology is pneumonia (encountered in 21 patients) 52.5% of the cases. All the analysis and the full cases summaries are below.

		Pathology			Total
		Asthma	Bronchitis	Pneumonia	
Ward	pediatric	4	2	14	20
	pneumology	6	7	7	20
Total		10	9	21	40

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Asthma	10	25.0	25.0	25.0
	Bronchitis	9	22.5	22.5	47.5
	Pneumonia	21	52.5	52.5	100.0
	Total	40	100.0	100.0	

BORG before RP		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	extremely light	10	25.0	25.0	25.0
	very light	13	32.5	32.5	57.5
	light	8	20.0	20.0	77.5
	somewhat hard	5	12.5	12.5	90.0
	hard	2	5.0	5.0	95.0
	very hard	2	5.0	5.0	100.0
	Total	40	100.0	100.0	

BORG after RP		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no exertion	18	45.0	45.0	45.0
	extremely light	11	27.5	27.5	72.5
	very light	6	15.0	15.0	87.5
	light	3	7.5	7.5	95.0
	somewhat hard	2	5.0	5.0	100.0
	Total	40	100.0	100.0	

	Ward	Gender	Pathology	BORG before RP	BORG after RP
1	pediatric	male	Asthma	extremely light	no exertion
2	pediatric	male	Asthma	somewhat hard	light
3	pediatric	male	Bronchitis	somewhat hard	very light
4	pediatric	male	Bronchitis	light	very light
5	pediatric	male	Pneumonia	extremely light	no exertion
6	pediatric	male	Pneumonia	light	extremely light
7	pediatric	male	Pneumonia	very light	no exertion
8	pediatric	male	Pneumonia	extremely light	no exertion
9	pediatric	male	Pneumonia	extremely light	no exertion
10	pediatric	male	Asthma	light	extremely light
11	pediatric	male	Asthma	very light	extremely light
12	pediatric	male	Pneumonia	very light	no exertion
13	pediatric	female	Pneumonia	extremely light	no exertion
14	pediatric	female	Pneumonia	very light	no exertion
15	pediatric	female	Pneumonia	very light	no exertion
16	pediatric	female	Pneumonia	light	extremely light
17	pediatric	female	Pneumonia	very light	no exertion
18	pediatric	female	Pneumonia	light	extremely light
19	pediatric	female	Pneumonia	very light	no exertion
20	pediatric	female	Pneumonia	extremely light	no exertion
21	pneumology	male	Pneumonia	very light	no exertion
22	pneumology	male	Bronchitis	very hard	somewhat hard
23	pneumology	male	Bronchitis	hard	light
24	pneumology	male	Bronchitis	light	extremely light
25	pneumology	male	Asthma	very hard	somewhat hard
26	pneumology	male	Asthma	hard	light
27	pneumology	male	Pneumonia	somewhat hard	very light
28	pneumology	male	Pneumonia	extremely light	no exertion
29	pneumology	male	Pneumonia	extremely light	no exertion
30	pneumology	male	Asthma	very light	extremely light
31	pneumology	male	Asthma	light	extremely light
32	pneumology	male	Asthma	very light	extremely light
33	pneumology	female	Bronchitis	very light	extremely light
34	pneumology	female	Pneumonia	extremely light	no exertion
35	pneumology	female	Pneumonia	extremely light	no exertion
36	pneumology	female	Bronchitis	somewhat hard	very light
37	pneumology	female	Bronchitis	light	very light
38	pneumology	female	Pneumonia	very light	no exertion
39	pneumology	female	Asthma	somewhat hard	very light
40	pneumology	female	Bronchitis	very light	extremely light
Total N	40	40	40	40	40

For comparison the groups before and after treatment, is used the t-test.

Group Statistics

	Ward	N	Mean	Std. Deviation	Std. Error Mean
BORG before RP	pediatric	20	9.3000	1.97617	.44189
	pneumology	20	10.9000	3.27511	.73234
BORG after RP	pediatric	20	6.8000	1.36111	.30435
	pneumology	20	8.1000	2.31471	.51759

Independent Samples Test

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	**Sig. (2-tailed)**	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
BORG before RP	5.735	.022	-1.871	38	**.069**	-1.60000	.85532	-3.33151	.13151
			-1.871	31.216	**.071**	-1.60000	.85532	-3.34396	.14396
BORG after RP	7.810	.008	-2.165	38	**.037**	-1.30000	.60044	-2.51552	-.08448
			-2.165	30.736	**.038**	-1.30000	.60044	-2.52503	-.07497

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	BORG before RP	10.1000	40	2.79009	.44115
	BORG after RP	7.4500	40	1.98649	.31409

Paired Samples Correlations				
		N	Correlation	**Sig.**
Pair 1	BORG before RP & BORG after RP	40	.926	**.000**

Paired Samples Test								
	Paired Differences					t	df	**Sig. (2-tailed)**
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
before RP - after RP	2.65000	1.21000	.19132	2.26302	3.03698	13.851	39	**.000**

Discussion

This study demonstrates that respiratory physiotherapy continues to be used by physiotherapists, and has a possitive impact in rehabilitation of pneumologic patients, especially in recuperation and improving breathing, also decreasing problems of breath cicle as dispnea. This proves that physioterapeutic techniques increase the vital capacity and the quality of life of the patients.

P. Young et. al. study is about fifty-one subjects with severe COPD that completed the programme. There was a significant improvement in exercise capacity (a six MWD test improved from 375±126 m at baseline to 440±109 m at three months, $p<0.005$). There were significant improvements in QOL. There was a reduction in the level of perceived dyspnoea (modified Borg Scale). [7]

Another study indicates that respiratory and physical training could be a promising adjunct to medical treatment in severe PH. The effects add to the beneficial results of modern medical treatment. [8]

Zamunér et.al. concluded that muscular and respiratory RPE, as expressed on the Borg CR-10 scale, were correlated to the AT. Furthermore, the similar perception of exercise intensity, which corresponded to the AT of different individuals, makes it possible to prescribe exercise at an intensity equivalent to the AT by means of the RPE. Scores close to 5, which correspond to a "strong" perception, may be used as parameters for quantifying the aerobic exercise intensity of both active and sedentary women. [9]

Physiotherapy appeared to have an advantage in reducing Rrs in some patients, but also produced changes in derived blood gas parameters. Within individuals, physiotherapy treatments were also more likely to produce improvements in VTE, Crs and Rrs than suction. [10]

Conclusions

Respiratory physiotherapy regulate the respiratory cycle, improve ventilation, aspirate secretions, and normalize the general condition of the patient. RP techniques are ideal in treating pediatric and adult patients with pulmonary problems.

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