P149

THE ROLE OF OSA PATHOPHYSIOLOGICAL TRAITS ON MANDIBULAR ADVANCEMENT TREATMENT RESPONSE AND EFFICACY OF A NOVEL MANDIBULAR ADVANCEMENT DEVICE

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Mandibular advancement devices (MAD) are an effective therapy for OSA. However, treatment response is difficult to predict. Recent studies have investigated the influence of OSA endotypes on MAD outcomes albeit using simplified endotyping methods. We aimed to prospectively quantify and compare OSA pathophysiological traits between responders and non-responders to a novel MAD using gold-standard endotyping methodology.

Data from 30 OSA patients (AHI>10events/h) are analysed to date. OSA was confirmed via in-laboratory polysomnography. Next, a detailed physiology night was conducted before MAD therapy. Participants were instrumented with EEG, nasal mask, pneumotachograph, epiglottic pressure catheter and intramuscular genioglossus electrodes to quantify baseline OSA pathophysiological traits. Pcrit was quantified via CPAP drops and non-anatomical traits from naturally occurring respiratory events. Participants were fitted with a novel MAD with a built-in oral airway (Oventus O2Vent Optima™) and titrated to ≥75% of maximum mandibular advancement. A treatment efficacy PSG followed therapy acclimatisation.

OSA severity decreased by 41±30% (25.1[16.3,39.2] vs. 12.1[7.3,20.0] events/h P<0.001) with MAD therapy. Similar reductions occurred in participants with high nasal resistance. OSA pathophysiological traits measured by gold-standard methodology were similar between responders and non-responders to MAD (residual AHI>10events/h). MAD responders had less collapsible airways at baseline when measured using simple estimates (Vpassive: 92.5[86.3,97.0] vs. 72.5[43.0,91.3] %Veupnea, P=0.022).

The novel MAD reduced OSA severity by ~40% including in those with nasal obstruction. The upper airway was less collapsible in responders to MAD when estimated but not when directly measured. Simple estimates of OSA pathophysiological traits may be used to predict responses to MAD.

P150

Abstract Withdrawn

P150

Abstract Withdrawn

P151

SHORT-TERM MANDIBULAR ADVANCEMENT SPLINT THERAPY FOR OBSTRUCTIVE SLEEP APNOEA IMPROVES PARASYMPATHETIC MODULATION

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Introduction: Altered autonomic function (specifically, sympathoexcitation and vagal withdrawal) contributes to cardiovascular risk. Obstructive sleep apnoea (OSA) is associated with altered autonomic function. Heart rate variability (HRV) is a non-invasive measure of autonomic function. We aimed to assess whether short-term OSA treatment with mandibular advancement splints (MAS) improves autonomic function measured by HRV.

Methods: A retrospective analysis of participants in MAS treatment studies (N=105, 56% male, age, 56±1 years; BMI, 30±5 kg/m2) was undertaken. Nocturnal HRV was assessed using electrocardiograms from pre and post-treatment polysomnograms. HRV was calculated across 2-minute epochs over the entire electrocardiogram and divided into each sleep stage (wake, non-rapid eye movement (NREM), and rapid eye movement (REM)). HRV measures reflecting sympathetic (normalised low frequency (LFnu)), parasympathetic (pNN50%, RMSSD (ms), normalised high frequency (HFnu)), total HRV (SDNN (ms) and HTI) and R-R interval were calculated. Changes in HRV measures following treatment were assessed (paired t-test) and compared to AHI change (linear regression, with adjustment for age, sex, BMI).

Results: Following MAS treatment, HTI increased (14.78±39.99, p=0.008), and LFnu reduced during wake (-0.43±38.18, p=0.03). Linear regression, showed AHI reduction related to increased R-R interval during wake (-0.002, 0.001), p=0.009) [unstandardised β/SE]