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Anatomically based oropharyngeal rehabilitation for patients with obstructive sleep apnea- A Systemic Review and Meta-analysis

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Background: Pathophysiology of obstructive sleep apnea (OSA) is critically based on the determinant, upper airway anatomic impairment, predisposed by oropharyngeal muscle dysfunction or respiratory drive instability or both. However, oropharyngeal muscle dysfunction is the most frequent predisposing factor among them and also the very key point in this study. One of the most important function of oropharyngeal muscle is to dilate and stiffen the upper airway patency throughout respiratory cycle. Therefore, oropharyngeal rehabilitation becomes a novel non-invasive management for OSA.

Objectives: Since a comprehensive oropharyngeal rehabilitation program should involve with multiple levels based on upper airway anatomy, therefore, (1) a systemic review was explored to summarize WHAT a comprehensive oropharyngeal rehabilitation program might be. (2) a meta-analysis was conducted to examine HOW the effect of oropharyngeal rehabilitation might be, and to delineate the indications for WHO might benefit from oropharyngeal rehabilitation.

Methods: A search was performed on MED-LINE, EMBASE, and The Cochrane Library. The Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) procedure were followed as guidelines.

Statistics: Main outcomes from polysomnography (PSG) including the Apnea Hypopnea Index (AHI), lowest oxygen saturation (LSAT) and Epworth Sleep Scale (ESS) are analyzed by Comprehensive Meta-Analysis version 2.0 to demonstrate the effects of oropharyngeal rehabilitation.

Results: 7 studies with 201 participants were included in our meta-analysis and the pooled data demonstrated that the effects of oropharyngeal rehabilitation between pre- and post- intervention were significantly changes in mean difference reduced 9.605 events/ hour on AHI (95 % CI -11.099 to -8.112; $p < 0.0001$); declined 3.336 % on LSAT (95 % CI -4.549 to -2.124; $p < 0.0001$); lowered 1.301 on ESS (95 % CI -1.949 to -0.653; $p < 0.0001$); decreased 0.574 cm on NC between (95 % CI -1.058 to -0.089; $p = .002$); no significant change on BMI.

Conclusions: Oropharyngeal rehabilitation can have more significant effects in improvement of both objective AHI, oxygen saturation and neck circumference and as well objective Epworth Sleep Scale for mild and moderate subjects than severe ones; however, it also proved no significant effect on BMI.

Conclusions: Our systemic review implies that oropharyngeal rehabilitation with multilevel approach on anatomical basis can supply the practical strategy for clinical application. However, local oropharyngeal rehabilitation cannot satisfy other the clinical phenotypes associated with different pathophysiology, a comprehensive OSA rehabilitation should involve more scenarios aiming at the systemic effect of respiratory control circuit.

Keywords: obstructive sleep apnea, oropharyngeal rehabilitation, AHI, ESS, meta-analysis

Biography

Hsin Yu Lin is a Doctoral student in the Institute of Allied Health Science in National Cheng Kung University in Taiwan. She is an experienced Physical Therapist with Orthopedic specialty, particularly with post-operative rehabilitation and assistive technology. Her research interest is in sleep medicine which is a multidisciplinary specialty as the traumatic center which is also integrated by different clinician team members.

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