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Investigation of Spine Structure and Mobility in COPD Patients and Its Relationship with Dyspnea- A Controlled Cross Sectional Study

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Objectives: In chronic obstructive pulmonary disease (COPD); postural structure is affected due to pulmonary mechanics, increased respiratory muscle load, decreased flexibility, functional performance and physical activity. Although the spinal posture was evaluated with different methods in patients with COPD, it was not found any study that spinal curves and their mobility were compared with the control group and investigated its relationship with dyspnea. Therefore, the aim of this study was to investigate the changes in spinal structure and mobility in COPD patients compared to non-COPD control group and to investigate their relationship between dyspnea.

Methods: In our cross sectional study; a total of 48 cases;26 COPD (median age; 61 [56,68], duration of diagnosis; 7 [2,14] years) and 22 non-COPD (median age; 57 [55,64] years) included. The dyspnea severity was scored between 0-4 according to the Modified Medical Research Council (MMRC) Dyspnea Scale. Respiratory functions were evaluated by spirometer (Cosmed Pony FX [Italy]). Spine structure and mobility were assessed using the HocomaValedo® Shape device (Idiag, Fehraltorf, Switzerland) in the sagittal plane. Mann Whitney U Test was used to compare the continuous variables of the groups and Spearman Test was used for intra-group correlation analysis. $p < 0.05$ was considered significant.

Results: Age and gender of the groups were similar ($p > 0.05$). The body mass index of the COPD group was lower than the non-COPD group ($p = 0.049$). When the spinal angle and mobility of the groups were compared in sagittal plane; in COPD patients, the curve in the thoracic spine ($p = 0.005$) and spinal mobility were lower ($p = 0.021$). Although spinal mobility in COPD group seemed to decreased in both lumbar and sacral spine both while standing and sitting, the difference was not significant ($p > 0.05$). When the relationship between dyspnea and spinal angle and mobility in COPD patients was examined; there was a moderate positive correlation between thoracic curve angle and MMRC score ($r = 0.533$; $p = 0.005$).

Conclusion: As a result of our study, it was seen that thoracic curve increased and thoracic mobility decreased in COPD patients compared to non-COPD patients. This result supports the studies in the literature that reported postural changes and increased thoracic kyphosis in COPD patients. In addition, in our study it was found that the perception of dyspnea was increased as the thoracic curve angle increased in COPD patients. Based on these results, in the rehabilitation programs in COPD patients, it may be appropriate to configure evaluation and exercise programs considering changes of the spinal structure and mobility.

Keywords: COPD, dyspnea, spinal mobility, spinal structure