ABSTRACTS SLAAP2021

Name	Date	Time
Aaronson, Justine	Friday 26 November	13.00 – 14.00
Andel, van Emma	Friday 26 November	14.25 – 15.25
Bais, Babette	Thursday 25 November	13.00 – 14.00
Bijlenga, Denise	Friday 26 November	10.25 – 11.25
Boer, de Tom	Thursday 25 November	14.15 – 15.15
Bolsius, Youri	Thursday 25 November	10.10 – 11.10
Bosschieter, Pien	Friday 26 November	13.00 – 14.00
Broekman, Birit	Thursday 25 November	13.00 – 14.00
Busch, Vincent	Thursday 25 November	13.00 – 14.00
Chaves, Inês	Thursday 25 November	14.15 – 15.15
Cheng, Philip	Thursday 25 November	14.15 – 15.15
Coppus, Tonnie	Friday 26 November	13.00 – 14.00
Deforche, Benedicte	Thursday 25 November	13.00 – 14.00
Dekker, Alain	Friday 26 November	13.00 – 14.00
Dijk, van Karin	Friday 26 November	14.25 – 15.25
Dommershuijsen, Lisanne	Friday 26 November	14.25 – 15.25
Douglas, Pamela	Friday 26 November	13.00 – 14.00
Dresler, Martin	Friday 26 November	10.25 – 11.25
Ellis, Jason	Thursday 25 November	14.15 – 15.15
Fonseca, Pedro	Friday 26 November	10.25 – 11.25
Fronczek, Rolf	Friday 26 November	14.25 – 15.25
Gool, Jari	Thursday 25 November	10.10 – 11.10
Harvey, Allison	Thursday 25 November	13.00 – 14.00
Hendriksen, Heleen	Friday 26 November	14.25 – 15.25
Hirtum, van Pauline	Friday 26 November	13.00 – 14.00
Hoeven, van der Adriënne	Thursday 25 November	10.10 – 11.10
Kalsbeek, Andries	Friday 26 November	09.00 – 10.20
Kerkhof, van Linda	Thursday 25 November	14.15 – 15.15
Kocevska, Desi	Thursday 25 November	10.10 – 11.10
Lammers- Holst, van der Heidi	Thursday 25 November	14.15 – 15.15
Lavrijssen, Willem	Friday 26 November	13.00 – 14.00
Leentjens, Mickey	Friday 26 November	13.00 – 14.00
Leerssen, Jeanne	Thursday 25 November	10.10 – 11.10
Leone, Juliana Maria	Thursday 25 November	14.15 – 15.15
Louter, Maartje	Friday 26 November	13.00 – 14.00
Luik, Annemarie	Friday 26 November	14.25 – 15.25
Marle, van Hein	Thursday 25 November	13.00 – 14.00
Medeiros, Sylvia	Thursday 25 November	15.30 – 16.15
Nijenhuis- Huls, Rixt	Friday 26 November	13.00 – 14.00
Noordam, Raymond	Friday 26 November	10.25 – 11.25
Oosterhout, van Floor	Friday 26 November	10.25 – 11.25
Overeem, Sebastiaan	Thursday 25 November	14.15 – 15.15
Peersmann, Shosha	Friday 26 November	10.25 – 11.25

Pépin, Jean-Louis	Friday 26 November	14.25 – 15.25
Pevernagie, Dirk	Thursday 25 November	13.00 – 14.00
Pevernagie, Dirk	Friday 26 November	13.00 – 14.00
Pillen, Sigrid	Friday 26 November	13.00 – 14.00
Pijpers, Angelique	Friday 26 November	14.25 – 15.25
Rauwerda, Nynke	Friday 26 November	13.00 – 14.00
Rijn, van Karin	Friday 26 November	10.25 – 11.25
Rösler, Lara	Thursday 25 November	10.10 – 11.10
Rutters, Femke	Friday 26 November	10.25 – 11.25
Sastry, Manu	Thursday 25 November	13.00 – 14.00
Sastry, Manu	Friday 26 November	13.00 – 14.00
Schneider, Hartmut	Friday 26 November	10.25 – 11.25
Schoch, Sarah	Friday 26 November	10.25 – 11.25
Schwandt, Noortje	Friday 26 November	13.00 – 14.00
Schwartz, Sophia	Thursday 25 November	10.10 – 11.10
Shan, Ling	Thursday 25 November	10.10 – 11.10
Smits, Annelies	Friday 26 November	13.00 – 14.00
Stralen, van Maartje	Thursday 25 November	13.00 – 14.00
Talamini, Lucia	Thursday 25 November	10.10 – 11.10
Talamini, Lucia	Thursday 25 November	13.00 – 14.00
Vanderveken, Olivier	Friday 26 November	13.00 – 14.00
Verbraecken, Johan	Friday 26 November	14.25 – 15.25
Verbraecken, Johan	Friday 26 November	13.00 – 14.00
Wassing, Rick	Thursday 25 November	10.10 – 11.10
Werf, van der Ysbrand	Thursday 25 November	14.15 – 15.15
Zijlmans, Jendé	Friday 26 November	14.25 – 15.25

THURSDAY 25 NOVEMBER

10.10 – 11.10 Insomnie

Hebben sommige kinderen een genetische aanleg voor slecht slapen? Een polygene risicoscore studie in de algemene pediatrisch populatie

Desi Kocevska, postdoctoraal onderzoeker, Slaap en Cognitie Lab, Nederlands Herseninstituut, Amsterdam en de afdeling Epidemiologie en afdeling Kinder- en Jeugdpsychiatrie, Erasmus MC, Rotterdam.

Inleiding: Genoombrede associatiestudies (GWAS) hebben genetische varianten geïdentificeerd die betrokken zijn bij slapeloosheid en slaapduur. GWAS's zijn echter bij volwassenen uitgevoerd. Het is onbekend of de genetische varianten die bij volwassenen samenhangen met slaap, ook al van invloed zijn op slaap in de kinderjaren.
Onderzoeksvraag: Zijn individuele polygene risicoscores (PRS) voor slapeloosheid (PRS-I) en slaapduur (PRS-SD) geassocieerd met slaap in de kinderjaren en de vroege adolescentie?
Methoden: Voor 2,458 kinderen van Europese afkomst uit de Generatie R-studie geïncludeerd waren zowel genotype- als slaapgegevens beschikbaar. PRS-I en PRS-SD zijn berekend op basis van de grootste GWAS-studies tot nu toe. Slaapproblemen werden door de moeders gerapporteerd toen de kinderen 1,5, 3 en 6 jaar oud waren. Bij 975 van hen werd ook actigrafie gemeten toen zij tussen de 10 en 16 jaar oud waren. We gebruikten regressiemodellen om de voorspellende waarde van de PRS voor slaap te schatten.
Resultaten: Moeders van kinderen met een hogere PRS-I rapporteerden meer slaapproblemen op 6-jarige leeftijd (BPRS-Ip<5e08=0,1, 95%CI: 0,02;0,2) en een trend voor meer slaapproblemen 1,5-jarige leeftijd (BPRS-Ip<0,001=0,1, 95%CI: 0,04-0,2). Tijdens adolescentie voorspelde een hogere PRS-SD een langere actometrisch gemeten slaapduur (BPRS-SDp<5e08=0.05, 95%CI: 0.001;0.1), maar ook langer wakker liggen tijdens de nacht (BPRS-SDp<0.005=0.3, 95%CI: 0.04;0.5).
Conclusies: Al in de vroege kinderjaren hangt slaap samen met het polygenetische risico's voor slapeloosheid en slaapduur. Kinderen met een hogere genetische kwetsbaarheid voor slapeloosheid hebben meer problematische slaap. Adolescenten met een hogere genetisch predispositie voor langere slaap, slapen langer.

Insomnie behandeling ter preventie van depressie.

Jeanne Leerssen, Phd, Nederlands Herseninstituut, Amsterdam

Preventie van depressie is essentieel om de globale ziektelast van deze stoornis te bestrijden. Insomnie behandeling in individuen die risico lopen een depressie te ontwikkelen, zoals recent gevonden insomnie subtypen, zou een effectieve strategie kunnen zijn om depressie te kunnen voorkomen. Eerdere studies gebruikten geautomatiseerde eHealth interventies, maar de bevindingen van deze studies zijn moeilijk te interpreteren door hoge drop-out.
In de huidige gerandomiseerde trial onderzoeken we of de verergering van depressie symptomen te voorkomen is in insomnie subtypen met een hoog risico op depressie, door het aanbieden van internet cognitieve gedragstherapie voor insomnie (CGT-I), choronobiologische interventies (CI), of een combinatie van deze interventies (CGT-I+CI) onder begeleiding van een online therapeut.
Deelnemers met een insomnie subtype met hoog risico voor depressie (N=132) werden gerandomiseerd tot 6 weken CBT-I, CI, CGT-I+CI, of geen behandeling. De Inventory of Depressive Symptomatology (IDS-SR) vragenlijst werd afgenomen op baseline en op 4 vervolgmetingen gedurende één jaar.
Zonder behandeling verergerden inderdaad de depressieve symptomen gedurende 4 de vervolgmetingen bij deze hoog-risico insomnianten (d=0.3, p=0.041). Therapeut-begeleide online CGT-I of CGT-I+CI verlaagde de IDS-SR score over alle 4 de vervolgmetingen (CGT-I d=-0.8, p=0.001; CGT-I+CI d=-1.0, p<0.001). Alhoewel CI

opzichzelfstaand ineffectief bleek, lijkt de toevoeging van CI aan CGT-I de lange-termijn stemmingsverbeteringen te versterken op 9 en 12 maanden (respectievelijk d=-1.3, p=0.001; d=-0.7, p<0.012). Studie drop-out tijdens de therapeut-begeleide interventies was laag (8%), vergeleken met de volautomatische interventies van eerdere studies (57-62%).
Therapeut-begeleide online CGT-I kan nuttig zijn om de verergering van depressieve symptomen te voorkomen bij insomnie subtypen die een hoog risico hebben om een depressie te ontwikkelen. De begeleiding van een onlinetherapeut tijdens Ehealth interventies kan helpen om drop-out te beperken. Zorginstanties en overheid preventieprogramma's zouden therapeut-begeleide online insomnie interventies kunnen overwegen als een effectieve schaalbare interventie om de verergering van depressieve symptomen te voorkomen.

