512. Obstructive sleep apnoea: physiology, diagnostic tools and technology

P4951
Effect of chronic intermittent hypoxia on rat genioglossus
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Objective: To investigate the effect of chronic intermittent hypoxia (CIH) on rat genioglossal ultrastructure and mitochondrial function as well as the intervention role of adiponectin (Ad).
Methods: 42 rats were randomly divided into three groups: normal control (NC) group, CIH group and CIH+Ad group with 14 rats in each. Rats in NC group were kept breathing normal air, while rats in both CIH and CIH +Ad groups received same CIH environment. However, rats in CIH+Ad group was given intravenous Ad supplement. At the end of experiment (day 35), the genioglossal ultrastructure, the mitochondrial membrane electrical potential ($\Delta\Psi_m$)as well as mitochondrial complexes I and IV were compared among different groups.
Results: a) In CIH group there were significant genioglussal ultrastructural changes such as myofibril discontinuities, lysis of myofilament, edema of mitochondria and disruption of cristae, vacuolus and lysis of some mitochondria. These changes were less significant in CIH +Ad group. b) The $\Delta\Psi_m$ was significantly lower in CIH group than that in NC group (P <0.01). The $\Delta\Psi_m$ in CIH+Ad group was statistically lower than that in NC group but higher than that in CIH group (all P<0.05). d) The mitochondrial complexes I and IV in CIH group were the lowest but became higher and higher from CIH+Ad group to NC group, with a significant difference between NC and CIH groups (all P<0.05).
Conclusion: CIH could lead to impaired genioglossal ultrastructure and mitochondrial dysfunction in genioglossal cells. These pathological changes could be partially improved by supplement of adiponectin.

P4952
CPAP therapy withdrawal – A model to evaluate treatments for OSA
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Background: Evaluating OSA therapies by recruiting previously untreated patients in randomised controlled trials is time consuming and expensive. A more efficient model to investigate effects of OSA treatments could be during CPAP withdrawal. There is no data from randomized controlled trials defining the effects of CPAP-withdrawal on OSA, thus we determined the effects of two weeks CPAP withdrawal on sleep-disordered breathing, sleepiness and psychomotor performance.
Methods: 41 OSA patients on CPAP were randomized to either withdraw CPAP (sham-CPAP) or continue CPAP for 2 weeks. At baseline, 1 and 2 weeks, apnea/hypopnea index (AHI), oxygen desaturation index (ODI), Epworth sleepiness scale (ESS), Osler test, divided attention driving simulator (DADS) and psychomotor vigilance test (PVT) were assessed.
Results: Withdrawal of CPAP increased AHI at 1 and 2 weeks (mean difference in AHI change +31.9 (95%CI 20.1,43.7) and +33.5 (95%CI 22.4,44.6), respectively) and ODI (mean difference in ODI change +26.3 (95%CI 16.6,36.0) and +26.4 (95%CI 16.1,36.8), respectively) in comparison to continuation of CPAP (p<0.001 for all comparisons). ESS increased significantly at 1 and 2 weeks in the CPAP withdrawal group compared to the CPAP group (mean difference in ESS change +1.9 (95%CI 0.4,3.3) and +2.7 (95%CI 1.2,4.3), p=0.015 and p<0.001, respectively). CPAP withdrawal was not associated with deterioration in the Osler test, DADS and the PVT at 1 and 2 weeks.
Conclusions: CPAP withdrawal leads to a fast recurrence of OSA and a slow return of subjective sleepiness, but is not associated with deterioration in psychomotor performance within 2 weeks. Therefore, this model seems suitable and safe to evaluate treatment effects on OSA.

