respiratory disturbance for a given change in MM signal using a mixed linear-regression.
Results: Participants (n=38) had mild to severe OSA (median AH index 28.9/h; median arousal index 23.2/h). MM showed a high level of synchronization with concurrent PES signals. Distribution of gyroscope MM signal amplitude differed significantly between event types: median (95% confidence interval) values of 0.60 (0.17–2.43) for CA, 0.83 (0.23–4.71) for CH, 1.93 (0.54–5.57) for MxA, 3.23 (0.72–18.09) for OH, and 6.42 (0.88–26.81) units for OA. Mixed regression indicated that crossing from NB to central events would decrease gyroscope MM signal amplitude by –1.23 (CH) and –2.04 (CA) units, while obstructive events would increase gyroscope MM signal amplitude by +3.27 (OH) and +6.79 (OA) units (all p<10-6).
Conclusion: In OSA patients, MM signals facilitated the measurement of specific levels of RE associated with obstructive, central or mixed apneas and/or hypopneas. A high degree of similarity was observed with the PES gold-standard signal.
Support (If Any):

0737

FACTORS INFLUENCING AROUSAL THRESHOLDS

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Introduction: Obstructive Sleep Apnoea (OSA) is the most common sleep-related breathing disorder with an estimated prevalence of approximately 15-30 percent in males and 10-15 percent in females. A low respiratory arousal threshold (ArTH) is one of several traits involved in OSA pathogenesis. This has been shown to be reliably predicted using an Arousal Score which is calculated using the patients overall Apnoea-Hypopnoea Index (AHI), nadir SpO2 and Hypopnoea:Apnoea ratio where a score of 2 or more predicts a low arousal threshold, and a score of 1 indicates a high arousal threshold. Our objective was to describe factors associated with high arousal thresholds in patients with OSA as determined by the Arousal Score in a metropolitan population.
Methods: 208 unselected, consecutive, adult, overnight polysomnography with prospectively calculated arousal scores were assessed from 2019 – 2020. Demographic and anthropometric data including Age, Sex, BMI, Epworth Sleepiness Score (ESS), AHI, SpO2 nadir, Hypopnoea:Apnoea ratio and arousal index was recorded. The arousal score was calculated by assigning one point for meeting each of the following requirements: AHI <30; SpO2 nadir > 82.8%; Hypopnoea:Apnoea ratio > 58.3, with a score <2 considered low. Spearmann correlation was performed to determine the factors associated with the Arousal Score.
Results: 208 patients were included in the study. 35.6% of patients had mild sleep apnoea, 23.1% moderate sleep apnoea, 22.6% severe sleep apnoea with 18.8% of patients with no sleep apnoea. Mean arousal score was 2.47 (Std Dev 0.839). Spearman correlation indicated that disease severity, BMI (rs -.374, p-value < 0.01) and STOP-BANG (r2 -0.419, p-value < 0.01) had a statistically significant relationship with Arousal Score. That is, a higher AHI, BMI and STOP-BANG was associated with a low arousal score. Moreover, Gender and Epworth Sleepiness Score exhibited an insignificant association with arousal score. We found increasing severity of disease was associated with lower arousal score and therefore a higher arousal threshold
Conclusion: Our study demonstrates that worsening sleep apnoea severity, higher BMI and higher STOP-BANG are associated with a lower arousal score and therefore higher arousal threshold. Gender and ESS do not appear to be significantly associated.
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0738

CLINICAL AND PHYSIOLOGICAL RELEVANCE OF COMPUTATIONAL STUDIES OF OBSTRUCTIVE SLEEP APNEA: A SYSTEMATIC LITERATURE REVIEW

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Introduction: Structural interventions for obstructive sleep apnea (OSA) have unpredictable success rates. Anatomically accurate computer simulations of airflow and soft tissue dynamics may be used in future virtual intervention planning tools to identify the optimal patient interventions. The objective of this study is to review the existing literature on the correlation between computer-derived biomechanical variables and clinical measures of OSA severity.
Methods: Scientific papers written in English that correlated the apnea-hypopnea index (AHI) with computer-derived biomechanical variables were identified by searching on the PubMed and SCOPUS databases the search phrase “sleep apnea” AND “computational fluid dynamics” OR "finite element" OR “fluid structure interaction”.
Results: A total of 19 articles were identified that reported correlations between computer-derived biomechanical variables and AHI, which was the metric of OSA severity reported in most studies. These studies demonstrated that several anatomic and physiologic variables correlate with OSA severity, including airspace cross-sectional areas, airspace volumes, and airflow resistance. No studies were found that correlated computer-derived dynamic measures of upper airway mechanical stability, such as tissue compliance, to OSA severity.
Conclusion: Computer-derived anatomic and physiologic variables may serve as useful predictors of surgical outcome or mandibular device treatment response in OSA patients. Further research is needed to test the hypothesis that virtual surgery planning based on computer-derived measures of upper airway stability can improve outcomes of OSA interventions.
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0739

CEREBROVASCULAR RESPONSE TO INTERMITTENT HYPOXIA DURING SLEEP IN OSA PATIENTS

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Introduction: Obstructive sleep apnea (OSA) is associated with increased risks of cerebrovascular accidents, but it remains unclear how OSA impacts the cerebral vasculature. Intermittent hypoxia is a hallmark feature of OSA and recurs throughout sleep. In awake humans, the cerebrovascular response to intermittent hypoxia has been well characterized, as an increase of blood perfusion that begins at least a few seconds after the start of hypoxia. Functional magnetic resonance imaging (fMRI) that measures the blood oxygen level dependent (BOLD) signal has revealed significant differences between the cerebrovascular responses in awake humans with and without OSA. However, intermittent hypoxia occurs primarily during sleep in OSA, yet the cerebrovascular response to intermittent hypoxia has not been studied during sleep.