De nadelige gevolgen van rusteloze REM slaap op regulatie van emotionele herinneringen in insomnia

Rick Wassing, Phd, Woolcock Institute of Medical Research, Dept Sleep and Circadian Research, Syndney

Ongeveer 10% van de algemene bevolking heeft slapeloosheid (insomnia), en daarmee plaatst het zich in de top drie van meest voorkomende psychische stoornissen samen met angststoornissen en depressie. De onderliggende neurobiologische verbanden zijn in ons onderzoek in de laatste jaren aan het licht gekomen. De gemeenschappelijke noemers in alle drie de stoornissen is een ontregeld limbisch hersencircuit en 'rusteloze REM slaap'. Dat laatste is REM slaap dat veel fragmentatie vertoont met veel ontwakingen maar ook kortstondige corticale 'arousals'. Ten grondslag aan deze fragmentatie is een verstoorde regulatie van de Locus Coeruleus. Waar normaliter de Locus Coeruleus zich stil houdt tijdens REM slaap van normale slapers, doet deze kern in de hersenstam dat niet bij mensen met slapeloosheid. Dit resulteert in een ongewoon sterke neuromodulatie van Noradrenaline op het brein. Onze hypothese was dat dit negatieve gevolgen moest hebben op de nachtelijke verwerking van emotionele herinneringen. Normale slapers en insomnia patiënten werden in een MRI-scanner in sterke verlegenheid gebracht door ze te laten luisteren naar opnames van hun eigen valse gezang dat eerder was opgenomen. Ook moesten ze autobiografische beschamende herinneringen ophalen. Na een nacht slaap met polysomnografie werden ze in de ochtend weer blootgesteld aan de emotionele stimuli. De studies laten zien dat het limbische brein niet meer activeert in de ochtend, maar alleen als de REM slaap voldoende geconsolideerd was. Na een nacht met rusteloze REM slaap bleef het limbische brein actief reageren op de emotionele stimuli, in sommigen zelfs nog sterker dan in de avond daarvoor. Deze bevindingen onderschrijven ons theoretisch model waarin we beschrijven hoe emotionele herinneringen worden verwerkt tijdens onze slaap. Dit proces is afhankelijk van een nauwkeurig afgestemde balans tussen neurofysiologie (e.g. slaap-spindles) en neuromodulerende systemen (e.g. Noradrenaline).

10.10 – 11.10 Abstract session: Sleep disorders

A systematic search for hypothalamic neuropathology in narcolepsy type 1

Ling S. Shan [1] Balesar [2], Swaab [2], Lammers [3], Fronczek [3]
[1] **LUMC Leiden Netherlands,** [2] Netherlands Institute for Neuroscience Amsterdam Netherlands, [3] Leiden University Medical Centre Leiden Netherlands

Background: Narcolepsy type 1 (with cataplexy) is a rare invalidating chronic sleep disorder caused by a loss of hypocretin neuropeptides, presumed to be due to an auto-immune process. A systematic search for possible involvement of other hypothalamic neurons implicated in sleep-wake regulation has never been performed.
Methods: We systematically quantified immunohistochemically stained sleep-wake-related neuronal populations and the presence of microglia reactions in the hypothalamus comparing narcolepsy type 1 (n=4) with idiopathic hypersomnia (n=1) and matched controls (n=5).

Results: Biological clock**:** there was no difference in the numbers of vasopressin-expressing neurons in the suprachiasmatic nucleus. Sleep promoting neurons: the density of galanin positive neurons in the ventrolateral preoptic nucleus was stable. Arousal related neurons: we confirmed the hallmark loss of hypocretin-1 expressing neurons and the increased numbers of histidine decarboxylase positive histaminergic neurons. The density of choline acetyltransferase-expressing neurons in the nucleus basalis of Meynert was unchanged. Microglial reactions: The presence of ionized calcium-binding adaptor molecule 1 tended to be increased in the hypocretin area, but not in any other adjacent area. The human leukocyte antigen-staining was similar in all these areas.
Conclusion: These data support the hypothesis that narcolepsy type 1 is associated with loss of hypocretin-1 expressing neurons and the increased numbers of histidine decarboxylase positive histaminergic neurons in the hypothalamus. Results of other arousal nuclei under study will be reported.

Diagnosing narcolepsy type 1: the role of intermediate hypocretin-1 cerebrospinal fluid concentrations and characteristics of cataplexy

A.E. Hoeven [1], Fronczek [1], Schinkelshoek [2], Roelandse [2], Bakker [2], Overeem [3], Bijlenga [1], Lammers [1]
[1] SEIN Heemstede Netherlands, [2] LUMC Leiden Netherlands, [3] Kempenhaeghe Heeze
Background: Narcolepsy type 1 (NT1) is characterized by the presence of cataplexy and/or cerebrospinal fluid (CSF) hypocretin-1 concentration ≤110 pg/ml. CSF hypocretin-1 levels >200 pg/ml are regarded normal. The characteristics and diagnostic value of intermediate CSF hypocretin-1 levels, 111-200 pg/ml, have not been established. Also the specific type of cataplexy (typical or atypical) has not been evaluated for diagnostic relevance. In this study, we determined the clinical and diagnostic characteristics of this intermediate hypocretin-1 group, and the diagnostic value of cataplexy characteristics.
Methods: Retrospective cross-sectional study in all subjects (n=355) who visited one of two highly specialized Sleep-Wake Centers in the Netherlands between 2001 and 2019 with a complaint of hypersomnolence and a CSF hypocretin-1 assessment.
Results: A significantly higher percentage of patients with an intermediate concentration had cataplexy compared to patients with a normal hypocretin-1 concentration (75.0 vs 9.1%, respectively, p<.05). In addition, patients with an intermediate concentration fulfilled the ICSD-3 polysomnographic (PSG) and Multiple Sleep Latency Test (MSLT) criteria for narcolepsy more often when compared to the normal hypocretin-1 group. Presence of typical cataplexy was the best predictor of hypocretin deficiency: of those with typical cataplexy, 88% had low, 7.2% intermediate, and 4.8% had a normal hypocretin-1 concentration (p<.001). For the atypical cataplexy group, this was 58.8%, 0.0% and 41.2%, respectively (p<.001).
With an area under the curve of 0.952, a cut-off value of 149 pg/ml hypocretin-1 best predicts the combination of typical cataplexy and/or positive PSG and MSLT findings.
Conclusion: The MSLT and PSG outcomes of patients with intermediate hypocretin-1 concentrations differed significantly from those with normal concentrations. The current threshold of 110 pg/ml may be too low for the diagnosis of NT1. Typical cataplexy is more specific for CSF hypocretin-1 deficiency than atypical cataplexy and should be therefore evaluated in the diagnostic assessment of narcolepsy.

Unsupervised clustering of central hypersomnolence disorders: an important step towards data-driven phenotyping

JK Gool [1], R Fronczek [1], GJ Lammers [1]
Zhang, Oei, Mathias, Dauvilliers, Mayer, Plazzi, Del Rio-Villegas, Santamaria, Šonka, Partinen, Overeem, Peraita-Adrados, Heinzer, Martins da Silva, Högl, Wierzbicka, Heidbreder, Feketeova, Manconi, Jitka, Canellas, Bassetti, Barateau, Pizza, Schmidt, Khatami
[1] Sleep-Wake Centre SEIN Heemstede Heemstede
Background: Recent studies fueled doubts as to whether all currently defined central disorders of hypersomnolence are stable entities, especially narcolepsy type 2 and idiopathic hypersomnia. New reliable biomarkers are needed and the question arises

whether current diagnostic criteria of hypersomnolence disorders should be reassessed.
Methods: We used agglomerative hierarchical clustering, an unsupervised machine learning algorithm, to identify distinct hypersomnolence clusters in the large-scale European Narcolepsy Network database. We included 1078 unmedicated adolescents and adults and 97 variables, covering all aspects of central hypersomnolence disorders such as symptoms, demographics, objective and subjective sleep measures, and laboratory biomarkers. We specifically focused on subgrouping of patients without cataplexy. The number of clusters was chosen to be the minimal number for which patients without cataplexy were put in distinct groups.
Results: Seven clusters were identified, of which four clusters included predominantly individuals with cataplexy. The two most distinct clusters consisted of 158 and 157 patients respectively, were dominated by those without cataplexy and, amongst other variables, significantly differed in presence of sleep drunkenness, subjective difficulty awakening and weekend-week sleep length difference. Patients formally diagnosed as narcolepsy type 2 and idiopathic hypersomnia were evenly mixed in these two clusters.
Conclusions: Using a data-driven approach, our study provides promising new variables for distinct diagnostic categories from the largest study on central disorders of hypersomnolence to date, especially in people without cataplexy. Cluster-based classification will result in a more solid hypersomnolence classification system that is less vulnerable to instability of single features.

