

## Effects of physical therapy with multilevel upper airway exercise for moderate and severe obstructive sleep apnea- A preliminary randomized controlled trial

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### Abstract

**Background:** Obstructive sleep apnea (OSA) is characterized with complete or partial obstruction of upper airway during sleep. Critically compromised by upper airway anatomical impaired properties, oropharyngeal muscle dysfunction is recognized as one of the primary phenotypic traits. The upper airway exercise was targeted on oropharyngeal muscle dysfunction by re-educating and re-shaping the oropharyngeal muscles to maintain the upper airway patency. Although OSA was thought as multilevel collapsibility of the upper airway, it still lacked clinical evidence to prove an effective model of upper airway exercise. Therefore, the purpose of this study was to exam the clinical effects of physical therapy with multilevel upper airway exercise for moderate and severe OSA.

**Methods:** Fifteen subjects with newly diagnosed moderate or severe OSA ( $AHI \geq 15$ ) were randomized into intervention group and control group. The intervention group ( $N=8$ ) underwent a 12-week-intervention of hospital based rehabilitation program, while the control group ( $N=7$ ) was kept on waiting for 12 weeks. The multilevel upper airway exercise comprised retropalatal, retroglossal, hypopharyngeal, facial and TMJ levels. The primary outcome was Polysomnography (PSG) data, including apnea-hypopnea index (AHI), arousal index, mean SpO<sub>2</sub>, and oxygen desaturation index (ODI). Additionally, the secondary outcome was oropharyngeal and respiratory muscle function.

**Results:** In intervention group, AHI significantly improved ( $46.96 \pm 19.45$  versus  $32.78 \pm 10.78$  events/h,  $p=0.017$ ); in control group, AHI significantly worsened ( $35.77 \pm 17.49$  versus  $42.96 \pm 17.32$  events/h,  $p=0.043$ ). While the control group remained no change after intervention, the intervention group demonstrated other PSG outcomes significantly improvement, including arousal index ( $46.04 \pm 18.9$  versus  $32.98 \pm 8.35$ /h), mean SpO<sub>2</sub> ( $92.88 \pm 2.1$  versus  $94.13 \pm 1.46\%$ ), ODI ( $31.13 \pm 19.48$  versus  $20.57 \pm 7.83$ /h). Besides, the intervention group demonstrated significant improvement on oropharyngeal and respiratory muscle function compared to the control group.

**Conclusion:** This physical therapy with multilevel upper airway exercise can be proven a non-invasive approach with the significant clinical improvement on sleep apnea for moderate and severe OSA.

### Biography

Hsin-Yu Lin has completed her master degree at the age from National Yang Ming University since 2003, Taiwan. She is a fourth grade PhD student of Allied Health Institute of Medical College of National Cheng Kung University, Taiwan; her mentor is Professor Ching-Hsia Hung. She was experienced on post-surgery orthopedic physical therapy and nowadays conducts the clinical research on sleep medicine, especially physical therapy for obstructive sleep apnea.



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