Pulmonary Rehabilitation in COPD exacerbation: is upper limbs exercise training safe and effective?

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INTRODUCTION

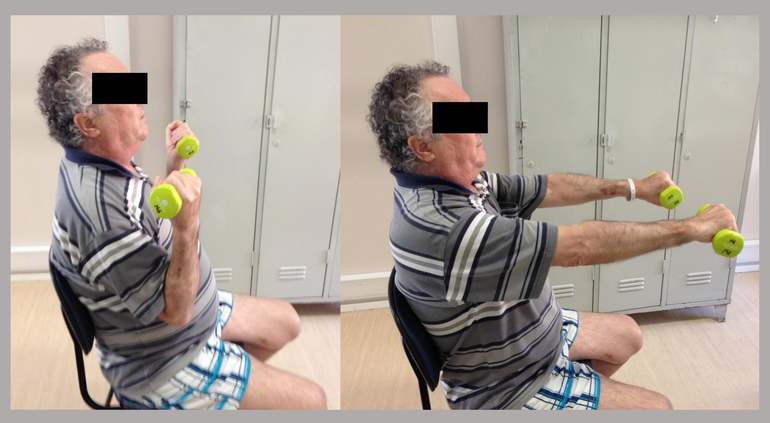
Pulmonary rehabilitation in COPD exacerbation has several advantages such as reduction of hospital readmission and mortality, the considerable increase of quality of life and functional improvement translated into a better outcome in the 6 min walking test. Upper limbs exercise is recommended in pulmonary rehabilitation guidelines because it reduces stress, decreases dyspnea and dynamic hyperinflation and improves functional capacity with impact on daily living activities. This study aimed to evaluate the functional changes that occur in COPD patients with exacerbation, after a program of resistance exercises of the upper limbs.

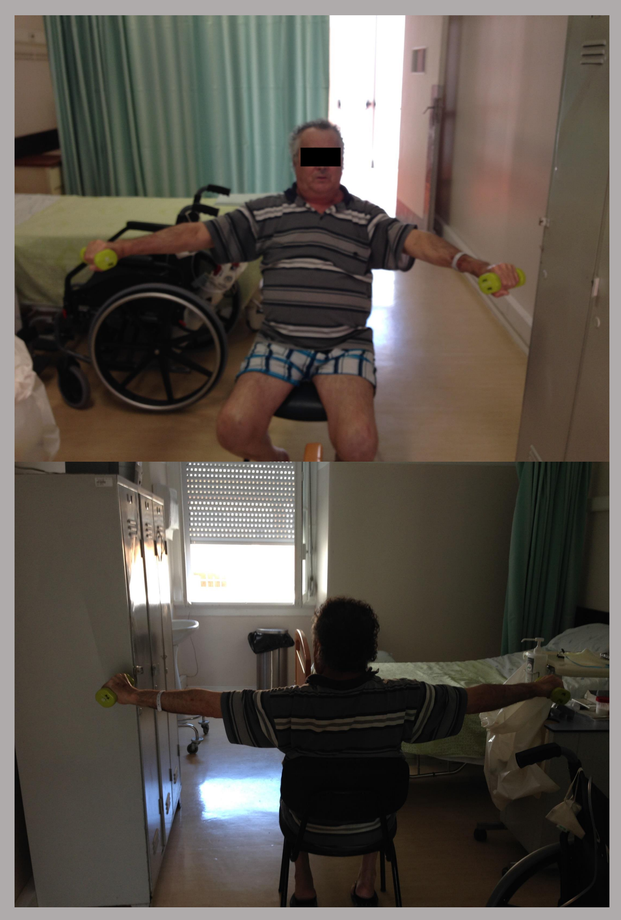
METHOD

A multi-case study was developed on seven patients with COPD, GOLD III and IV (diagnosed by FEV) in exacerbation. Data collection included an initial interview for clinical history, functional assessment using the London Chest Activity of Daily Living (LCADL), the 6 min Pegboard and Ring Test (6min PBRT), handgrip strength and the Saint George Questionnaire for quality of life assessment.
A program of upper limbs exercise training was implemented. Vital signs (blood pressure, respiratory rate, heart rate and pain, dyspnea (Borg Dyspnea Scale) and peripheral oxygen saturation were assessed before and after exercise training and during if the patient presented any symptom. After 7 days of treatment, assessment instruments were applied.