Actigraphy in insomnia: is it really worth the effort?

Lara Rösler [1], Van Someren
[1] **Netherlands Institute for Neuroscience Amsterdam**

Study Objectives: In the past decades, actigraphy emerged as a promising, cost-effective and easy-to-use tool for ambulatory sleep scoring. Polysomnography (PSG) validation studies showed that actigraphy sleep scoring fares relatively well in healthy sleepers. Additionally, multiple day actigraphy recordings have been used to study circadian rhythms. To this date, however, there is little evidence that the diagnosis, monitoring severity or treatment of insomnia can significantly benefit from actigraphy recordings. In the present article, we therefore critically examine whether sleep estimates or circadian patterns derived from actigraphy add to the detection and understanding of sleep complaints in insomnia.
Methods: We acquired actigraphy recordings and sleep diaries of 37 controls and 175 patients with varying degree of insomnia severity for up to 9 consecutive days at three different timepoints in their home environment. Additionally, participants spent one night in the laboratory, where actigraphy was recorded alongside PSG to check whether sleep is in principle well-estimated. Automated Cole-Kripke sleep scoring was used to derive established actigraphy sleep estimates, while PSG recordings were scored manually by two independent scorers. We further used nonparametric circadian rhythm analysis to calculate measures of 24-h activity patterns.
Results: Actigraphy sleep estimates failed to successfully differentiate patients with insomnia from controls. Similarly, circadian rhythm analyses only revealed alterations in nocturnal activity patterns rather than pointing to general circadian rhythm disturbances in insomnia. Merely the actigraphy sleep estimates acquired in the lab could sufficiently discriminate between patients and controls, suggesting that actigraphy is only reliable in very controlled settings.
Conclusions: Our results are in line with a prior lack of evidence for the validity of ambulatory actigraphy in insomnia. Despite vast efforts to tune actigraphy devices towards the reliable detection of wakefulness in patients with insomnia, state-of-the-art actigraphy methods fall short of contributing to an improved understanding of insomnia.

10.10 – 11.10 Sleep and cognition

Sleep fosters insight into real-life problems

Lucia Talamini, Head of Sleep and Memory Lab – UvA, University of Amsterdam

Anecdotal reports recount of individuals obtaining insights during sleep. For instance, various acclaimed scientists and artists have attributed some of their greatest insights to sleep-related mentation. We have previously explored the occurrence and characteristics of Sleep-Related Insights (SRIs), using a questionnaire approach, in a large sample of university students. Here, we report on a second study that investigates SRI's in a general population sample with a broad age range and multiple educational levels.
The results corroborate and extends our previous findings, showing that shows that SRI's are quite common in the general population (with e.g. 55% of participants experiencing SRI's at least once a month). Age had a negative effect on the occurrence of SRI's, while being a morning-type and having lucid dreams were positively related to the occurrence of SRI's. The content of SRI's was more often of an emotional nature than a rational nature and emotional SRI's were more often associated with dreams than rational SRI's. Lastly, SRI's were not related to subjective sleep quality and occurred in individuals with both poor and good sleep quality. In conclusion, SRIs are much more common than might have been expected, manifest in several forms and appear to be part of normal, healthy sleep.

Recovery of "lost" spatial memories after sleep deprivation

Youri G. Bolsius[1]*, Pim R.A. Heckman[1,2]*, Frank Raven[1#], Elroy L. Meijer[1], Martien J.H. Kas[1], Steve Ramirez[3], Peter Meerlo[1], Robbert Havekes[1]
[1]University of Groningen, Groningen, The Netherlands; [2] University of Maastricht, Maastricht, The Netherlands; [3] Boston University, Boston, USA
* equal contribution
# current address: Department of Molecular, Cellular, and Developmental Biology, Ann Arbor MI 48109

Sleep deprivation (SD) is a common problem in our modern 24/7 society. A loss of sleep negatively impacts brain function and in particular cognitive processes that require the hippocampus. In fact, a brief period of sleep deprivation immediately after a hippocampal learning trial leads to memory deficits. It is unclear, however, whether sleep deprivation leads to an absolute loss of information or, alternatively, affects the retrievability of this information stored under sleep deprivation conditions.
In the current study, we use mouse models to specifically tag and optogenetically reactivate the hippocampal neuronal ensembles, responsible for the storage and retrieval of a spatial memory (i.e., memory engram). In line with previous work, we found that 6 hours of SD after a spatial learning episode hampered the memory performance. However, optogenetic activation of the memory engram preceding the test session resulted into a rescue of the spatial memory. This observation suggests that SD does not lead to the loss of information but rather impacts the natural accessibility of spatial memories formed under SD conditions. As a next step, we rescued these inaccessible memories after SD by the systemic treatment with the clinically-approved phosphodiesterase-4 (PDE4) inhibitor, which increases the hippocampal cAMP levels, preceding the test session. Lastly, we combined optogenetic engram stimulation with PDE4 inhibitor treatment three days following training and subsequent SD, this manipulation resulted in a more persistent memory trace that allowed for natural retrieval several days later.
Our studies demonstrate that SD does not necessarily cause memory loss, but instead leads to the suboptimal storage of information that is inaccessible for natural retrieval. We also provide a proof-of-principle that these suboptimally stored memories can be made accessible again far beyond the learning episode and that the clinically-approved PDE4 inhibitor roflumilast may be used to successfully retrieve information thought to be lost.

Emotional (re)processing in sleep and dreams

Sophie Schwartz, Head of the Sleep and Cognition Lab and full professor at the Neuroscience Dept., Faculty of Medicine, University of Geneva, Switzerland.

Sleep favors the consolidation of newly acquired memories. Yet, how our brain selects the noteworthy information to be reprocessed during sleep remains largely unknown. From an evolutionary perspective, individuals must retain information that promotes survival, such as avoiding dangers, finding food, obtaining praise or money. Recent neuroscientific theories also suggest that emotions experienced in dreams contribute to the resolution of emotional distress and preparation for future affective reactions. In my presentation, I will report experimental evidence supporting that neural and mental representations of emotional events are prioritized for reprocessing during sleep. I will also show that dreaming (beyond sleep) benefits emotional regulation, thus substantiating a link between emotional processes occurring during sleep and emotional brain functions during wakefulness. Based on these findings, we will discuss whether sleep and dreaming may offer an opportunistic window for exposure and extinction-based therapies in affective disorders.

13.00 – 14.00 APNEU: WEL OF GEEN BEHANDELING VAN ASYMPTOMATISCH SLAAPAPNEU

Asymptomatische ernstige OSA wel behandelen

Manu Sastry, longarts, Ciro Academic Sleep Center, Horn

Asymptomatische ernstige OSA niet behandelen

Dirk Pevernagie, longarts-somnoloog en is verbonden aan de universiteit en het universitair ziekenhuis van Gent, België.

Tijdens deze sessie zullen twee deskundigen zich buigen over dit controversiële onderwerp. Wat is het risico als asymptomatisch OSA onbehandeld blijft en zijn er voordelen voor de patiënt als asymptomatisch OSA behandeld wordt? Na deze sessie weten we wat de wetenschappelijke bewijzen hiervoor zijn, maar ook de mening van de experts.

13.00 – 14.00 SLAAP EN PSYCHIATRIE

De relatie tussen geslachtshormonen en slaap

Birit Broekman, psychiater, AmsterdamUMC
Margot Morssinkhof, PhD student, Amsterdam UMC en OLVG

Depressie tijdens de zwangerschap: slaap, licht en cortisol

Babette Bais, postdoc, Erasmus MC, Dept. Obstetrics & Gynaecology

Akoestische neurostimulatie tijdens de slaap

Lucia Talamini, Head of Sleep and Memory Lab – UvA, University of Amsterdam

Trauma behandelen tijdens slaap, kan dat?

Hein van Marle, psychiater en senior onderzoeker, GGZ inGeest en afdeling Psychiatry, Amsterdam UMC, VUMC.

In de sessie "Slaap en psychiatrie" komen 2 thema's voor het voetlicht: "Slaap, hormonen en psychiatrie" en "Kunnen psychiatrische stoornissen behandeld worden tijdens de slaap?". Per thema presenteren twee gekoppelde sprekers ieder in 8 minuten hun eigen werk en relevante, recente bevindingen, gevolgd door 10-15 minuten discussie met u als publiek.