P4953
The effect of interleukin-1β on lung ventilation and central CO_2 chemoreception
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Oxidative stress developed at many respiratory diseases associated with significant increase in inspiratory resistive loading (such as asthma, COPD, sleep apnea) leads to elevation of the plasma and cerebral levels of pro-inflammation cytokines. On the other hand resistive breathing has influence on the central chemoreception by decreasing the ventilatory response to hypercapnic stimulation. Little is known about mechanisms of this influence.
The aim of the present study was to examine the hypothesis that elevation of pro-inflammatory cytokine level in liquor may decrease the ventilatory response to carbon dioxide.
For this purpose intracerebroventricular microinjections of human recombinant interleukin-1β (IL-1β) were used in tracheostomized anaesthetized rats during the resting and hypercapnic stimulated breathing. The hypercapnic ventilatory response was measured by using rebreathing techniques before and after 10 μl intracerebroventricular injection of ether saline (placebo) or IL-1β (0,5 μg/rat).
It was sown that when the resting breathing the intracerebroventricular injections of IL-1β evoke the significant increase in minute ventilation and mean inspiratory flow. During the hypercapnic rebreathing experiments it was obtained that the increase of IL-1β in liquor weakens the ventilatory, tidal volume and mean inspiratory flow responses to carbon dioxide.
We concluded that the elevation of pro-inflammatory cytokine level in liquor intensifies ventilation during the resting breathing but weakens chemoreflex sensitivity to hypercapnia that suggests participation of pro-inflammatory cytokines in mechanisms of central breathing control and central chemoreception.

P4954
Didgeridoo may lower apnea hypopnea index through reducing parapharyngeal fat pads
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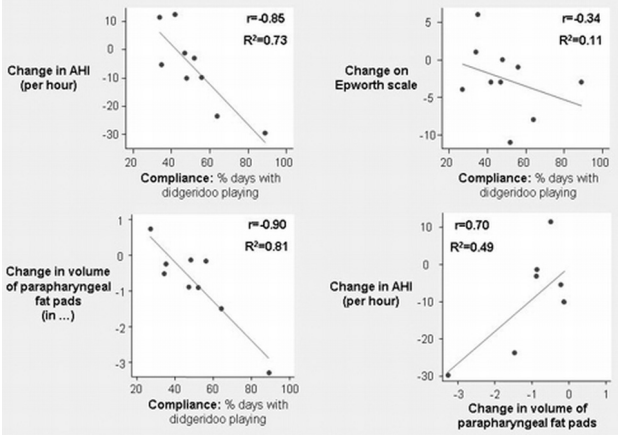
Background: Our aim was to assess changes in anatomical structures of the upper airways in patients with obstructive sleep apnea syndrome (OSAS) undergoing



didgeridoo training to understand the mechanisms by which this treatments exhibits its beneficial effects.
Methods: We included patients over 18 years of age with newly diagnosed OSAS and an AHI between 15-45/hour. We excluded patients with central sleep apnea, need for CPAP therapy, planned weight reduction intervention, high alcohol inatke and adiposity. Patients received didgeridoo lessons and practiced for 4 months. To measure compliance a device attached inside the didgeridoo continuously monitored temperature and pressure. Before and after treatment patients underwent polysomnography and MRI imaging for soft-tissue volumetric measurements.
Results: In 10 patients included so far (median age 52 years, BMI 27 kg/m^2) the median AHI decreased from 31 to 19/hour and Epworth sleepiness score from 12 to 10. Figure 1 shows very strong associations between the extent of playing digeridoo and a decrease in AHI (r= -0.85) and in the volume of parapharyngeal fat pads (r= -0.90) but a moderate association only with decrease in daytime sleepiness (r= -0.34).
A decrease in AHI was strongly associated with a decrease in the volume of parapharyngeal fat pads (r=0.70).
Conclusion: The data strongly suggest that didgeridoo playing decreases the AHI by downsizing parapharyngeal fat pads.

