

Editorial

*Corresponding author

Masahiro Kohzuki, MD, PhD
Professor and Chairman
Department of Internal Medicine and
Rehabilitation Science
Disability Science
Tohoku University Graduate
School of Medicine
1-1, Seiryō-cho, Aoba-ku
Sendai 980-8574, Japan
Tel. 022-717-7351
Fax: 022-717-7355
E-mail: kohzuki@med.tohoku.ac.jp

Volume 3 : Issue 1

Article Ref. #: 100PRRMOJ3e004

Article History

Received: May 16th, 2016

Accepted: May 19th, 2016

Published: May 20th, 2016

Citation

Kohzuki M, Ebihara S. Taste sensitivity and nutrition in COPD rehabilitation. *Pulm Res Respir Med Open J*. 2016; 3(1): e1-e2. doi: [10.17140/PRRMOJ-3-e004](https://doi.org/10.17140/PRRMOJ-3-e004)

Copyright

©2016 Kohzuki M. This is an open access article distributed under the Creative Commons Attribution 4.0 International License (CC BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Taste Sensitivity and Nutrition in COPD Rehabilitation

Masahiro Kohzuki, MD, PhD¹; Satoru Ebihara, MD, PhD²

¹Department of Internal Medicine and Rehabilitation Science, Tohoku University Graduate School of Medicine, Sendai, Japan

²Department of Rehabilitation Medicine, Toho University School of Medicine, Tokyo, Japan

Chronic Obstructive Pulmonary Disease (COPD) is a chronic disease of the lungs characterized by persistent airflow obstruction resulting from inflammation and remodeling of the airways, and may include development of emphysema.¹ Inflammatory activation in COPD induces a hypermetabolic state, characterized by catabolic and anabolic imbalance, which results in weight loss,² commonly seen in patients with COPD. Weight loss and low body weight are independent risk factors of morbidity and mortality in such patients.³ One possible reason for weight loss in patients with COPD is altered taste sensitivity. Because patients with COPD may need to consume additional energy to maintain or gain weight, the taste sensory quality of meals becomes important.

Pulmonary rehabilitation is known to lead to improved exercise performance in patients with COPD. However, the relationship between pulmonary rehabilitation and taste sensitivity has not been evaluated. Therefore, we compared taste sensitivity before and after pulmonary rehabilitation in patients with COPD.⁴ The six-min walk distance (6MWD), COPD assessment test, and taste test were conducted before and after 4-week comprehensive pulmonary rehabilitation. Taste sensitivity was evaluated using the filter-paper disc method for 4 taste stimuli. Taste stimuli were salty, sweet, sour, and bitter tastes. Three taste thresholds (salty, sweet and bitter) were significantly lower at the end of the PR program than at the beginning.⁴ Each patient with COPD took part in the PR program, which consisted of a 20-min class one or more times a day. The exercise training consisted of walking on a treadmill, stair climbing, and ergometer cycling. Frequency of the training program was 5 times a week for 4 weeks. The intensity of the training program was 60-70% of peak work rate.⁵ Following pulmonary rehabilitation, the 6MWD, COPD assessment test, salty recognition threshold, sweet recognition threshold and bitter recognition threshold improved significantly, whereas there were no significant improvements in body mass index or sour recognition threshold.⁴ Pulmonary rehabilitation may improve taste sensitivity in patients with COPD.⁴

In any wasting condition, the aim of nutritional intervention is not only to treat anorexia or balance elevated energy requirements, but also to facilitate muscle protein synthesis. In the COPD field, Engelen et al.⁶ was the first to show elevated whole body protein turnover in COPD and identified abnormalities in amino acids profiles in wasted COPD patients as putative therapeutic target.⁷ In 2012 Cochrane meta-analysis concluded that nutritional intervention is indeed effective to improve weight, body composition and exercise performance in malnourished COPD patients.^{8,9} Therefore, nutritional supplementation is an important therapeutic intervention, particularly for severely ill COPD patients with malnutrition.