In het eerste deel "Slaap, hormonen en psychiatrie" zullen Margot Morssinkhof, Birit Broekman en Babette Bais spreken over de associaties tussen hormonen, slaap en stemming. In vogelvlucht worden de effecten van hormonen op de slaap besproken, met aandacht voor mannen en vrouwen, en mogelijke onderliggende mechanismen die hierin een rol spelen. Daarna worden de resultaten van een observationele studie naar effecten van de anticonceptiva op slaap en stemming gepresenteerd. Veranderingen in slaap en stemming tijdens de zwangerschap worden gerelateerd aan circadiane ritmiek en effecten van hormonen, vooral in verband met mogelijke aangrijpingspunten voor behandeling.

In het tweede deel "Kunnen psychiatrische stoornissen behandeld worden tijdens de slaap?" gaan Lucia Talamini en Hein van Marle in op technologische ontwikkelingen die een unieke mogelijkheid bieden om psychiatrische aandoeningen te behandelen door interventie tijdens de slaap. De achtergrond en methode van akoestische neurostimulatie tijdens de slaap worden besproken. Deze nieuw ontwikkelde techniek heeft groot potentieel om bestaande psychiatrische behandelingen te optimaliseren. Als concreet voorbeeld van de toepassing hiervan worden de eerste resultaten van de TMR-TRAUMA studie gepresenteerd, een studie naar de effecten van Targeted memory reactivation bij patiënten met PTSS.. Het idee hierbij is dat door het beïnvloeden van geheugenopslag tijdens de slaap de door EMDR geneutraliseerde traumaherinneringen versterkt vastgelegd kunnen worden, en daarmee de behandeluitkomst kan verbeteren.

13.00 – 14.00 SLEEP HEALTH PROMOTION IN ADOLESCENTS

Modifying the Impact of Eveningness Chronotype in Adolescence on Sleep, Circadian and Risk Outcomes

Allison G. Harvey, PhD[1], Kerrie Hein, MA[1], Michael Dolsen, MA[1], Lulu Dong, PhD[1], Sophia Rabe-Hesketh, PhD[1], Nicole B. Gumport, BA[1], Jennifer Kanady, PhD[1], James K. Wyatt[2], Stephen P. Hinshaw[1], Jennifer S. Silk[3], Rita L. Smith, PhD[1], Monique A. Thompson, PsyD[1], Nancee Zannone, MFT[1] and Daniel Jin Blum, PhD[1] **[1] University of California, Berkeley, CA**, [2] Rush University Medical Center, Chicago, IL, [3] University of Pittsburgh, Pittsburgh, PA

Background: Adolescence is a one of the most important developmental stages and a time of great vulnerability. There is evidence that the onset of puberty triggers a general preference for eveningness. Evening chronotype ('night-owls') adolescents follow a delayed sleep-wake schedule, increasing mental and/or physical activity later in the day, compared to morning chronotypes ('larks'). The evening preference has been identified as a contributing factor for poorer health across multiple domains (emotional, cognitive, behavioral, social, physical). A 'treatment experiment' will be described in which a psychosocial intervention (Transdiagnostic Sleep and Circadian Intervention; TranS-C-Youth) was administered to test the hypothesis that reducing eveningness will improve sleep and circadian functioning and reduce risk.
Methods: Youth aged 10 to 18 with an evening chronotype were randomized to: (a) TranS-C (n=89) or (b) Psychoeducation (PE; n=87). Treatments were 6 individual, weekly 50-minute sessions during the school year. Using multiple methods (global and prospective self-report, dim light melatonin onset, ecological momentary assessment) and multiple informers (adolescents, parents), outcomes were assessed by blind assessors pre-treatment and post-treatment.
Results: Relative to PE, TranS-C was associated with less evening circadian preference, earlier endogenous circadian phase (dim light melatonin onset; DLMO), less weeknight-weekend discrepancy in Total Sleep Time (TST) and wakeup time, less daytime sleepiness, and better self-reported sleep via youth and parent report. In terms of risk outcomes, relative to PE, TranS-C was not associated with greater pre-post change on the primary outcome. However, there was no group difference for total sleep time or bedtime on weeknights. There were significant interactions favoring TranS-C on the Parent-Reported Composite Risk Scores for cognitive health and selected other risk

outcomes.
Conclusions: Relative to PE, TranS-C was associated with improvement on selected sleep, circadian and risk outcomes.
improves sleep outcomes, changes a biological marker of circadian functioning (DLMO) and reduces adolescent risk on selected outcomes.

Effect evaluation of a participatory developed healthy sleep intervention for adolescents

Benedicte Deforche, full professor, Department of Public Health and Primary Care (Faculty of Medicine and Health Sciences), Ghent University (UGent) and assistant professor, Department of Movement and Sport Sciences (Faculty of Physical Education and Physiotherapy), Vrije Universiteit Brussel (VUB).
Background: Sleep deprivation and reduced sleep quality are common in adolescents, which negatively impacts their physical and mental wellbeing and cognitive skills. This study examined the effect of a participatory developed intervention to promote healthy sleep in adolescents on their sleeping behavior and behavioral and cognitive determinants of sleep.
Methods: By combining Participatory Action Research with the Intervention Mapping Protocol, a sixteen-week intervention focusing on healthy sleep, regular sleep patterns, screen time, physical activity, nutrition and relaxation was co-created with adolescents and implemented in two secondary schools. Four schools participated as control schools. Data on sleep behavior and its determinants were collected in1181 adolescents (15.0 ± 0.7 years; 54% boys) through a validated questionnaire using a pre-post-follow-up design. Preliminary repeated measures (M)ANCOVA analyses on the pre and post measures were performed in SPSS. Multilevel analyses in R including follow-up measures are currently ongoing and will be presented at the conference.
Findings: Based on the preliminary analyses, no significant intervention effects were found on adolescents' sleep duration and quality, and only a few effects were found on determinants of sleep. There were favorable intervention effects on adolescents' knowledge of importance of sleep and sleep hygiene ($F=13.44$; $p<0.001$), physical activity on weekdays ($F=5.14$; $p=0.024$), regular sleep patterns on weekend days ($F=5.11$; $p=0.024$) and taking screens to bed ($F=6.67$; $p=0.010$). The intervention had an unfavorable effect on self-efficacy towards screen use in the evening ($F=10.84$; $p=0.001$) and perceived sleep behaviors of parents ($F=4.05$; $p=0.044$).
Conclusion: Although the intervention was developed in collaboration with the target group, preliminary analyses showed limited short-term intervention effects on determinants of sleep and no effects on sleep behavior. Process evaluation data will clarify to what extent the intervention has been properly implemented and has reached everyone and whether intervention effects differ according to dose received and involvement in the co-creation process.

Promoting Sleep Health in Dutch Teens applying a complex adaptive systems approach

Maartje van Stralen1 and Vincent Busch2
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Dutch teens today are sleeping too little, often experience poor quality sleep and the great majority reports being structurally tired during the day. Consequently, we face a serious public health threat as poor sleep causes teens immediate harm (e.g. impaired cognitive development, increased obesity and depression risks) in a crucial developmental life phase, but also increases their risks of long-term health consequences such as diabetes and cardiovascular disease. Therefore, Brain Foundation Netherlands developed educational program Charge Your Brainzzz (CYB), the first and only preventive intervention promote healthy sleep in 13-15 year old Dutch teens. CYB aimed to build teens' knowledge, attitudes, subjective norms and self-efficacy in relation to sleep in order to bolster teens' intentions and subsequent healthy sleep behavior. CYB was

appreciated by its implementers (teachers; school staff) and well-received by the teens. Even more, CYB effectively stimulated knowledge, attitude and self-efficacy but these changes did not translate to changes in sleep hygiene or actual sleep health. Altogether, CYB 1.0 serves as our study's starting point in which we aim to extend and improve upon CYB by developing a more comprehensive CYB 2.0, by (1) applying a complex adaptive systems approach, (2) co-creating CYB 2.0 via participatory action research by involving users (i.e. teens, parents) and implementers so it fits their wishes and needs and (3) tailor it to be appropriate for different cultures and educational levels. By applying a complex adaptive systems approach, which inherently respects and deals with the multilevel nature of complex behaviors such as sleep, and in doing so, is capable of effective, sustainable, and scalable change. Via complex adaptive system, CYB expands to address the full range of social-environmental variables (e.g. peer influences, parental rules) and sleep-related behaviors (e.g. late-night media use, stress) needed to influence teens' sleep health.

14.15 – 15.15 YEAR IN REVIEW

Experimenteel humaan
Ysbrand van der Werf, Hoogleraar Functionele Neuroanatomie aan het Amsterdam UMC

Basaal
Tom de Boer, Associate professor, Leids Universitair Medisch Centrum (LUMC)

Klinisch
Sebastiaan Overeem, Arts- somnoloog, Centrum voor Slaapgeneeskunde Kempenhaeghe.

