

# **Effectiveness of hypoglossal nerve stimulation in the treatment of obstructive sleep apnea**

Study of meta-analysis  
For partial fulfillment of Master degree in OtoRhinoLaryngology

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قالوا

سببنا انك لا تعلم لنا  
إلا ما علمتنا إنك أنت  
العليم الحكيم

صدق الله العظيم

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## List of Abbreviations

|      |                                            |
|------|--------------------------------------------|
| AHI  | Apnea- hypopnea index.                     |
| CCC  | Complete concentric collapse.              |
| CPAP | Continuous positive airway pressure.       |
| ES   | Electrical stimulation.                    |
| ESS  | Epworth sleepiness scale.                  |
| FOSQ | Functional outcome of sleep questionnaire. |
| HNS  | Hypoglossal nerve stimulation.             |
| ODI  | Oxygen desaturation index.                 |
| OSA  | Obstructive sleep apnea.                   |
| PSG  | Polysomnography.                           |

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# Introduction



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## **Introduction**

Obstructive sleep apnea (OSA), is the most common respiratory sleep disorder and its incidence is increasing due to the obesity epidemic and aging population. It has been estimated that symptomatic OSA affects up to 10% of middle-aged men and 3% of middle-aged women. (*Bisogni et al, 2017*).

OSA characterized by upper airway collapse during sleep, resulting in obstructive apneas or hypopneas and causing frequent arousals. Associated symptoms of disturbed sleep include snoring, daytime sleepiness, and neurocognitive impairment. Untreated OSA is associated with long-term negative health outcomes, including an increased risk of cardiovascular diseases, reducing quality of life. (*Wray CM & Thaler ER, 2016*).

The most widely accepted treatment is nasal continuous positive airway pressure (CPAP). CPAP use improves polysomnography (PSG) outcomes, quality of life, and medical morbidities. Although CPAP is a first-line treatment for moderate and severe sleep apnea, long-term use for many patients is suboptimal. Adherence in several large cohort studies over a period of 6 months is only 39% to 50%. (*Woodson BT et al, 2016*).

One such therapy for those who have failed CPAP is direct stimulation of the hypoglossal nerve to increase pharyngeal muscle tone to prevent airway collapse. Several recent studies have

examined the role of hypoglossal nerve stimulation (HNS) as an alternative therapy for OSA. HNS targets pharyngeal tone and stimulates genioglossus to maintain airway patency. Another advantages include targeting airway collapse at multiple anatomic levels and the ability to titrate the device during sleep studies. Several recent clinical trials have looked at the efficacy of these devices. *(Kompelli A. R. et al, 2018).*

The purpose of this study was to perform a meta-analysis of available HNS studies to determine the role of HNS in treating OSA.



# Aim of the Work



## **Aim of the work**

The aim of this study is to evaluate the effectiveness of hypoglossal nerve stimulation in management of obstructive sleep apnea through a meta-analysis study.



# Review of literature



Chapter (1): 

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# Anatomy

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