RESULTS

All 7 participants (2 women, 5 men), aged between 50 and 85 years, had as risk factor being ex-smokers. The entire group has several comorbidities (diabetes, heart problems, anxiety/depression, osteoporosis) and low inclusion in rehabilitation or exercise programs.
Upper limbs exercise during an exacerbation period appeared to be safe and beneficial in all of the cases studied. Vital signs, dyspnea and peripheral oxygen saturation remain on normal range during exercise training sessions.
Data obtained in 6min Pegboard and Ring Test (6PBRT), London Chest Activity of Daily Living (LCADL) and handgrip strength showed a positive evolution between assessments in all participants resulting in an improvement of exercise capacity of the upper limbs and in an increase of their functionality.
There was no significant changes in quality of life.





	Caracterization						
	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7
Height (meters)	1.5	1.63	1.66	1.63	1.75	1.68	1.73
Weight (KG)	62	101	60	67	95	85	102
BMI (Kg/m^2)	27.56	38.01	21.77	25.21	31.02	30.11	34.08
Oxygen Therapy (L/min)	1.5	--	2	1	2	1	--
Spirometry							
FVC	1.15	2.1	1.99	2.45	1.2	2.81	3.16
FEV1	0.7	1.18	0.86	0.62	0.57	0.81	1.23
FEV1/FVC	60.68	59.28	43.46	25.25	47.7	28.7	38.95
FEV1 predict	2.9	2.37	2.01	2.29	3.41	2.99	2.95
GOLD classification	IV	III	III	IV	IV	IV	III

	Participant 1		Participant 2		Participant 3		Participant 4		Participant 5		Participant 6		Participant 7	
6PRBT	*Before*	*After*	*Before*	*After*	*Before*	*After*	*Before*	*After*	*Before*	*After*	*Before*	*After*	*Before*	*After*
	35	37	52 *	76	56	63	52	63	53	78	23 *	72	70 *	80
Handgrip strength (bar)	*Before*	*After*	*Before*	*After*	*Before*	*After*	*Before*	*After*	*Before*	*After*	*Before*	*After*	*Before*	*After*
Left	0.25	0.25	0.2	0.55	0.2	0.25	0.4	0.45	0.5	0.6	0.25	0.3	0.4	0.4
Right	0.25	0.3	0.325	0.6	0.05	0.1	0.4	0.4	0.5	0.6	0.2	0.3	0.5	0.5
LCADL	*Before*	*After*	*Before*	*After*	*Before*	*After*	*Before*	*After*	*Before*	*After*	*Before*	*After*	*Before*	*After*
Self-care activities	8	7	12	8	17	14	16	11	11	11	20	14	12	8
Domestic activities	12	12	3	2	26	26	24	24	35	35	15	15	0	0
Physical activities	4	4	8	6	7	6	5	5	6	6	5	3	8	4
Leisure activitie	7	4	10	4	5	3	8	7	5	5	9	5	9	5
Total Score	31	27	33	20	55	49	53	47	57	57	49	37	29	17
SGQR	*Before*	*After*	*Before*	*After*	*Before*	*After*	*Before*	*After*	*Before*	*After*	*Before*	*After*	*Before*	*After*
Symptoms	23	23	14	14	22	22	13	13	17	17	22	22	14	14
Activity	6	4	8	5	8	5	8	4	6	6	9	0	9	3
Impact	8	6	12	9	20	20	17	17	19	19	18	22	14	15
Total Score	31	29	26	23	42	42	30	30	36	36	40	44	37	29

* with rest break

CONCLUSION

Results may indicate that the inclusion of resistance active exercises in rehabilitation programs tend to improve skeletal muscle strength and performance in ADL.

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