14.15 – 15.15 SLEEP IN TIMES OF COVID-19

What we learnt about the impact of lockdown and how we can use it to improve circadian rhythms and sleep
Maria Juliana Leone, Senior Research Scientist, Scientific and Technical Research National Council of Argentina, the Universidad Nacional de Quilmes (UNQ) and the Universidad Torcuato Di Tella (UTDT)
Daily life changed under COVID-19 pandemic associated lockdown. Sleep and circadian rhythms were expected to be affected. In a first and longitudinal study, we evaluated the impact of lockdown on sleep and chronotype on a sample of subjects which completed a detailed circadian/sleep survey both before and during the lockdown. Sleep was longer and later during lockdown weekdays, social jetlag was lower but chronotype was delayed during lockdown, compared with the control condition (Leone et al 2020, Current Biology). In a second study, we evaluated a new sample where participants completed a similar but different survey. The goal of this second study was not only to learn about sleep and circadian rhythms, but to develop an evidence-based algorithm to be implemented on a mobile app (MiRelojInterno, www.mirelojinterno.org) which provides customized recommendations based on local data. The contribution of these results exceeds the generation of scientific knowledge, offering a tool designed to help users to improve and maintain healthy sleep and biological rhythms.

Preventing COVID-related Insomnia
Jason Ellis, PhD, Professor, Department of Psychology Northumbria University, Director, Northumbria Sleep Laboratory and Clinic, United Kingdom
The COVID-19 pandemic has resulted in a significant increase in both the incidence and prevalence of acute insomnia. That said, one unusual, but often reported, feature of

sleep during this time has been the increased presence of vivid disturbing dreams. Whether this represents i) an actual increase or change in dream activity or ii) increased awakenings from sleep, is unclear. The aim of the present study is to attempt to elucidate this relationship using a brief CBT-I based intervention. Sixty individuals with acute insomnia were recruited and assigned to either a waitlist control or treatment group (n = 30 in each group). The treatment group were provided an online variant of the 'one shot' (a pamphlet) whereas the control group just completed baseline and post treatment assessments. All participants completed the Mannheim Dream Questionnaire, the Insomnia Severity Index and a Sleep Diary pre and post intervention. Dream constructs such as vividness, frequency and duration were significantly associated with number of awakenings ($p<.05$). Following treatment, the intervention group reported significantly reductions in insomnia severity, dream frequency and improved sleep, compared to controls ($p<.001$). The results are discussed in relation to managing dreaming during a phase of acute insomnia.

Sleep health as a mechanism of resilience during COIVD-19

Philip Cheng, Assistant Scientist and licensed psychologist in the Sleep Disorders and Research Center at the Henry Ford Health System, Detroit, USA

Study Objectives**:** Stressful life events contribute to insomnia, psychosocial functioning, and illness. Though individuals with a history of insomnia may be especially vulnerable during stressful life events, risk may be mitigated by prior intervention. This study evaluated the effect of prior digital cognitive-behavioral therapy for insomnia (dCBT-I) versus sleep education on health resilience during the COVID-19 pandemic.
Methods**:** COVID impact, insomnia, general- and COVID-related stress, depression, and global health were assessed in April 2020 in adults with a history of insomnia who completed a randomized controlled trial of dCBT-I (n = 102) versus sleep education control (n = 106) in 2016-2017. Regression analyses were used to evaluate the effect of intervention conditions on subsequent stress and health during the pandemic.
Results: Insomnia symptoms were significantly associated with COVID-19 related disruptions, and those previously received dCBT-I reported less insomnia symptoms, less general stress and COVID-related cognitive intrusions, less depression, and better global health than those who received sleep education. Moreover, the odds for resurgent insomnia was 51% lower in the dCBT-I versus control condition. Similarly, odds of moderate to severe depression during COVID-19 was 57% lower in the dCBT-I condition.
Conclusions: Those who received dCBT-I had increased health resilience during the COVID-19 pandemic in adults with a history of insomnia and ongoing mild to moderate mental health symptoms. These data provide evidence that dCBT-I is a powerful tool to promote mental and physical health during stressors, including the COVID-19 pandemic.

14.15 – 15.15 MOLECULAR MECHANISMS OF SLEEP AND THE BIOLOGICAL CLOCK

Towards interventions that improve shift work related sleep disturbances and health

Linda van Kerkhof, scientific researcher at the National Institute of Public Health and the Environment (RIVM)

Over the last centuries, our lifestyle dramatically changed as a result of the modernization of our society and the widespread availability of artificial light. While these technological improvements have undoubtfully eased our daily life (e.g. constant access to light, energy, and food), they also introduced a new phenomenon in our population, known as "circadian misalignment". Circadian misalignment occurs for example during nightwork inherent to our 24/7 economy. Less well known, it can also occur due to misalignment between our biological time, as determined by our internal body clock, and social times, mainly dictated by social obligations such as school or work. Circadian misalignment is strongly associated with sleep problems. Currently, intervention strategies for minimizing sleep problems related to circadian disturbance are

very limited. Using new strategies to measure physiological responses during night shift work we aim to provide evidence-based interventions to minimize the health risks of shift work and other circadian disturbances.

Sleep and the circadian clock in neonates: impact of perinatal circadian disturbance on later life health and sleep

Inês Chaves, assistant professor in the Department of Molecular Genetics of the Erasmus MC

Hospital patients are generally exposed to an environment immersed in noise, frequent and irregular interruptions, and atypical light cycles. These conditions preclude healthy sleep patterns and robust 24-h rhythms. Research suggests that this negatively impacts patient health and can slow down recovery. Studies on preterm infants revealed that light conditions in the Neonatal Intensive Care Unit (NICU) exert short-term health effects (e.g. faster weight gain and recovery, shorter hospitalization), with cycling light favorable over constant light or (near) dark conditions.
Preterm infants experience a shorter period of circadian entrainment in-utero, and miss important parts of postnatal maternal regulation. Moreover, nutritional practices are altered: breast milk is pumped by the mothers and later given to the infant via nasogastric tubes. Evolutionary, nutritional, hormonal, and immunological factors in breast milk are likely adapted to the infant's specific needs during day and night. By establishing the relation between the maternal circadian rhythm and the composition of important breast milk components, we may tackle one of the factors disturbing the development of the infant's circadian system, with potential lifelong health effects.
The aim of this project is to preserve circadian clock function by minimizing adverse hospital conditions, focusing on preterm babies, a particularly vulnerable patient population. We will examine the effect of the rhythms of the mother, feeding timing and composition and light conditions in the neonatal care unit on short-term and long-term growth, sleep, neurodevelopment and circadian development, and identify epigenetic marks predictive of health risk.

Sleep, Shiftwork and the Immune response to COVID-19 vaccination

Heidi Lammers-van der Holst, Senior Researcher at Erasmus Medical Center in Rotterdam

In our current COVID-19 pandemic with devastating health, social and economic impacts, there is an urgent need for effective vaccination programs. Previous influenza and hepatitis vaccination studies have shown that lack of sleep can negatively alter the immune responsiveness. Most likely, circadian misalignment may also play an important role in the immune response to vaccination, but has not been studied before.
The objective of this study was to investigate the immune response to COVID-19 vaccination in shift workers, a vulnerable group facing chronic sleep deprivation and circadian misalignment, and compare these results to a group of dayworkers with sufficient sleep duration and regular sleep times.
Twenty-five day workers and 24 shift workers, aged between 18 and 50 years, received two SARS-CoV-2 mRNA Moderna vaccinations, through the Dutch vaccination program. To assess immune responsiveness, blood was drawn at baseline (i.e. before 1st vaccination), 10 days after the first vaccination, the day prior to second vaccination; and 28 days, 6 months and 12 months after the second vaccination time point. Antibody titers and T-cell responses were assayed. Actigraphy and daily sleep e-diaries were implemented for 7 days around each vaccination to assess sleep duration and sleep quality. The Pittsburg Sleep Quality Index was used to monitor sleep in the long term.
The first preliminary results will be presented during this presentation.
To conclude, our study is innovative as we are the first to examine the association of sleep and antibody responses to the COVID-19 vaccination in a vulnerable population, i.e. night shift workers. Results of this study could provide insights to develop sleep and circadian-based interventions to enhance vaccination immunity, and thereby improve global health.

15.30 – 16.15 KEYNOTE

Evolution of sleep in the octopus and the cyclic alternation of two states analogous to SWS and REM sleep

Sylvia Lima de Souza Medeiros, PhD student in Neuroscience, at the Brain Institute of the UFRN, Brazil

Electrophysiological recordings in amniotes (mammals, birds and some reptiles) show distinct spectral profiles that comprise two major alternating sleep states, one quiet and another active. However, obtaining electrophysiological data from invertebrates to determine neurobiological rhythms remains very challenging due to technical difficulties caused by a soft body, a rigid carapace, or life in the aquatic environment. Despite these limitations, the study of invertebrate sleep has advanced using behavioral criteria originally developed to investigate mammalian sleep (e. i. stereotyped or species-specific postures, maintenance of behavioral quiescence, elevated arousal threshold, state reversibility by sensory stimulation, and homeostatic regulation able to cause sleep rebound after deprivation). To investigate in detail the behavioral structure of cephalopod sleep, we video-recorded four adult specimens of *Octopus insularis* and quantified their distinct states and transitions. Movements of eyes and mantle were assessed using automated image processing tools, and arousal threshold was measured using sensory stimulation. Besides, as octopus' skin contains pigmented chromatophore organs, controlled by motoneurons originated in brain lobes, we also assessed the changes in skin color and texture. Two distinct states unresponsive to stimulation occurred in tandem. The first was a 'Quiet sleep' state with uniformly pale skin, closed pupils, and long episode durations. The second was an 'Active sleep' state with dynamic skin patterns of color and texture, rapid eye movements, and short episode durations. During resting, animals also displayed the 'Half and Half' skin pattern with one side uniformly pale and the other uniformly dark, which showed an arousal threshold between 'Alert' state and 'Quiet sleep'. 'Active sleep' was periodic and occurred mostly after 'Quiet sleep'. These results suggest that cephalopods have an ultradian sleep cycle analogous to that of amniotes.

