Welcome to our review of Sleep DownUnder 2017, the 29th Annual Scientific Meeting of Australasian Sleep Association and Australasian Sleep Technologists Association.

This review has been created to allow those unable to attend, but with a keen professional interest, to access a summary of some of the presentations. Associate Professor Garun Hamilton, who attended this annual meeting, has carried out selection and review of the research independently.

All oral abstracts and poster abstracts from the conference are available online: [https://www.sleep.org.au/documents/item/3176](https://www.sleep.org.au/documents/item/3176)

I hope you enjoy this conference review and find it useful in your clinical practice.

Kind Regards

Dr Janette Tenne
Medical Research Advisor
janette.tenne@researchreview.com.au


Chairpersons: Matthew Naughton, Shyamala Pradeepan

How safe is CPAP?
Presenter: Matthew Naughton

Think before sinking your teeth into oral appliance therapy
Presenter: Peter Cistulli

Adjunctive medications used in OSA treatment – how safe are they?
Presenter: Nigel McArdle

Upper Airway Surgery for OSA - is the benefit worth the risk?
Presenter: Stuart Mackay

Comment: This was an excellent session with discussion about the safety of the main treatments for obstructive sleep apnoea (OSA). Peter Cistulli reviewed the adverse effects of oral appliances. He demonstrated that side effects are common, but usually minor and don’t usually lead to discontinuation of treatment. The major concerns in the long term are changes in “bite” and these occur to some degree in over 80% of patients. There are no good predictors of who will be affected so regular dental monitoring is vital (recommended at 6 monthly intervals). Matthew Naughton summarised the safety of continuous positive airway pressure (CPAP). As we all know, although CPAP is safe from the perspective of serious side effects, irritating effects may occur in many – including nasal and skin irritation. A key take home message from both presentations is that often the biggest potential risk is the “opportunity” cost of not delivering the treatment properly. For oral appliances, this means the importance of a specialist dentist making the device and of regular dental follow up – properly counselling and monitoring the patient regarding the potential for teeth movement. For CPAP, this means ensuring CPAP is delivered well to those who need it – ensuring that the diagnosis of OSA, initial trial of CPAP followed by sale and ongoing monitoring, all occur with proper independent medical oversight.

Reference: Plenary 9:00 Thursday 26th October

Abbreviations used in this review:

AHI = Apnoea Hypopnoea Index
CBTl = Cognitive Behavioural Therapy for Insomnia
ESS = Epworth Sleepiness Scale
OSA = obstructive sleep apnoea
ODI = oxygen desaturation index
PTSD = post-traumatic stress disorder
PVT = Psychomotor Vigilance Test
RCTs = randomised controlled trials
TIB = time in bed
The impact of a meal, snack, or not eating during the nightshift on driving performance.

Presenter: Charlotte Gupta

Summary: Healthy males (n = 13) and females (n = 9) aged 18-39 years were randomly allocated to one of three conditions: meal at night comprising 30% of 24 h energy intake (n = 7), snack at night comprising 10% of 24 h energy intake (n = 7) or no eating at night (n = 8). Participants underwent four simulated nightshifts over seven days and were assessed using a 40-minute driving simulation, a Psychomotor Vigilance Task (PVT) and subjective ratings of sleepiness. The authors concluded the snack at night condition displayed significant increases in time spent driving in the safe zone and significant decreases in speed variability, lane variability, lapses and subjective sleepiness, compared to the meal at night condition. They found no significant differences between the snack at night and no eating at night conditions.

Comment: It is well known that circadian disruption and sleep deprivation may affect performance in night shift workers. We all have many patients tell us they feel sleepy after a big meal, however, it is not known whether meal size during a night shift further affects performance. In this well-designed study, driving simulator performance was better after a snack (or no eating) compared to after having a large meal at night during a night shift. Attention/vigilance as assessed by the PVT was also worse. Most concerning, the people who were performing the worst were the most hungry, whereas the “snack” condition was the most satisfied with their “hunger and satiety” rating. This was a healthy young group – the results therefore need replication in actual shift workers and in older populations. Nevertheless, these results suggest that workers in safety critical roles should limit size of meals during night shift to try and optimise attention and performance.

Reference: Oral Poster Presentation, Abstract 004

Training the upper airway muscles to treat OSA and reduce snoring.