P4955
Improvement in obstructive sleep apnoea features under targeted hypoglossal neurostimulation is independent from body mass index and collar size
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Background: The treatment of moderate to severe obstructive sleep apnoea (OSA) is continuous positive pressure (CPAP) applied during sleep. Although its health effects are beyond doubt, many patients refuse or stop CPAP because of intolerance or local side effects. Alternative therapies are needed.
Aim: We used targeted hypoglossal neurostimulation (THN) to treat 11 patients (1 female) non compliant with CPAP therapy with the aim of improving both breathing and sleep.
Methods: One hypoglossal nerve was stimulated through a multicontact cuffed electrode positioned around the main trunk of the nerve and connected to a stimulator implanted in a subcutaneous pocket on the anterior chest wall. Stimulation was applied continuously during sleep.
Results: The BMI of the group was 30.7+3.5 kg/m^2; on diagnostic polysomnography the average apnoea-hypopnoea index (AHI) was 47.5+16.6, the 4% oxygen desaturation index (ODI) 28.6+21.5 and the microarousal index (MAI) 35.5+13.8, all per hour of sleep. After 3 months therapy the BMI was unchanged whereas the AHI was 21.5+12.2, the ODI 13.9+14.7 and the MAI 24.8+15.1, all $p<0.05$. There was a significant correlation between initial AHI and ODI and BMI ($p<0.05$) and there was a tendency for initial AHI to correlate to collar size ($p<0.1$). The final ODI correlated to BMI ($p<0.05$). By contrast, there was no significant correlation between changes in AHI, or changes in ODI with THN and BMI or collar size.
Conclusions: THN may improve breathing and sleep irrespective of body size and of collar size, two well known determinants of OSA severity.

P4956
Supine position dependency in obstructive sleep apnea
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Introduction: It is known that supine sleep position may lead to an increase in the severity of obstructive sleep apnea (OSA) patients. The aim of this study were to define the prevalence of supine positional OSA in patients diagnosed with OSA and to draw attention to alternative therapy planning in these patients.
Patients and Method: A total of 3,214 patients diagnosed as OSA between June 2007 and June 2010 were included to the study. Positional OSA was defined as a total apnea-hypopnea index (AHI) $\geq$5 and supine AHI/non-supine AHI $\geq$2. Characteristics of positional OSA and non-positional OSA groups were compared statistically.
Results: Patients grouped as positional OSA composed 39.9% (n: 1283) of all patients. Positional OSA patients were younger with lower body mass index (BMI) and their OSA was less severe.
Conclusions: Positional OSA, which may require different treatment approaches, is not uncommon among OSA patients and should be understood as a different clinical entity.

P4957
Berlin questionnaire performance for detecting sleep apnea in the general population
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Introduction: Berlin questionnaire (BQ) has been proposed as a screening tool for identifying patients at risk for obstructive sleep apnea (OSA). The aim of our study is to evaluate the performance of this questionnaire for detecting OSA in a large sample of middle-aged general population.
Methods: 469 subjects (46.4% women, 50.6±7.4 years old, BMI 25.1±4.9 kg/m^2) participating in an ongoing population-based cohort study (HypnoLaus, Lausanne, Switzerland) underwent a complete polysomnographic recording at home and an extensive clinical workup including BQ. This instrument includes 3 categories: 1) witnessed apnea and snoring 2) daytime sleepiness and 3) obesity or hypertension. A positive score in 2 or more categories was considered suggestive of OSA.
Results: Mean AHI was 6.3±10.6/h. Mean 4%ODI was 5.8±10.0. Prevalence of OSA defined as an AHI >5/h, >15/h and >30/h was 33.3%, 10.3% and 3.8%, respectively in our population. Prevalence of positive BQ score was 24.4% (29.2 in men, 18.81 in women). BQ sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) to detect OSA were 36.1%, 82.4%, 51.8% and 72.9% respectively for an AHI >5/h; 52.1%, 78.8%, 21.9% and 93.5% for an AHI>15; and 72.2%, 77.6%, 11.4% and 98.6% for an AHI>30/h. Positive BQ was associated with higher 4% ODI (10.8/h vs 4.2/h $p<0.001$), higher Epworth score (8.3 vs 6.2 $p<0.0001$) and broader neck circumference (38.6 vs 35.7 cm $p<0.0001$).
Conclusion: BQ questionnaire performance for identifying OSA is lower in a middle-aged general population than previously reported in a clinical population. Our results do not support its use as a screening tool for OSA in an unselected population.

