**Supplement to**


**Patient-reported Outcomes with Hypoglossal Nerve Stimulation for Treatment of Obstructive Sleep Apnea:**

**A systematic review and Meta-analysis**

## I. Search strategy

### a. Key words

"Obstructive sleep apnea[Title/Abstract] OR Upper airway resistance[Title/Abstract]) AND (Implantable nerve stimulator[Title/Abstract] OR hypoglossal[Title/Abstract] OR Inspire implant[Title/Abstract]"

### b. Inclusion & exclusion criteria

| Inclusion criteria | Exclusion |
|---|---|
| Publication between 01/2000 and 08/2022 | Review articles |
| English language publication | Animal studies or in-vitro studies |
| At least ten subjects included in study | Editorials |
| Follow-up period at least 3 months | Abstracts |
| PROM or PREM in OSA-relevant outcome domain reported | Studies reporting on pediatric populations |

**Supplementary table S1: Inclusion and exclusion criteria**

# II. Risk of bias assessment

| First author | Year | Bias due to confounding | Bias due to selection of participants | Bias in classification of interventions | Bias due to deviations from intended interventions | Bias due to missing data | Bias in measurement of outcome | Bias in selection of reported results | Overall bias |
|---|---|---|---|---|---|---|---|---|---|
| Baptista et al. | 2022 | ● moderate | ● moderate | ● low | ● low | ● serious | ● low | ● low | ● critical |
| Eastwood PR et al. | 2011 | ● low | ● moderate | ● low | ● low | ● serious | ● low | ● low | ● serious |
| Eastwood PR et al. | 2019 | ● low | ● serious | ● low | ● low | ● low | ● low | ● low | ● moderate |
| Heiser C et al. | 2017 | ● low | ● low | ● low | ● low | ● serious | ● low | ● low | ● moderate |
| Heiser C et al. | 2022 | ● low | ● low | ● low | ● low | ● low | ● low | ● low | ● low |
| Hinder D et al. | 2022 | ● low | ● low | ● low | ● low | ● serious | ● low | ● low | ● moderate |
| Hofauer B et al. | 2017 | ● low | ● low | ● low | ● low | ● serious | ● low | ● low | ● moderate |
| Hofauer B et al. | 2019 | ● low | ● low | ● low | ● low | ● moderate | ● low | ● low | ● low |
| Huntley C et al. | 2018 | ● low | ● low | ● low | ● low | ● moderate | ● low | ● low | ● low |
| Kent DT et al. | 2019 | ● low | ● low | ● low | ● low | ● low | ● low | ● low | ● low |
| Kent DT et al. | 2016 | ● low | ● serious | ● low | ● low | ● serious | ● low | ● low | ● serious |
| Kezirian EJ et al. | 2014 | ● low | ● low | ● low | ● low | ● serious | ● low | ● low | ● moderate |
| Kumar AT et al. | 2020 | ● low | ● low | ● low | ● low | ● moderate | ● low | ● low | ● low |
| Lee CH et al. | 2019 | ● low | ● low | ● low | ● low | ● serious | ● low | ● low | ● moderate |
| Mahmoud AF et al. | 2018 | ● low | ● low | ● low | ● low | ● serious | ● low | ● low | ● moderate |
| Mwenge GB et al. | 2013 | ● low | ● serious | ● low | ● low | ● low | ● low | ● low | ● moderate |
| Parikh V a et al. | 2018 | ● low | ● moderate | ● low | ● low | ● serious | ● low | ● low | ● serious |
| Pascoe M et al. | 2022 | ● low | ● low | ● low | ● low | ● serious | ● low | ● low | ● moderate |
| Patil R et al. | 2021 | ● low | ● low | ● low | ● low | ● serious | ● low | ● low | ● moderate |
| Patil R et al. | 2021 | ● low | ● low | ● low | ● low | ● serious | ● low | ● low | ● moderate |
| Pawlak D et al. | 2021 | ● low | ● low | ● low | ● low | ● serious | ● low | ● low | ● moderate |
| Philip P et al. | 2018 | ● low | ● serious | ● low | ● low | ● serious | ● low | ● low | ● critical |
| Sarber KM et al. | 2020 | ● low | ● low | ● low | ● low | ● serious | ● low | ● low | ● moderate |
| Sarber KM et al. | 2020 | ● low | ● moderate | ● low | ● low | ● serious | ● low | ● low | ● serious |
| Shah J et al. | 2018 | ● low | ● low | ● low | ● low | ● serious | ● low | ● low | ● moderate |
| Steffen A et al. | 2019 | ● low | ● low | ● low | ● low | ● serious | ● low | ● low | ● moderate |
| Steffen A et al. | 2020 | ● low | ● low | ● low | ● low | ● serious | ● low | ● low | ● moderate |
| Suurna M et al. | 2021 | ● low | ● low | ● low | ● low | ● serious | ● low | ● low | ● moderate |
| Van de Heyning PH et al. | 2012 | ● low | ● low | ● low | ● low | ● serious | ● low | ● low | ● moderate |