Speaker: Geraldo Lorenzi-Filho

Comment: Poor upper airway muscle responsiveness is one of four key physiological “traits” which may act to cause (or contribute to) the pathogenesis of OSA. Improving upper airway muscle function may therefore improve either OSA and/or snoring in some OSA patients. Geraldo Lorenzi-Filho from Brazil, reviewed the results of two randomised controlled trials (RCTs) he has published to assess the effect of upper airway muscle training on OSA and snoring. The first RCT in 2009 (Quinoneres KG, et al. Am J Respir Crit Care Med 2009 May 15;179(10)) assessed moderate OSA and the second in 2010 (Santos-Silva 2010, unpublished) assessed snoring and mild OSA. In both these studies there was an improvement in Apnoea Hypopnoea Index (AHI) and snoring. Intriguingly, improvement was accompanied by a reduction in neck circumference, which opens up a lot of questions about what the mechanism of action of any benefit may be. Whether these results can be replicated and/or translated into more widespread clinical practice is uncertain – note that a speech pathologist was required to deliver the training to the patient, they need to be done 3 times per day for 8 minutes each when starting, and Geraldo reported that when the patients stopped doing the exercise the benefits disappeared. What these studies do tell us, however, is that we need to focus more attention on how we can potentially augment upper airway muscle function as a treatment for snoring and OSA. OSA endotyping (or “phenotyping”) can tell us which patients are most likely to benefit and work needs to be done to try and refine techniques to enhance muscle function into something which can be easily delivered in the sleep clinic.

Reference: Symposia session: New and emerging approaches to target the upper airway muscles to treat obstructive sleep apnoea

Chairpersons: Danny Eckert and Geraldo Lorenzi-Filho

Hypoglossal nerve stimulation to treat OSA.

Speaker: Peter Eastwood

Comment: Peter Eastwood gave an excellent overview of the current state of play with hypoglossal nerve stimulation as a treatment for OSA. Activation of the hypoglossal nerve during inspiration stimulates the muscles of the tongue to contract and move the tongue forward – thereby opening the airway while the patient is sleeping. There have been four types of devices used and studied so far. Three have used a cuff electrode over the hypoglossal nerve to provide unilateral stimulation. The Apex™ and ImThera™ devices are not in active use after the initial clinical trials. The Inspire™ device has approval for use in the USA and Germany, although not yet in Australasia. Almost 2,000 patients have been implanted. The initial positive results in the clinical trials at 12 months have been sustained up to 3 years and the device has been shown to be safe. Important criteria prior to implantation include BMI < 32, AHI 15 – 65/hr and absence of concentric collapse on Sleep Induced Drug Endoscopy. There is another device undergoing current clinical trials (Nyxoa™), which is different in that it uses a saddle electrode under the skin to provide bilateral stimulation. Where will hypoglossal nerve stimulation sit as a treatment for OSA? As you can see from the above, only a small subset of OSA patients are likely to be clinical candidates for treatment, in addition to the fact that it will be reserved for CPAP failures and those who can afford its high cost. Tellingly, however, the symptomatic benefits seen in those in the initial clinical trials (and subsequent post market use of the Inspire™ device) have been significant, with very few patients requesting removal of the device. The extent of future uptake will likely depend on the ability to refine the technology to provide effective (? bilateral) nerve stimulation in a safe and more cost-effective manner. Longer term safety data will also be important to convince clinicians and patients to consider the treatment.

Reference: Symposia session: New and emerging approaches to target the upper airway muscles to treat obstructive sleep apnoea

Chairpersons: Danny Eckert and Geraldo Lorenzi-Filho

Friday 27th October 2017 16:30 - 16:50

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Sleep in the West Australian Pregnancy Cohort: from gestation to adulthood and across generations.

Speaker: Peter Eastwood

Comment: The Raine cohort is a remarkably powerful longitudinal cohort in Western Australia. It was initially set up between 1989 – 1991 to look at ultrasound during pregnancy but since then has become a child (and now parent) follow up study for a variety of health and lifestyle outcomes. The amount of data that has been collected over the years are truly amazing. Peter Eastwood is now scientific director of the cohort and has been therefore able to include sleep measures in the latest follow up round. Peter described the results of a sleep apnoea prevalence study in the participants who are now aged 22 years old. Those data are particularly important because OSA prevalence and clinical predictors have not been well characterised at his age previously. In this study, 956 subjects had full laboratory polysomnography as well as a wealth of questionnaire data. OSA was detected in 21% of the cohort – an incredibly high figure. In 17% OSA was mild and in 4% OSA was moderate-severe. Those with OSA were more likely to be male (male:female = 2:1), report a history of snoring and were more likely to be overweight or obese (based on BMI and waist-hip ratio). Interestingly, there was no difference in those with or without OSA in terms of sleepiness (ESS), depression and anxiety or quality of life. These results highlight a number of crucial challenges for our field. OSA, as defined on sleep testing, is incredibly common, however we do not have a clear understanding of when and in whom “disordered breathing” during sleep has clinical consequences. Follow up of this cohort over time will provide important information about the evolution and natural history of those with OSA (from the perspective of both physiology and clinical symptoms), and those who will develop it in later years. Hopefully it will enable us to get a better handle on where early intervention strategies can be focussed.