P4958
STOP-BANG score as a screening tool for obstructive sleep apnea in the general population
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Introduction: STOP-BANG (Snoring, Tiredness during daytime, Observed apnea, High blood Pressure, Body mass index >35, Age >50, Neck circ >40 cm, Gender) score has been shown to be a useful tool to screen for obstructive sleep apnea (OSA) during preoperative evaluation. The aim of our study is to evaluate the performance of this score for detecting OSA in a large sample of middle-aged general population.
Methods: 458 subjects (47.7% women, 50.6±7.5 years old, BMI 25.2±4.9 kg/m^2) participating in an ongoing population-based cohort study (HypnoLaus, Lausanne, Switzerland) underwent a complete polysomnography at home. Apnea hypopnea index (AHI) was scored acording to AASM 2007 criteria. A STOP-BANG score of 3 or more out of a possible 8 was considered suggestive of OSA.
Results: Mean AHI was 6.04±10.3/h. Prevalence of OSA defined as an AHI >5/h, 15/h and 30/h was 33.0%, 9.39% and 3.49%, respectively in our population. Mean STOP-BANG score was 2.16±1.37. 34.9% of the subjects had a score $\geq$3. To detect OSA with AHI thresholds of 5/h, 15/h and 30/h, sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) were respectively 55.6%, 75.2%, 52.5% and 77.5% for an AHI >5/h; 76.7%, 69.4%, 20.6% and 96.6% for an AHI>15; 93.8%, 67.2%, 9.4% and 99.7% for an AHI>30/h. The area under the ROC curve for whole STOP-BANG score was 0.7 for an AHI> 5/h, 0.775 for an AHI>15/h and 0.871 for an AHI >30/h.
Conclusion: STOP-BANG score appears to be a useful clinical tool to rule out severe OSA (AHI>30/h) in a selected population, with a high negative predictive value. However, it is not an adequate screening tool for OSA in the general population due to its poor sensitivity.

P4959
AutoCPAP devices accurately identify obstructive sleep apnea patients with residual apnea during treatment
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Background: Objective data on the effectiveness of CPAP therapy of patients with obstructive sleep apnea syndrome (OSA) are needed. The accuracy of the apnea/hypopnea index (AHI) recorded by CPAP devices during treatment is unknown. We tested the hypothesis that AHI derived from CPAP devices accurately predict an elevated AHI during a sleep study.
Methods: 48 OSA patients, mean±SD age 54±6y, baseline AHI 52.5±21.6/h, underwent in-laboratory sleep studies once or twice during long-term autoCPAP therapy. AHI from CPAP devices (ResMed S8, Philips Respironics REMstar) during sleep studies and during the preceeding 7 nights were recorded.
Results: The AHI derived from 60 sleep studies was 5.0±6.2/h. The mean difference (bias) of the corresponding AHI from CPAP devices was 1.8/h, 95% confidence interval -7.4 to +11.0/h. The difference between the minimal and maximal CPAP-derived AHI in the week preceeding the sleep study was 6.1±5.1/h. In

22 of 60 sleep studies, the AHI was >5/h. The accuracy of the AHI from CPAP devices to correctly predict an elevated AHI >5/h was quantified by the area under the receiver operating characteristic curve of 0.87 (95% CI 0.78 to 0.96). The sensitivity and specificity of an AHI >5/h from CPAP devices to identify a polygraphic AHI >5/h were 86% and 75%, respectively; the negative and positive predictive values were 93% and 56%, respectively.
Conclusions: The studied CPAP devices accurately identify OSA patients with elevated AHI during treatment. Because of the high night-to-night variability mean AHI derived from autoCPAP devices over several nights might be clinically more relevant than a single night AHI measured in the sleep laboratory.