Difficulties may be experienced by these COPD patients, who are struggling to breathe and eliminate CO₂ from the lungs, resulting in dyspnea, hypercapnia, hypoxia, and respiratory acidosis, which exacerbates muscle loss through oxidative stress and inflammatory responses.¹⁰ To overcome these problems, nutritional supplements should aim to reduce metabolic CO₂ production, lower respiratory quotient, and improve lung function. Several studies have shown that high-fat supplements produce less CO₂ and have lower respiratory quotient value than high-carbohydrate supplements. In addition, high-fat supplements may be the most efficient means of providing a low-volume, calorie-dense supplement to COPD patients, and may be

most beneficial to patients with prolonged mechanical ventilation where hypercapnia and malnutrition are most pronounced.¹⁰

The goal of effective COPD management is to relieve symptoms, slow disease progression, improve exercise tolerance, prevent and treat complications, and improve nutritional status and overall quality of life. In conclusion, this study suggests that a PR program may improve taste sensitivity in patients with COPD, contributing to avoiding weight loss and improving the prognosis for patients with COPD. Further studies are required to look at combining these optimal nutritional supplements with pulmonary rehabilitation for COPD patients according to their disease severity could be extremely useful and would provide a relatively cheap and simple method to improve clinical outcomes of COPD patients.

CONFLICTS OF INTEREST: None.

REFERENCES

1. Vestbo J, Hurd SS, Agusti AG, et al. Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease: GOLD executive summary. *Am J Respir Crit Care Med.* 2013; 187: 347-365. doi: [10.1164/rccm.201204-0596PP](https://doi.org/10.1164/rccm.201204-0596PP)
2. Goldstein S, Askanazi J, Weissman C, Thomashow B, Kinney JM. Energy expenditure in patients with chronic obstructive pulmonary disease. *Chest.* 1987; 91(2): 222-224. doi: [10.1378/chest.91.2.222](https://doi.org/10.1378/chest.91.2.222)
3. Muers MF, Green JH. Weight loss in chronic obstructive pulmonary disease. *Eur Respir J.* 1993; 6(5): 729-734. Web site. <http://erj.ersjournals.com/content/6/5/729.short>. Accessed May 15, 2016
4. Ito K, Kohzuki M, Takahashi T, Ebihara S. Improvement in taste sensitivity following pulmonary rehabilitation in patients with chronic obstructive pulmonary disease. *J Rehabil Med.* 2014; 46(9): 932-936. doi: [10.2340/16501977-1861](https://doi.org/10.2340/16501977-1861)
5. Kortianou EA, Nasis IG, Spetsioti ST, Daskalakis AM, Vogiatzis I. Effectiveness of interval exercise training in patients with COPD. *Cadio pulm Phys Ther J.* 2010; 21(3): 12-19. Web site. http://journals.lww.com/cptj/Abstract/2010/21030/Effectiveness_of_Interval_Exercise_Training_in.4.aspx. Accessed May 15, 2016
6. Engelen MP, Deutz NE, Wouters EF, Schols AM. Enhanced levels of whole body protein turnover in patients with chronic obstructive pulmonary disease. *Am J Respir Crit Care Med.* 2000; 162(4 pt 1): 1488-1492. doi: [10.1164/ajrccm.162.4.2002045](https://doi.org/10.1164/ajrccm.162.4.2002045)
7. Engelen MP, Wouters EF, Deutz NE, Menheere PP, Schols AM. Factors contributing to alterations in skeletal muscle and plasma amino acid profiles in patients with chronic obstructive pulmonary disease. *Am J Clin Nutr.* 2000; 72(6): 1480e7. Web site. <http://ajcn.nutrition.org/content/72/6/1480.long>. Accessed May 15, 2016
8. Collins PF, Stratton RJ, Elia M. Nutritional support in chronic obstructive pulmonary disease: a systematic review and meta-analysis. *Am J Clin Nutr.* 2012; 95(6): 1385-1395. doi: [10.3945/ajcn.111.023499](https://doi.org/10.3945/ajcn.111.023499)
9. Ferreira IM, Brooks D, White J, Goldstein R. Nutritional supplementation for stable chronic obstructive pulmonary disease. *Cochrane Database Syst Rev.* 2012; 12: CD000998. doi: [10.1002/14651858.CD000998.pub3](https://doi.org/10.1002/14651858.CD000998.pub3)
10. Hsieh MJ, Yang TM, Tsai YH. Nutritional supplementation in patients with chronic obstructive pulmonary disease. *J Formos Med Assoc.* 2016; 1-7. doi: [10.1016/j.jfma.2015.10.008](https://doi.org/10.1016/j.jfma.2015.10.008)