FRIDAY 26 NOVEMBER

09.40 – 10.20 KEYNOTE

Chrono nutition: why meal timing and eating windows really do matter

Andries Kalsbeek, Netherlands Institute for Neuroscience, Dept. Hypothalamic Integration Mechanisms, Amsterdam Zuid-Oost

An important hypothesis nowadays in chronobiology is that many of the metabolic problems in our current society can (at least partly) be explained by a misalignment of the central brain clock and the peripheral clocks in metabolic tissues such as the liver, pancreas, muscle and fat. Best-known example of such a misalignment is jet lag, but the most severe problems are experienced by people working shift work. It is still not clear, however, which factor is (most) responsible for these metabolic problems. Is it the disturbed sleep/wake rhythm, the changed eating patterns, the nocturnal light exposure, or a combination of these factors? In a series of human and animal experiments he investigated the metabolic consequences of light (i.e., light at night) and feeding at the wrong time of day. These experiments revealed that the primary problem seems to be a desynchronization of the different peripheral clocks. Whereas the liver clock nicely adapted to the new feeding time, the muscle clock became arrhythmic and the brown adipose tissue clock shifted only partly and showed a reduced amplitude. The varying degrees of adaptation of the different peripheral clocks probably result in a non-optimal alignment of different metabolic processes, for instance glucose production and glucose

uptake or lipolysis and lipid oxidation. Also light exposure at the wrong time of day caused an impairment of energy metabolism, in this case a reduced glucose tolerance. The mechanism seems to involve both increased glucose production, reduced glucose uptake and an inhibition of insulin release. However, the time-restricted feeding experiments also revealed the potential of chrono-nutrition. Currently, we are investigating how feeding and exercise can be timed best to reduce or prevent the negative metabolic consequences of shift work.

10.25 – 11.25 CIRCADIANE RITMESTOORNISSEN

Circadiane slaap/waak-ritmestoornissen in de klinische praktijk

Floor van Oosterhout, Chronobioloog & Physician Assistant, Zaans Medisch Centrum

Bij een circadiane ritmestoornis is er sprake van een vertraagd, vervroegd, irregulair of 'non-24h' slaap/waak-ritme. Het vertraagde slaapfasesyndroom (delayed sleep phase disorder, DSPD) is het meest voorkomende type en wordt gekenmerkt door een onvermogen om in slaap te vallen en wakker te worden op de sociaal wenselijke tijden. Moeilijk in slaap vallen door een circadiane ritmestoornis of door primaire 'insomnie' is niet altijd simpel van elkaar te onderscheiden. Goede diagnosestelling is van belang om tot een juiste behandelkeuze te komen.
Chronotherapie is erop gericht het circadiane ritme te 'resetten' of stabiliseren door een gecontroleerde blootstelling aan externe stimuli die de biologische klok beïnvloeden, zoals licht, donker, bedtijdregulatie, voedings- en bewegingsadviezen.
In deze sessie wordt ingegaan op de diagnostiek en behandeling van circadiane slaap/waak-ritmestoornissen. Welke factoren zijn van belang bij de slaapanamnese en het diagnostisch onderzoek? Hoe kunnen chronotherapeutische interventies worden toegepast en waarom vraagt de behandeling een gepersonaliseerde aanpak? In welke gevallen is het gebruik van melatonine wel of niet geïndiceerd?

Chronotherapie bij volwassenen met ADHD

Denise Bijlenga, psycholoog en senior onderzoeker, Slaap-Waakcentrum van SEIN

Het merendeel van de volwassenen met Attention-Deficit/Hyperactivity Disorder (ADHD) heeft een verlaat slaap-waak ritme. De diagnose Delayed Sleep Phase Syndrome (DSPS) kan bij ongeveer een kwart worden gesteld. DSPS en het daarmee gepaard gaande chronische slaaptekort heeft een negatieve invloed op de mentale en lichamelijke gezondheid. Slaapproblemen en ADHD symptomen lijken hand in hand te gaan gedurende de levensloop. Eerdere kleinere onderzoeken hebben aangetoond dat behandeling van de slaapproblemen bij ADHD een positief behandel effect geeft voor zowel de slaapproblemen als op de ADHD symptomen. In deze sessie zullen de resultaten worden besproken uit onze recente dubbelblind gerandomiseerde trial waarin werd onderzocht wat de beste chrono-therapeutische behandeling is voor DSPS bij volwassenen met ADHD. Ook zal ons behandelprotocol voor slaapproblemen bij volwassenen met ADHD worden besproken.

Diagnostiek en behandeling van een Non-24-hour sleep-wake disorder (N24SWD)

Karin van Rijn, GZ-psycholoog en somnoloog, Slaap-Waakcentrum van SEIN

Bij een N24SWD zien we het steeds verschuiven van het moment van in slaap vallen en wakker worden. Het slaapritme loopt niet in de pas met het normale 24-uurs patroon van licht en donker. Deze slaapstoornis wordt verondersteld alleen voor te komen bij mensen met een visuele beperking. In deze sessie wordt het ontstaan, diagnostiek, herkenning en behandeling van deze slaapstoornis besproken. Wat zien we in de klinische praktijk van deze slaapstoornis en wat is de relatie met psychiatrische co-morbiditeit? Uit de casuïstiek in de klinische praktijk blijkt dat jonge mannen met een stoornis in het

autisme spectrum relatief vaak deze slaapklacht hebben.

10.25 – 11.25 TECHNICAL DEVELOPMENTS IN MEASURING SLEEP

A wearable patch-based Polysomnograpy System for Conducting Sleep Studies: Effect of 2012 AASM Hypopnoe Rules on AHI in Healthy Subjects

Hartmut Schneider (Lutherville Timonium/US, Eindhoven/NL, Frankfurt/DE), JC De Vries (Eindhoven/NL), AC Rossi (Eindhoven/NL), M Oloo (Frankfurt/DE), F Fronic (Frankfurt/DE), Stefan Müller (Frankfurt/DE), R De Francisco (Eindhoven/NL)

Introduction Current home sleep test (HST) devices are limited by an absence of EEG, or by being too cumbersome to use. We developed a wireless PSG system (Onera Health, NL) consisting of four disposable patches to record EEG, EOG, EMG, SaO2, ECG, bioimpedance derived respiratory airflow and effort, airflow via nasal cannula, snoring sounds, body position, actigraphy, and leg movements. Signals are stored on reusable electronic modules attached to each patch.

Aim 1 is to determine set-up time of Onera wearable PSG system

Aim 2 is to compare two hypopnea scoring rules, Rule 1 with >3% fall in SaO (AASM 2007)2 only to Rule 2 >3% fall in SaO2 or arousal (ASSM 2012)

Methods We measured PSG hook-up time in 15 healthy laypersons (6 male, 9 female, age 18-to-70 yrs, BMI 29.7±5.2 kg/m2). We also enrolled 6 additional asymptomatic healthy volunteers (2 male, 4 female, age 27-to-33 yrs, BMI 24.3±5.7 kg/m2) with history of occasional snoring, on which we scored the apnea-hypopnea index (AHI) using data from our patch-based PSG system recorded at home. We evaluated scoring using the 2016 AASM rules for hypopneas in comparison to the 2007 AASM rules requiring a greater than 3% fall in SaO2 for obstructive hypopneas.

Conclusion The wireless, patch-based PSG system is an easy and fast method for setting up a high fidelity full polysomnography in the home.

The presence of EEG, EOG and EMG signals allows to determine NREM and REM statistics, respiratory and non-respiratory arousal indices, AHI and hyponeas with and without hypoxia, e.g. those that are terminated by arousal only.

In normal individuals, using cortical arousal criteria for hypopneas, the AHI is more pronounced in NREM compared to REM sleep.

Implications The Onera patch-based PSG system enables sleep diagnostic services to patients who could not have easy access to gold standard sleep studies, e.g. home bound patients, home care facilities and hospital beds.

The Onera PSG system may extend the diagnostic capacity of sleep physicians.

HST devices without EEG may underestimate the event rate of obstructive hypopneas and the degree of sleep abnormalities in young and particularly asymptomatic individuals.

Sleep EEG wearables for large-scale home recordings

Martin Dresler, Associate Professor, Donders Institute, Nijmegen

Polysomnography is the methodological gold standard in sleep research. The advantage of high-quality data recorded under highly controlled laboratory conditions, however, comes with the disadvantage of considerable investments in time, effort and human resources, and thus considerable restrictions on sample sizes for sleep studies. In recent years, several sleep technology companies have developed sleep wearables with the promise of reliable sleep EEG recordings that can be self-applied with minimal effort by consumers, patients or study participants. The data quality of such sleep EEG wearables in comparison to gold standard polysomnography remains to be established, though. In this talk, recent developments in wearable sleep EEG will be presented. Empirical data on two examples of sleep EEG headbands will be highlighted: the Zmax system by Hypnodyne, and the iBand+ system by Arenar B.V.