P4960
Neural network model for estimating the apnoea-hypopnea index from nocturnal oxygen saturation
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Background: Nocturnal polysomnography (PSG) is the gold-standard for SAHS diagnosis. However, it is complex, expensive and time-consuming. Thus, simplified diagnostic techniques are desirable.
Aims: This study proposes a novel method to assist in SAHS diagnosis based on automated analysis of oxygen saturation (SaO2) recordings. It is hypothesised that an accurate estimate of the AHI can be obtained from these recordings using signal processing methods.
Methods: A database with 96 subjects (64 SAHS-positive) was available. Multilayer perceptron (MLP) neural networks were used to model SAHS diagnosis as a regression problem. A methodology composed of two stages was designed: 1) feature extraction and 2) regression analysis. In the first one, a set of 14 time-domain and frequency-domain features was defined to reflect the dynamical properties of SaO2 signals with respect to SAHS. In the second stage, the pattern composed of the extracted features was used as input to the MLP regression algorithm. The intraclass correlation coefficient (ICC) and the root mean square error (ERMS) between true and predicted AHI were computed to evaluate the accuracy of the estimation.
Results: The MLP-based approach achieved ICC = 0.92 and ERMS = 9.47, which outperformed conventional oximetry indices and the Delta index. In addition to high ICC, this algorithm achieved small error for all the range of AHI values. The regression model using ODI3 overestimated AHI for small target values. The diagnostic ability of the regression model based on ODI3 was very poor
Conclusions: The proposed method represents a valuable screening tool that could contribute to reduce the number of required PSG tests

P4961
A clinical score to predict polysomnographic (PSG) results in paediatric sleep disordered breathing (SDB)
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Aims: To develop a reliable tool, PSG validated, for diagnosis of SDB and to reduce the use of PSG.
Methods: Children with referred SDB undergoing a PSG for the first time. We propose the Sleep Clinical Record (SCR) to predict SDB in children, based on clinical experience. It consists of objective data, subjective symptoms, clinical history, behavioural and cognitive problems. These items were used in a model which combine subjective and objective parameters to create the sleep clinical score (SCS) with the higher predictive value.
Results: We studied 289 children (6.2±3.1 yrs, 63.3% M). We found 28% children's with primary snoring (PS) and 72% with OSAS. The SCS was higher in children with OSAS than children with PS (8.8±2.7 vs 7.4±3.1, $p < 0.005$) and it was correlated with AHI (r=0.156, p=0.008). The SCS's distribution has identified the value of 6.5 as its 25° centile, so the SCS was defined as positive when it was major of 6.5. The SCS was positive in 224 of the 289 children studied, of these 177 had OSAS (real positives) and 47 were PS (false positives). 65 children had a negative SCS, of these 31 were diagnosed as OSAS (false negatives). These children had lower AHI than OSAS'children with positive score (5.1±4.9 vs 8.9±10.1 p = 0,04).
Conclusion: This SCS is useful to screen SDB in selected population with referred symptoms, and is able to perform diagnosis of OSAS with a positive predictive value of 79% and an accuracy of 73%. It is a useful instrument to select patients with OSAS that could be treated without PSG diagnosis when the study is difficult to perform or is unavailable.

P4962
Reducing investigation time for the diagnosis of the obstructive sleep apnoea syndrome (OSAS) by combining oximetry with a screening algorithim
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Introduction: Oximetry and limited channel sleep studies (LCSS) for the diagnosis of OSAS have sensitivities of 87% and 82-94% respectively and specificities of 65% and 82-100% respectively [1]; implying that oximetry is useful for confirming OSAS in high probability patients but not at ruling it out. LCSS seems useful for both. However,the average time taken for oximetry is 15 minutes compared with 75 minutes for LCSS. (Average times were pooled form 5 Welsh sleep centres). We proposed an investigative approach that combined a screening algorithm [2] that would allocate high probablity patients to oximetry and low probability patients to LCCS. High probability subjects with negative oximetry also proceeded to LCSS.

