Effect of different sounds on peak expiratory flow rate

Maja Frangež¹ Maja Marija Potočnik², Ludovik Strauch², Nejka Potočnik³

¹ Medical Rehabilitation Unit, University Clinical Center Ljubljana, Slovenia
² Respiratory Therapy Department, Clinical Department of Anesthesiology and Perioperative Intensive Care, University Clinical Centre Ljubljana, Slovenia
³ Institute of Physiology, Medical Faculty Ljubljana, University of Ljubljana, Slovenia

Introduction: Good lung condition is maintained by inhaling and exhaling through the nose. During moderate physical exercise, often exhaling through mouth is suggested. Exhalation through mouth bypasses physiological airway resistance (5 cm H2O) and compromises the respiratory system. During mouth exhalation we can generate different expiratory sounds producing different resistance to expiratory air flow in larynx. The aim of our study was to find the expiratory sound (nose closed) which best matches the expiration through the nose with respect to peak expiratory flow rate (PEFR).

Methods: 30 healthy young subjects were included in the study (age = 21±, 6 males, 24 females). Expiration through the nose and through the mouth utilizing different sound formation was performed. Three different expiratory sounds H, S and SH were generated and PEFR was measured by peak flow meter (Wright's Peak flow meter, measurement range 50-400 L/min) as well as facial mask. Each test was repeated three times and the average PEFR was calculated. The data was tested for normality and the repeated measurement comparison was applied to find the statistical significant changes in PEFR, paired t test was applied for pairwise comparison. The subjects were in upright posture when performing the test.

Results: the mean flow measured with PEFR produced with sound H was 371.67 L/min, with sound S 131.17 L/min and with sound SH 241.83 L/min. When exhaling through the nose PEFR was 256.50 L/min. Statistically significant difference was found in PEFR comparing exhalation through the nose to exhalation sound H (P < 0.0001) as well as to exhalation sound S (P < 0.0001). Difference in PEFR comparing exhalation sound SH to exhalation through the nose was not statistically significant (P = 0.1866).

Conclusion: When exhaling with sound SH the airway resistance to flow is comparable to the resistance when exhaling through the nose. Expiration with SH sound may have benefit on respiratory system during moderate exercise.