Developments in wearable cardiorespiratory sleep staging

Pedro Fonseca, Senior scientist, Philips Research

Recent years have seen an explosion in the availability and use of consumer sleep trackers, with hundreds of millions of people using these devices to track their sleep and

other daily activities. This technology is based on the physiological principle that sleep stages are also expressed in autonomic nervous system activity. In turn, this can be measured, for example, with the PPG sensors integrated in these devices. Amongst others, heart rate variability has shown potential in providing surrogate measures of sleep.
Although evidence comparing these devices against PSG continues to increase, most studies still focus on healthy, often young adults, with varying outcomes.
Despite limited validation, the promise of longitudinal, objective measurements of sleep at home could be of relevance for clinical applications. But the question of how well these devices can represent sleep - especially disrupted sleep - remains largely unanswered.
In this presentation we will briefly review and discuss recent developments in this area. We will present research data from our own group, obtained in large clinical datasets, showing the potential of this approach for sleep medicine.

10.25 – 11.25 ABSTRACT SESSION: SLEEP AND PHYSICAL DISEASE

Exploring a new developmental concept: the sleep-brain-gut axis in infants

F. Schoch [1], Castro-Meija [2], Lukas [2], Kot [2], Leng [2], Kohler [3], Huber [4], Rogler [3], Biedermann [3], Walser [5], Nielsen [2], Kurth [3]
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Objectives: Studies in adults and animals show evidence for a bidirectional relationship between sleep and gut bacteria, contributing to human health. However, it is unclear when this relationship is established. In the first year of human life, brain maturation, sleep regulation, and gut bacteria composition undergo significant development; we thus hypothesized their co-maturation and interaction across infancy.
Methods: In 162 infants aged 3, 6, and 12 months we quantified habitual sleep (actigraphy), gut bacterial diversity, enterotype and maturity (16S rRNA gene profiling), and behavioral development (Ages and Stages Questionnaire). For a brain marker, we obtained high-density EEG during nighttime sleep in 32 infants age 6 months. After standard EEG processing (bandpass filter 0.5–50 Hz, down-sampling to 128 Hz, average referencing, sleep stage scoring, semi-automated artifact rejection, spectral analysis with Fast Fourier transform), we computed EEG power in the delta (1 – 4.5 Hz), theta (4.75 – 7.75 Hz) and sigma (10 – 16 Hz) frequency bands. We analyzed sleep-brain-gut associations using multilevel and regression models.
Results: We found a link between habitual sleep and gut bacteria: daytime sleep was linked to gut bacteria diversity ($p = 0.02$), and nighttime sleep fragmentation was linked to gut bacteria maturity ($p = 0.03$) and enterotype evolution ($p = 0.048$). Second, a sleep-brain-gut axis was found: Enterotype at 6 months was associated with slow wave activity ($p = 0.02$). Theta power at 6 months predicted later bacterial diversity ($p = 0.04$). Third, both gut bacteria and habitual sleep were linked with behavioral development, both concurrently and predictively in longitudinal associations, with the strongest associations at 3 months of age.
Conclusions: We find evidence for a sleep-brain-gut link in infants, with a sensitive period at 3 months of age. As both sleep and gut bacteria can be modified non-invasively, this new concept represents a promising health target.

Setting your clock: associations of physical activity timing with cardiovascular disease risk

G Albalak [1], Stijntjes [1], Van Bodegom [2], Jukema [1], Atsma [1], Van Heemst [1], **Noordam** [1]
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Background: Little is known about the impact of daily physical activity timing (here referred to as "chronoactivity") on cardiovascular disease (CVD) risk. For the present

study, we examined the associations between timing patterns of physical activity and multiple CVD outcomes in the UK Biobank.
Methods: Objective physical activity data was collected through triaxial accelerometer over a 7-day measurement period. We used K-means clustering to create groups of participants with similar chronoactivity irrespective of the mean daily intensity of the physical activity. Multivariable-adjusted Cox proportional hazard models were used to estimate hazard ratios (HRs) comparing the different clusters adjusted for age and sex (model 1), and baseline cardiovascular risk factors (model 2). Additional stratified analyses were done by sex, mean activity level, and self-reported sleep chronotype.
Results: We included 86 657 individuals (57.6% female, mean age: 55.9 [SD: 7.8] years, mean BMI: 26.6 [4.5] kg/m^2). Over a follow-up period of 6 years, 3707 CVD cases were reported. Overall, participants with a tendency of late morning physical activity had a lower risk of incident coronary artery disease (CAD) (HR: 0.84, 95%CI: 0.76, 0.92) and cerebrovascular disease (HR: 0.82, 95%CI: 0.69, 0.98) compared to participants with an average ("midday") pattern of acceleration with accompanying evidence that these effects were more pronounced in women (p-value for interaction = 0.00). We did not find evidence favouring effect modification in the stratified analyses for total activity level and sleep chronotype.
Conclusion: Our findings suggest that, irrespective of total physical activity, morning physical activity associates with lower risk of incident CVD, stressing the importance of chronoactivity in disease prevention and treatment.
Keywords: chronoactivity, physical activity, patterns, cardiovascular disease.

The prevalence of insomnia and the association with metabolic outcomes in people with type 2 diabetes: The hoorn diabetes care system cohort

L Groeneveld [1,] Beulens, Van Straten, Elders, **Rutters,**
[1] VUMC Amsterdam Netherlands

Background: The aim of this study was to investigate the prevalence of insomnia (symptoms) in people with T2D and to assess the association with metabolic outcomes cross-sectionally and after one year follow-up, and assess the mediating role of lifestyle factors.
Methods: We used data of 1272 participants with T2D, 63.4% men and aged 68.7±9 years. Insomnia symptoms and insomnia were defined based on the Insomnia Severity Index combined with use of sleep medication. Metabolic outcomes included annual levels of HbA1c, fasting plasma glucose, LDL, HDL, triglycerides, blood pressure and BMI. Stratified for comorbidities, associations between (symptoms of) insomnia and (1-year change in) metabolic outcomes were assessed using linear regression analyses, adjusted for age, sex, diabetes duration and educational level. Mediation analyses were conducted for physical activity, smoking and alcohol intake as mediators.
Results: The prevalence of insomnia symptoms and insomnia was 21.6% and 13.6% respectively. In people with T2D and comorbidities (n=759), insomnia symptoms were associated with higher levels of glucose 0.43 mmol/l (0.03:0.82) and lower levels of LDL -0.18 mmol/l (-0.36:-0.00), compared to no insomnia. No association was observed in people without comorbidities (n=513). Over 1 year, in people with comorbidities insomnia symptoms were associated with an increase in HbA1c of 0.12% (-0.03:0.3) as well as a decrease in HDL levels of -0.04 mmol/l (-0.06:-0.01), compared to no insomnia. Additionally, in people with T2D and comorbidities, insomnia was associated with an increase in triglyceride levels of 0.08 mmol/l (0.01:0.14), compared to no insomnia. No statistically significant associations were observed for the other metabolic outcomes and no mediation by lifestyle factors.
Conclusions: Overall, our study showed that about a third of people with T2D experience insomnia (symptoms) and it being associated with small but deleterious (changes in) metabolic outcomes, especially in those with comorbidities.

Prevalence of sleep disorders and associated risk factors in adolescents and young adults after childhood cancer

S.H.M. Peersmann [1] Grootenhuis [1], Van Straten [2], Kerkhof [3], Tissing [1], Abbink [4], De Vries [1], Van der Pal [1], Kaspers [1], Van Litsenburg [1]
[1] Princess Máxima center for pediatric oncology, Utrecht, The Netherlands Utrecht Netherlands, [2] Vrije Universiteit Amsterdam Amsterdam Netherlands, [3] Department of Psychology, University of Amsterdam Amsterdam Netherlands, [4] Emma Children's Hospital, Amsterdam UMC Amsterdam Netherlands

Objectives: Little is known about sleep disorders after childhood cancer. Therefore, we aim to study sleep disorders in adolescents and young adults who had childhood cancer and determine associated risk factors.
Methods: A national cohort of childhood cancer patients (12-30 years old), at least 6 months after treatment and within 10 years after diagnosis, were invited to fill out sociodemographic/medical questions and the Holland Sleep Disorders Questionnaire, which distinguishes six sleep disorders and shows substantial agreement with the International Classification of Sleep Disorders-2 classification. Logistic regression models were used to evaluate differences with the general population and risk factors.
Results: 382 patients participated thus far (response 52.5%); 49.7% females; mean age 17.2 years, adolescents 12-17 years old n= 203, young adults 18-30 years old n= 177; 48.2% hemato-oncology, 30.4% solid tumors, 21.5% neuro-oncology. Sleep disorders were reported by 24.1% of patients. Prevalence rates included (adolescents vs. young adults): insomnia (9.4%, 14.7%; p>0.5), restless legs syndrome (8.9%, 12.4%; p>0.5), circadian rhythm sleep disorder (CRSD) (7.9%, 15.8%; OR 3.0, 95%CI 1.5-6.1, p<0.001), parasomnia (3.4%, 6.8%; p>0.5), hypersomnia (1.5%, 7.9%; OR 5.7, 95%CI 1.6-20.3, p<0.001) and sleep-related breathing disorder (1.5%, 4.0%; p>0.05). Compared to the general population, in young adults insomnia (OR 1.9; 95% CI 1.1-3.4, p<.05) and CRSD (OR 3.7; 95% CI 1.9-7.2, p<.001) were significantly increased. No associations were found with cancer-related factors (diagnosis type, treatment type), except for time after treatment for CRSD (OR 1.2; 95% CI 1.0-1.4 p<.05).
Conclusions: Adolescents and young adults across all types of childhood cancer diagnosis and treatments report a diverse array of sleep problems. Young adults who had childhood cancer seem specifically at risk for insomnia and CRSD. Considering the negative impact of sleep problems on overall health, screening for sleep problems after childhood cancer offers an unique possibility to improve patient well-being.