Screening Algorithim

Risk factors: (1) Snoring, (2) Daytime Sleepiness, (3) Hypertension, obesity, large neck	
High Probability	2/3 factors positive
Low Probability	2/3 factors negative

Methods: We recruited consecutive sleep referrals over a 5 month period. We compared the total and average time taken with this algorithim against a strategy (control arm) of LCSS for every patient. The study was powered for 50 patients, 30 had been recruited to date.
Results: N=30. Median age 53 years, 19 were male.See table for results; average time saving – 24.5 minutes per patient.

	Algorithim arm	LCCS for all patients (control arm)
Total time	1515	2250
Average Time	50.5	75

Conclusion: We propose that allocating high probability subjects to oximetry and using LCSS for low probability subjects and for oximetry negative high probability subjects results in significant time and resource savings.
References:
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[2] Netzer NC,et al.Ann Int Med 1989;131:485-491.

P4963
Epworth sleepiness scale ratings – What does "in recent times" mean?
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Introduction: In patients with obstructive sleep apnoea (OSA), daytime sleepiness is routinely assessed with the Epworth sleepiness scale (ESS). It requires the estimation of the likelihood to fall asleep in eight daily life situations. The wording "This refers to your usual way of life in recent times" keeps the time scale for this assessment vague. We were interested in the actual time frame used by untreated OSA patients and patients treated with continuous positive airway pressure (CPAP) to estimate their sleepiness.
Methods: A time scale with a range from "one day" to "30 years or more" was printed on the backside of the ESS. Patients were asked to rate what "in recent times" meant to them. In addition, ESS scores and type of visit (diagnosis (D), treatment check (T)) were evaluated.
Results: 94 diagnostic and 73 CPAP patients participated. Diagnostic patients based their sleepiness assessment on a median time frame of 24 months (1st quartile (Q1) 12, 3rd quartile (Q3) 60 months). CPAP patients administered a significantly ($p<0.001$) shorter time scale of six months (Q1 3 months, Q3 24 months). For both groups, the time scale was independent from sleepiness severity (D r=0.039, p=0.708, T r= -0.044, p=0.701). As expected, diagnostic patients were sleepier than controls (median ESS score D 9 (Q1 6, Q3 13), T 6 (Q1 4, Q3 9), $p<0.001$).
Conclusion: Patients with untreated OSA use a surprisingly long time frame of 2 years to estimate their habitual sleepiness while CPAP-treated patients apply a much shorter time scale of 6 months. This indicates an adjustment of the subjective time scale due to treatment related changes and should be taken into account when the ESS is used to document changes in sleepiness.

P4964
Diagnostic performance of the non-contacting device SleepMinder in diagnosis of sleep apnea
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Background: Due to the unattended design screening of sleep-disordered breathing (SDB) has an error rate of 5-30%. Possible reasons for the screening failure are off-centered or unfixed sensors. Therefore often another screening is mandatory which is both expensive and impeding for the patient. In order to minimise screening failure it is desirable to develop non-contacting screening devices.
Methods: In 30 patients (5 no SDB, 19 obstructive sleep apnea, 6 central sleep apnea) we studied the diagnostic accuracy of SleepMinder (Biancamed, Dublin, Ireland) that was placed approx. 1m from the patient. SleepMinder emits a very weak electromagnetic radiation (factor 10-100 less compared to common household devices) and detects thorax and abdomen movement by measuring the Doppler effect. The diagnostic accuracy was validated against respiratory inductive plethysmography (RIP) in gold standard polysomnography (PSG).