| First author | Year | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Weeks B et al. | 2018 | ● low | ● moderate | ● low | ● low | ● serious | ● low | ● low | ● serious |
| Withrow K et al. | 2019 | ● low | ● low | ● low | ● low | ● low | ● low | ● low | ● low |
| Zhu Z et al. | 2018 | ● low | ● low | ● low | ● low | ● serious | ● low | ● low | ● moderate |

**Supplemenetary table S2: Risk of bias assessment of included observational and comparative studies using the ROBINS-I tool**

| First author | Year | Bias from randomization process | Bias from deviations from intended interventions | Bias from missing outcome data | Bias from measurement of the outcome | Bias from selection of the reported results | Overall bias |
|---|---|---|---|---|---|---|---|
| Heiser C et al. | 2021 | ● low | ● low | ● low | ● low | ● low | ● low |
| Woodson BT et al. | 2018 | ● low | ● low | ● low | ● low | ● low | ● low |

**Supplementary table S3: Risk of bias assessment of included randomized controlled studies using the Risk-of-bias 2 tool**

# III. Publication bias assessment
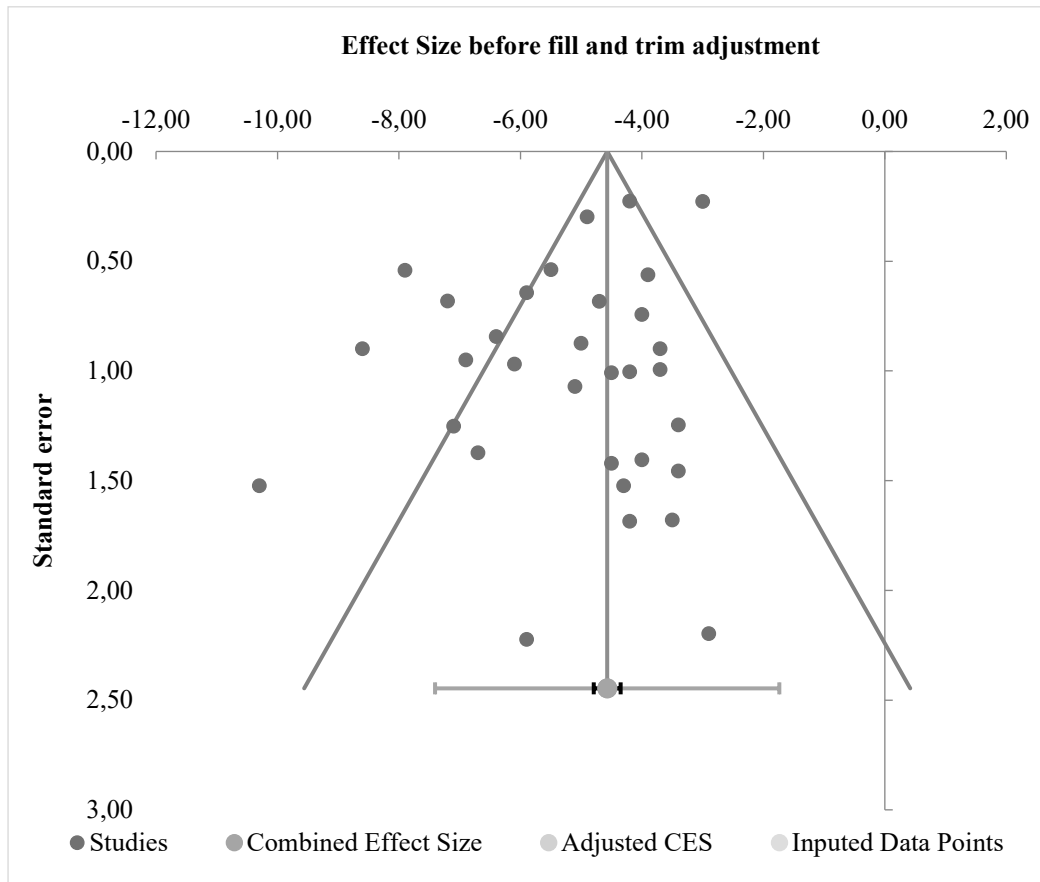


**Supplementary figure S1: Funnel plot before trim and fill adjustment**
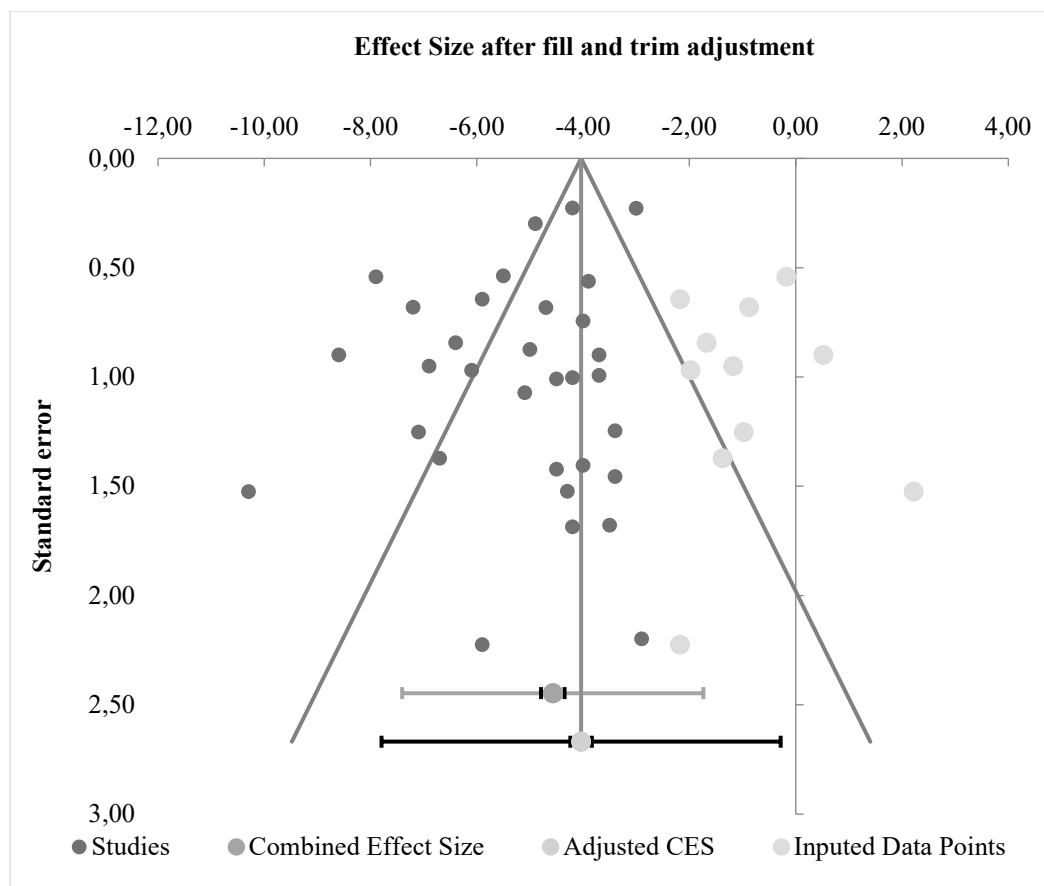
**Supplementary figure S2: Funnel plot after trim and fill adjustment**