DOI: 10.5152/TurkThoracJ.2019.106

[Abstract:0234] MS-147 [Accepted: Oral Presentation] [Pediatric Lung Diseases]

Effects of Inspiratory Muscle Training on Postural Stability, Pulmonary Function and Functional Capacity in Children with Cystic Fibrosis: A Randomised Controlled Trial

Melih Zeren[1], Erkan Çakır[2], Hülya Nilgün Gürses[1]

[1]Department of Physiotherapy and Rehabilitation, Bezmialem Vakif University School of Health Sciences, İstanbul, Turkey
[2]Department of Pediatrics, Division of Pediatric Chest Diseases, Bezmialem Vakif University School of Medicine, İstanbul, Turkey

Objectives: Guidelines state that physiotherapy approaches for improving airway clearance should be included in the management of cystic fibrosis (CF). Although inspiratory muscle training(IMT) is effectively used in various cardiopulmonary diseases, the literature related to its use in CF patients is conflicted. Additionally, recent studies emphasize the involvement of postural stability in patients with chronic lung diseases but the literature is limited regarding the involment of postural stability and its related mechanisms in CF patients. Our aim was to investigate the effects of adjunctive IMT in CF patients as well as analysing the factors which may be related to postural stability

Methods: Thirty-six patients aged between 8-18 years were randomized into experimental or control group. A comprehensive chest physiotherapy program including thoracic expansion exercises, incentive spirometer, oscillatory positive pressure device, postural drainage and physical activity counselling was given to the control group to be repeated twice a day, seven days a week for 8 weeks. In addition to comprehensive chest physiotherapy program, IMT at an intensity of 30% of maximum inspiratory pressure(MIP) with Threshold IMT® device was given to the experimental group to be repeated twice a day for 15 minutes. Pulmonary function test (PFT), respiratory muscle strentgth assessment, 6-min walk test (6MWT) and, postural stability and limits of stability tests in Biodex Balance System® were applied to all patients at the beginning and end of the study. For analyzing the independent predictors of postural stability among the respiratory parameters, linear regression analysis was conducted on the baseline values of thirty-six patients. Effects of treatments were compared between groups.

Results: Regression analysis revealed that maximum expiratory pressure (MEP) value was an independent predictor for overall score of limits of stability test. Subjects with higher MEP had better overall score in limits of stability test ($R=0.514$; $R^2=0.264$; $p=0.003$). After eight weeks of treatment, FVC, FEV1, PEF, MIP, MEP, 6MWT distance and overall score of limits of stability test significantly improved in both groups ($p<0.01$). Increase in MIP value was higher in experimental group compared to control group ($p<0.001$). Improvements in PFT parameters, MEP, functional capacity and overall score of limits of stability test did not differ between groups ($p>0.05$).

Conclusion: MEP value, which reflects the abdominal muscle strength was found to be an independent predictor for overall score of limits of stability test which evaluates dynamic balance ability. A comprehensive chest physiotherapy program improved pulmonary function, respiratory muscle strength and functional capacity. Adjunctive IMT further improved MIP value.

Keywords: Cystic fibrosis, inspiratory muscle training, postural stability, pulmonary function test