Results: Apnea-hypopnea index (AHI) of SleepMinder correlated well with PSG-AHI on simultaneous application (r=0.90, p<0.001). For PSG-AHI cut-off >15/h and SleepMinder-AHI cut-off >13.4/h, sensitivity was 77.3% and specificity was 100%. Furthermore, SleepMinder correlated with PSG regarding total sleep time (r=0.59, p=0.001), sleep efficiency (r=0.49, p<0.006) and time to sleep (r=0.41, p=0.03).
Conclusions: This study showed that SleepMinder, a non-contacting screening device, detects sleep apnea with sufficient diagnostic accuracy. Moreover, SleepMinder correlates with total sleep time, sleep efficiency and time to sleep.

P4965
Acoustic respiratory monitoring (ARM) as an adjunct to polysomnography (PSG) in a sleep laboratory
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Introduction: PSG helps elucidate the nature of sleep disturbance and daytime somnolence (SD-DS) but does not include the objective measurement of wheeze (Wz) or cough (C). Nocturnal Wz and C are important features of asthma and other lung diseases and have been shown to disturb sleep. Awareness of nocturnal Wz is low and often unreliable. We hypothesized that a proportion of patients referred to a sleep laboratory because of SD-DS might be suffering from nocturnal Wz or C.
Methods: 69 unselected subjects (20 – 73 yo) referred to a sleep laboratory for PSG complaining of SD-DS participated. No attempt was made to select patients with asthma or chronic cough. PSG by standard methods and ARM (Pulmotrack, KarmelSonix, Haifa, Israel) were adequate for all but 3 patients (5%). The analysis was done minute by minute throughout the record where WheezeRATE (Wz%) defined as% of duty cycle occupied by Wz and CoughCOUNT (CC) were measured. The present study concerns the detection of nocturnal Wz and C by ARM without reference to the PSG data.
Results: The duration of the overnight ARM in the 66 subjects was 65 - 478 min (median 439 min). Wz-minutes, defined as the number of minutes with a Wz% >5% and C-minutes, the number of minutes with CC=>1 were determined. In 16/66 (24%) of patients Wz-minutes occupied more than 3% of the recording and in 7/66 (10.6%) C-minutes occupied more than 2% of the recording with overlap in 3 patients who had both Wz and C.
Conclusion: With 20/66 (30%) of unselected patients referred to an adult sleep laboratory for SD-DS having nocturnal wheeze and/or cough, adding ARM to routine PSG should be considered.

P4966
A new method to determine the site of upper airway obstruction using sleep induced endoscopy in patients with obstructive sleep apnea
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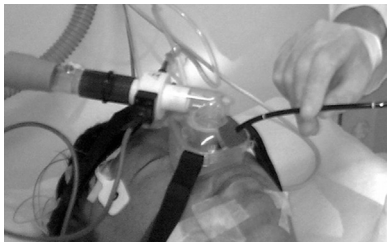
We evaluated 12 male OSA patients, age= 54±10y; body mass index = 28.8±3.5 kg/m^2 and apnea hypopnea-index = 39±18 events/h. The patients were monitored by full polysomnography and sleep was induced by midazolam drip infusion. The patients slept with a nasal mask attached to a flow generator capable of producing positive and negative pressures. After obtaining stable breathing, mask pressure was dialed down for 5 breaths to pre-established levels that induced flow restriction and apnea. Obstruction of the upper airway at the retropalatal (PAL) and retroglossal (GLOS) sites were classified as partial or complete by direct endoscopy visualization.



Results: The midazolam dose used was 3.7±2,25 mg and the mask pressure used to obtain flow restriction and apnea was 3.4±2.8 and 0.8±2.9 cmH2O, respectively. The behavior of the upper airways of all patients during flow restriction and apnea is presented below.