Reference: Helen Bearpark Plenary: Life course epidemiology and sleep: Identifying early life factors that influence adult sleep health and disease?

Chairpersons: Sutapa Mukherjee and Lyle Palmer

Saturday 28th October 2017 16:30-18:00

Email/instant messaging before bed is associated with less time in bed for Australian 8-16 year olds.

Presenter: Amy Reynolds

Summary: The Sleep in America poll in 2013 suggested that interactive technologies are more likely to be disruptive to sleep than passive technologies. This current study assessed the effect of email/instant messaging prior to going to bed (not while actually in bed). They studied 245 children aged 8 - 16 years. 47% reported chronic insufficient sleep, although 65% thought they were a “good or great” sleeper. Average time in bed (TIB) was 8.9 hours - at lower end of the normal scale. Time in bed decreased if interactive technology (email or instant messaging) was used in the hour before bed. This effect was most significant in those aged 8 - 13 years – rather than in teenagers. In this age group, on average the TIB was not meeting the recommended sleep time.

Comment: This study highlights the need to consider the effect of technology on sleep in the pre-teen years, not just teenagers. The message also needs to get out that it is not just technology use in bed that matters, but also technology (and the type of technology) used prior to bed. Just as importantly, parents need to set a good example and limit their own technology use in the evening.

Reference: Oral Poster Presentation, Abstract 050

Diagnostic utility of STOPBang and Berlin questionnaires for middle-aged Australians.

Presenter: Chamara Senaratna

Summary: The study aimed to validate STOPBang and Berlin questionnaires and compare their performance as screening tools for OSA. The study cohort consisted of a random sample from the Tasmanian Longitudinal Health Study with 772 participants completing the STOPBang and Berlin questionnaires but only 406 completing sleep studies. The investigators reported STOPBang and Berlin questionnaires identified, respectively, 61% and 42% of the sample, as being at high risk of OSA (defined as a score ≥3 for STOPBang and ≥2 positive categories for Berlin questionnaire). They also found the STOPBang detected more participants with any OSA (defined as oxygen desaturation index [ODI] ≥ 5) than the Berlin questionnaire (sensitivity = 70% and 49%, respectively), although its specificity was lower (62% and 75%, respectively), resulting in only slightly greater discrimination (diagnostic odds ratio = 3.6 vs 2.8). For participants with moderate-severe OSA (ODI threshold of ≥15), the sensitivity of both tools increased (82% for STOPBang and 70% % for Berlin questionnaire) but their specificity decreased (46% for STOPBang and 67% for Berlin questionnaire).

Comment: Because of the cost and complexity of performing sleep studies, screening questionnaires (such as the STOPBang and Berlin questionnaire) are commonly used to detect those who are at high risk of OSA. These questionnaires have rarely been validated in the general population, and their performance is likely to be different compared to when they are used in clinic settings. Importantly, these questionnaires may become a criterion for the funding of sleep studies by Medicare, when ordered directly from primary care, so knowledge of how well they perform is of critical importance. This study was performed in a true population based cohort and showed that both the STOPBang and Berlin questionnaire have sub-optimal diagnostic utility. Neither the sensitivity nor specificity was high enough to adequately “rule in” or “rule out” moderate – severe OSA. Increasing the STOPBang threshold from a cut-off of 3 to 4 improved the specificity and (therefore positive predictive value), but reduced the sensitivity (and therefore negative predictive value). Although further data are required (particularly in other age groups), these results suggest that these questionnaires should not be used for widespread screening of populations, and instead highlight the importance of clinical assessment in deciding who should either be referred directly for sleep study or further specialist assessment.

Reference: Poster Presentation, Abstract 160
Bed partner accommodation of insomnia in treatment seeking couples.

Presenter: Alik Mellor

Summary: The researchers explored specific behaviours in which partners of individuals with insomnia engage. Clients seeking treatment for insomnia and their partners (n=31) completed the Beck Anxiety Inventory, Patient Health Questionnaire, and Dyadic Adjustment Scale. Insomnia was assessed using the Insomnia Severity Index and a sleep diary. Three-quarters of partners encouraged early bed or late wake times, 65% adjusted their own sleep, 47% adjusted their family routine, 35% encouraged naps, caffeine or reducing daytime activities, and 52% modified leisure activities in response to the client’s insomnia. Partner accommodation was not linked to client insomnia severity. They also reported partner accommodation was linked to better client relationship satisfaction, but more partner anxiety.

