

PROPOSAL ABSTRACT:

Name of Principal Investigator:	Alvaro Reyes Ponce
Proposal Title:	The Effects of Respiratory Muscle Training and Air-Stacking in Patients with Parkinson´s disease

Describe the main issues to be addressed: goals, methodology and expected results. **The maximum length for this section is 1 page** (Verdana font size 10, letter size is suggested).

Introduction

Aspiration pneumonia is the leading cause of death in patients with Parkinson´s disease (PD). The high incidence of this complication has been associated to disturbances in respiratory and swallowing function. Studies about pulmonary function have shown that patients with PD have respiratory muscle weakness and rigidity, stiffness of the chest wall, and bradykinesia of respiratory muscles that are associated with reduced cough efficacy. Cough is an important defence mechanism that removes foreign material from the airway and prevents an aspiration. An effective cough comprises the ability to produce an adequate inspiratory capacity prior coughing and to generate high airflow during the expiratory phase of cough. Strengthening respiratory muscles and increasing insufflation capacity, may lead the expiratory muscles to produce greater expiratory flow and velocity and a more effective cough. The main goals of this proposed research are to compare the effects of an inspiratory versus an expiratory muscle-training program on peak cough flow and pulmonary function parameters, to investigate the effects of air stacking in addition to an inspiratory and an expiratory-muscle training program on peak cough-flow, and finally to determine the impact of an increased voluntary cough airflow on the risk of penetration/aspiration, in patients with PD.

Methodology

In study 1, thirty-nine patients of both genders with idiopathic diagnose of Parkinson´s disease at moderate level of disability, will be assigned to control group (n=13), inspiratory training (n=13) and expiratory training (n=13) groups. Participants in the training groups will receive home-based inspiratory (5 sets of 5 repetitions) muscle training or home-based expiratory (5 sets of 5 repetitions) muscle training, 6 times a week for 2 months using a resistance of 75% of each patient´s maximum inspiratory or expiratory pressure. The control group will perform home-based expiratory muscle training at minimum and fixed load (9cmH₂O) using the same protocol of training groups. Spirometric indices, maximum inspiratory and expiratory pressure, cough airflow and video-fluorographic measurement of swallowing will be assessed before, at 1 and 2 months after training. In study 2, twenty-six patients with PD and similar characteristics of patients included in study 1 will be assigned perform home-based expiratory muscle training and air stacking (n=13) and to perform home-based inspiratory muscle training and air stacking (n=13). Both groups will perform inspiratory or expiratory muscle training using the same training protocol of the participants in study 1 for the same number of repetitions, frequency, duration and intensity. In both groups, the air-stacking program will consist of 10 series of 3 to 4 consecutive lung insufflations using a manual resuscitator bag, 6 times a week for two weeks. Spirometric indices, maximum inspiratory and expiratory pressure, cough airflow and video-fluorographic measurement of swallowing will be assessed before, at 1 and 2 months after training.

Expected results

In study 1 it is expected that patients with PD performing expiratory muscle training achieve greater improvements in peak cough flow than that of patients performing inspiratory muscle training. In study 2 it is expected that an expiratory muscle training program in addition to an air-stacking program is more effective in increasing peak cough flow than an inspiratory muscle training program with an air-stacking protocol in patients with PD. Finally it is expected that an increase in peak cough flow after expiratory muscle training alone or in addition to an air stacking program is associated with lower score in the penetration/aspiration score from the video-fluorographic measurement of swallowing.