	Flow restriction		Apnea	
Obstruction	Partial	Total	Partial	Total
Exclusive PAL	0	1	0	2
Exclusive GLOS	0	1	0	3
PAL + GLOS	7	3	0	7

Five patients (42%) presented exclusively retropalatal (n=2) or retroglossal (n=3) obstruction during apena, suggesting that the site of obstruction is variable during obstructive events. We conclude that this is a promising method that may help to understand the mechanisms leading to OSA.

P4967
Interpretation of central and obstructive apnea event type varies widely between scorers: An observational study
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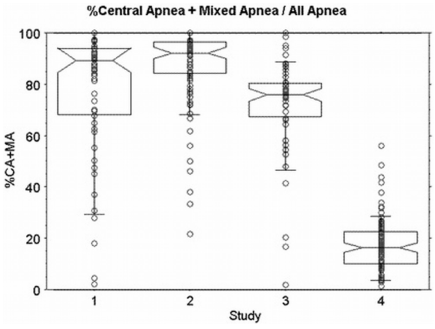
Background: Accurate classification of respiratory events in sleep as central or obstructive is critical to determining underlying pathophysiology and treatment.
Aim: To measure agreement in event classification in a group of scorers.
Methods: From June 2009 to Sept 2010, as part of a proficiency testing program within Australian and New Zealand laboratories, 10 studies were distributed. Four studies with AHI>40/hr and >10% of events scored as central or mixed apnea were chosen for analysis. Studies were scored by up to 103 scorers (mean 80) in up to 24 laboratories. Scored studies were compared and events defined as concordant if they overlapped in time. The majority of scorers indicated they used "Chicago" rules.
Results: There was major disagreement between scorers in classification of respiratory events. The figure shows a scatter plot of the percentage of all apnea classified as central or mixed for each scorer and each study. A superimposed box plot shows median, 25th and 10th percentiles.



Discussion: There is an expectation that scorers can accurately distinguish obstructive from central events. This observational study shows that interpretation varies widely. This has important consequences for treatment of individuals and for conduct of research studies. AASM rules may provide more clarity and improve concordance but ongoing training and interlaboratory comparisons are essential.

P4968
Prediction of cardiovascular risk from nocturnal pulse wave signal – Results from the ASIC multi center study
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Introduction: Analysis of multiple continuous physiological signals obtained during sleep may provide a novel method to assess cardiovascular (CV) risk. The autonomic state indicator (ASI) algorithm extracts variables reflecting arterial oxygen saturation (SpO2) as well as cardiac/vascular function from a photoplethysmographic pulse wave and computes a CV risk index.
Methods: 327 subjects (227 male, age 55.1±13.6 yrs, BMI 30.1±6.4 kg/m^2) referred to five sleep centers in Europe were studied. Subjects were classified according to 4 established CV risk matrixes (ESC/ESH, Framingham, PROCAM, EU-SCORE). The photoplethysmographic signal was obtained during overnight recordings. The ASI algorithm extracted patterns of the pulse wave and SpO2 signal by amplitude and time/frequency analysis. Five derived parameters were used to determine the ASI risk score.
Results: Patients were classified into five risk classes according to the ESH/ESC risk matrix. The computed ASI scores were 0.16 (±0.32), 0.25 (±0.37), 0.42 (±0.40), 0.75 (±0.34) and 0.71 (±0.38). High risk patients defined as ESC/ESH classes 4/5 were identified with a sensitivity of 78.2% and specificity of 71.1%. The ASI risk score was significantly associated with the Framingham risk score (r=0.42, p<0.001), PROCAM score (r=0.45, p<0.001) and EU-SCORE (r=0.36, p<0.001).
Conclusions: The ASI technique was found to enable recognition of subjects with increased CV risk based on an overnight recording of a single photoplethysmographic signal. Sleep appears to be a particularly useful window for this

assessment. ASI may – based on physiological signals – provide a useful tool for routine assessments in sleep and cardiovascular medicine.