Comment: Insomnia affects up to 15% of the Australian population and is an incredibly important, yet underappreciated problem. A key problem in chronic insomnia is that patients commonly engage in maladaptive reinforcing behaviours (such as going to bed too early or spending too long in bed). Cognitive Behavioural Therapy for Insomnia (CBTi) is the recognised first line treatment, but is usually administered to the patient themselves, without directly involving bed partners. The importance and novelty of this study is that it is the first to properly address the role that partners may inadvertently play in reinforcing and propagating the insomnia. The results show that partner behaviours, which accommodate the insomnia, are common and lead to relationship dissatisfaction and increased anxiety and depression in both the partner and patient. Awareness of this problem is crucial, as it highlights the importance of involving and educating the partner in the principles of CBTi – important because a number of features of CBTi (e.g. sleep restriction therapy) seem counterintuitive. Hopefully the authors will soon be able to report on the effect of an intervention aimed at both patient and partner.

Reference: Poster Presentation, Abstract 109

Prevalence study of sleep disturbance, mental health, and psychosocial concerns among asylum seekers and refugees.

Presenter: July Lies

Summary: Self report data collected from 2,703 asylum seekers and refugees included demographics, sleep disturbance, mental health symptoms and psychosocial concerns. The authors reported the proportion of the study cohort reporting severity level of sleep disturbances was ‘absent’ 11.7%, ‘mild’ 12.8%, ‘moderate’ 33.4%, and ‘severe’ 42.1%. They also noted increased sleep disturbance was correlated with increased severity of all mental health and psychosocial concerns.

Comment: Refugees and asylum seekers are known to report high rates of mental health issues such as anxiety, depression and post-traumatic stress disorder (PTSD). The prevalence of these issues in Australian refugees and asylum seekers is unknown and, particularly, the prevalence of sleep disturbance in this group and how this interplays with mental health needs attention. This study of 2,703 people demonstrated remarkably high levels of sleep disruption, anxiety, depression, social isolation, family dysfunction and interpersonal difficulties. Worryingly, 75% of those surveyed reported moderate or severe sleep disturbance and this was strongly correlated with mental health symptoms. Given the extent of the problem there is an urgent need for sleep related health screening followed by sleep health interventions in this vulnerable group.

Reference: Poster Presentation, Abstract 108

Pilot study: Barriers to good sleep in the hospital environment.

Presenter: Kanishka Rangamuwa

Summary: This team assessed associations between light, noise and operational processes and sleep quality in non-ICU patients. Data was collected in a variety of hospital wards including the respiratory and general medical wards (n=8). Data was also collected from a sleep laboratory to act as a control group (n=20). Recruitment from the wards is still underway. Noise and light levels were recorded along with shift schedules, medication charts and medical notes to determine interruptions. Daily assessment included validated questionnaires assessing sleep disturbance, insomnia, pain and mood. The team reported the results to date with mean sound levels on the ward significantly higher compared with the sleep laboratory, whilst mean light levels were significantly lower. Number of clinical interruptions overnight was significantly higher in the ward compared with the sleep laboratory.

Comment: Hospitals are difficult places to sleep for a variety of possible reasons, and disturbed sleep increases the risk of complications such as delirium. The first step required to improve sleep for hospitalised patients is to understand what the problems and barriers are, and then to try and target interventions to mitigate these difficulties. This study assessed factors affecting sleep quality in hospital ward patients compared to a control group in the sleep lab. Understandably, noise was reported to be a significant factor, and this is not always so easy to address without physically re-designing and/or re-building wards or whole hospitals. However, this study also found that ward lighting may be a potential therapeutic target. The author measured objective light intensity and found that there was an attenuated day-night circadian amplitude in delivered light – light intensity was too low in the day and too high at night. Perhaps more intense daytime lighting (with proper lux control) and better night-time light “blocking” can be a first step for hospitals to try and improve the sleep of in-patients.

Reference: Poster Presentation, Abstract 090

Clinical Associate Professor Garun Hamilton (MBBS, FRACP, PhD) is a sleep disorders and respiratory physician at Monash Health and Epworth Sleep Centre. He has clinical experience in the complete range of sleep disorders and as Director of Sleep Research at Monash Health, has worked collaboratively with national and international investigators on research projects ranging from obstructive sleep apnoea pathophysiology, epidemiological cohort studies and randomised controlled clinical trials. He is currently a Board member of the Australasian Sleep Association (ASA) and is Chair of the Clinical Committee of the ASA. A significant part of his role has been to develop clinical guidelines for the ASA, and he has also been invited to join the Clinical Guidelines Committee of the World Sleep Society.