ABSTRACT

Exposure: Dysfunctional breathing (DB) is common (60-80%) in adults. Individuals with DB may have decreased pain thresholds, impaired motor control and balance, and movement dysfunction. These impairments likely adversely affect performance. Research has demonstrated that DB is multi-dimensional and includes biochemical, biomechanical, and psychophysiological categories.

Purpose: The purpose of this study was to test the impact of breathing exercises in an otherwise healthy population of individuals diagnosed with at least one category of DB. It was hypothesized that the exercise program would normalize at least one category of DB.

Methods: An experimental group with DB was recruited, then the control group was matched for gender, age, BMI and activity. Baseline breathing metrics were obtained for each category of breathing dysfunction: capnography for biochemical (ETCO2 of < 35mmHg at rest = DB), HI-LO for biomechanical (upper chest or paradoxical patterns = DB), and Self-Evaluation of Breathing Questionnaire (SEBQ ≥ 25 = DB) and Nijmegen Questionnaire (≥ 22 = DB) for psychophysiological. The experimental group performed a four-week progression of home breathing exercises, once daily and the control group continued normal activities (no interventions). Re-testing of all outcome measures was performed after four weeks.

Results: Thirty-five individuals comprised the participant sample (16 experimental, 19 control, mean age 26.0 years, mean BMI of 24.3). There were no statistically significant differences between groups at baseline. Eighty-one percent of subjects in the experimental group improved in at least one category compared to 21% of subjects in the control group. Seventy-eight percent of subjects with biomechanical category of DB in the experimental group normalized this dysfunction, while none normalized in the control group, which was statistically significantly different. Twenty-seven percent of subjects with biochemical DB in the experimental group normalized, while only 25% in the control group which was not statistically different. There were only two subjects in each group with the psychophysiological category, therefore no analysis was performed.

Conclusion: Home exercises were effective in reversing the biomechanical category of DB in 78% of young, otherwise healthy adults versus no exercise. However, the exercises did not affect the biochemical category of DB. Performing a set of home exercises may be an effective option for fitness and rehabilitation providers to suggest for clients to normalize biomechanical breathing dysfunction.

Level of Evidence: 2b

Keywords: Apical breathing, disordered breathing, hypocapnia, Movement System

Conflict of interest: Dr. Kiesel has equity in Functional Movement Systems which owns the Functional Movement Screen™.

CORRESPONDING AUTHOR

Kyle Kiesel, PT, PhD
University of Evansville
Stone Family Center for Health Sciences, Room 3015
Evansville, IN
812-488-2646
E-mail: kk70@evansville.edu