13.00 – 14.00 KERNGROEP SLAAPGENEESKUNDE NVKNO: UPDATE OSA

Transorale Robotchirurgie (TORS): de eerste ervaringen in Nederland

Noortje Schwandt, Otorhinolaryngologist & Head and Neck surgeon, Medisch Centrum Leeuwarden

Bij matig en ernstig OSA is continuous airway pressure (CPAP) nog altijd de therapie van voorkeur, echter uit de literatuur blijkt dat na 6 maanden slechts 50% van de patiënten de CPAP-apparatuur adequaat gebruikt.Bij OSA-patiënten bij wie de therapie met CPAP faalt (niet verdragen of niet de voorkeur van behandeling van patiënt) kan, uiteraard, indien het niveau van de obstructie dit toelaat, chirurgische behandeling een optie zijn, vooral om een lange termijn effect op de OSA te bereiken. In 2009 werd de eerste Europese multi-center veiligheids- en haalbaarheidsstudie naar TORS voor OSA verricht. In dit onderzoek werd geconcludeerd dat TORS een adequate therapie vormt voor OSA bij patiënten met obstructie op tongbasisniveau. Ook de nieuwe richtlijn "OSA bij volwassenen" (2017) dicht een belangrijke rol toe aan TORS voor tong-reducerende chirurgie als behandeling voor OSA. De richtlijn schrijft: "Bij obstructie op tongbasisniveau lijkt TORS betere resultaten te geven dan hyoidthyroidpexie. De

beschikbaarheid van de apparatuur die hiervoor benodigd is in de Nederlandse ziekenhuizen kan een belemmerende factor zijn om patiënten op deze manier te behandelen". TORS kan zowel als single modality of als onderdeel van multilevel chirurgie toegepast worden. Het is belangrijk om van te voren een slaaponderzoek onder sedatie te verrichten met bepalingen volgens de velum-orofarynx-tongbasis-epiglottis (VOTE)-classificatie en poliklinisch de Friedman classificatie vast te leggen. De combinatie van deze classificaties met de polysomnografische bevindingen bepalen of een patiënt geschikt is om TORS te ondergaan als behandeling voor de OSA.

Inzetbaarheid van een interim mandibulair repositie apparaat in de behandeling van obstructieve slaapapneu

Pien Bosschieter, ANIOS en PhD kandidaat, afdeling Keel-, Neus- en Oorheelkunde, OLVG, Amsterdam

Een mandibulair repositie apparaat (MRA) is een van de behandelingsmogelijkheden voor patiënten met obstructieve slaapapneu (OSA). Verschillende type MRA zijn beschikbaar, variërend van thermoplastische tot op maatgemaakte types, bestaande uit één onderdeel of twee losse onderdelen. Er is weinig bekend over de mogelijke rol van een tijdelijke, eenvoudige MRA; een interim MRA, in de behandeling van OSA. Om deze reden hebben we in het OLVG het verschil in effect tussen de twee type beugels vergeleken. We deden een prospectieve cross-over monocenter studie met 60 patiënten met OSA die beide MRA's drie maanden hebben gedragen waarna een polysomnografie en vragenlijsten volgden om het effect te meten. In deze presentatie delen we de onderzoeksresultaten en de klinische relevantie hiervan met u.

Vernieuwingen op het gebied van unilaterale n. hypoglossus stimulatie

Mickey Leentjens, ANIOS/PhD kandidaat, afdeling Keel-, Neus-, en Oorheelkunde, OLVG, Amsterdam

Bilaterale n. hypoglossus stimulatie

Olivier Vanderveken, diensthoofd NKO, UZ Antwerpen en verbonden aan de Faculteit Geneeskunde, Universiteit Antwerpen (UA) als docent in het medisch-technisch vaardigheden onderwijs ('Skills Lab')

13.00 – 14.00 WERKSGROEP SLAAP- WAAKSTOORNISSEN

REM sleep behavior disorder, meer dan alleen Parkinson

Maartje Louter, neuroloog/klinisch neurofysioloog/somnoloog, ErasmusMC

De laatste decennia is steeds duidelijker geworden dat REM sleep behavior disorder (RBD) een sterke associatie heeft met neurodegeneratieve aandoeningen, zoals de ziekte van parkinson, andere parkinsonismen en de ziekte van Alzheimer, echter RBD kan ook voorkomen bij andere ziektebeelden of worden uitgelokt door medicatie.
Al in de jaren na de eerste beschrijvingen van RBD werd duidelijk dat er een verband was met het gebruik van bepaalde medicatie. Door de jaren heen is vastgesteld dat mn anti-depressiva (serotonine heropnameremmers en tricyclische antideprresiva) een invloed hebben op de REM slaap. De eerste REM slaap is vaak pas later in de nacht, maar ook kan er kan er REM slaap zonder atonie ontstaan met soms ook bewegingen tijdens REM. RBD wordt ook beschreven bij verschillende neurologische ziektebeelden buiten de parkinsonismen. Zo komt het veel voor bij de hereditaire ataxiëen, mn SCA 3, waarbij een prevalentie van wel 50% wordt genoemd. De pathofysiologie hierachter is nog niet helemaal duidelijk. Ook wordt steeds meer duidelijk dat de nieuwere auto-immuun encefalitiden ook een duidelijke invloed hebben op de slaap, veel patienten hebben last van insomnie, maar er is ook een duidelijke verandering van de REM slaap, dat kan bij sommige antistoffen zelfs kan leiden tot agrypnia excitata. Hiernaast wordt RBD

beschreven bij essentiële tremor, ALS, de ziekte van Wilson, Niemann Pick type C, multiple sclerose en na traumatisch hersenletsel. In de psychiatrie zijn er associaties met RBD. Vooral bij posttraumatische stress stoornis is bekend dat dit invloed heeft op de REM slaap, dit kan leiden tot nachtmerries en RBD. Ook bij ADHDH, autisme en schizofrenie kan RBD ontstaan. Recentelijk is een casus beschreven van RBD bij COVID.

Slaap bij niet- aangeboren hersenletsel, focus op niet medicamenteuze behandelopties

Willem Lavrijssen, psycholoog, Kempenhaeghe
Slaapstoornissen komen vaker voor bij mensen die hersenletsel hebben opgelopen. Wat maakt dit? Wat is erover bekend in de wetenschappelijke literatuur?
In deze voordracht wordt aan de hand van recente artikelen een selectief overzicht gegeven over de prevalentie van slaapstoornissen bij hersenletsel, mogelijke etiologische factoren en de specifieke nadruk op niet-medicamenteuze behandelopties voor de meest voorkomende slaapstoornissen.

13.00 – 14.00 NVALT: PANELDISCUSSIE

Interactieve casusbespreking: een aantal casus zal worden voorgelegd aan een panel van experts aanwezig in de studio, die hun kijk op zaak zullen geven. Daarnaast zal d.m.v. een poll de mening van het publiek worden gevraagd.

Casus door **Pauline van Hirtum, longarts in Centrum voor Slaapgeneeskunde Kempenhaeghe in Heeze**

Panelleden:
Dirk Pevernagie, longarts-somnoloog en is verbonden aan de universiteit en het universitair ziekenhuis van Gent, België.
Johan Verbraecken, longarts, Dienst Longziekten en Multidisciplinair Slaapcentrum, Universitair Ziekenhuis Antwerpen
Manu Sastry, longarts, Ciro Academic Sleep Center, Horn

13.00 – 14.00 NVAVG

Slaap en dementie bij het syndroom van Down

Tonnie Coppus, onderzoeker bij de afdeling Eerstelijnsgeneeskunde, AVG-arts en vertrouwensarts bij Dichterbij.

Slaapapneu vaststellen bij mensen met downsyndroom met WatchPAT: een haalbaarheidsstudie

Rixt Nijenhuis– Huls, arts verstandelijk gehandicapten bij Talant
Alain Dekker, onderzoeker – docent, Faculteit Medische Wetenschappen/UMCG

Diagnose en therapie slaapapneu bij mensen met het Downsyndroom

Annelies Smits, AVG-somnoloog, SEIN in Zwolle en Groningen

13.00 – 14.00 LVMP

Niet medicamenteuze (psychologische) behandeling van insomnie tijdens ziekenhuisopname: Een Best Practice. Nynke Rauwerda, klinisch psycholoog-psychotherapeut en somnoloog, afdeling Medische Psychologie van Ziekenhuis Gelderse Vallei.
De werkgroep Slaap van de Landelijke Vereniging Medische Psychologie is in 2016 opgericht als een platform van GZ-psychologen en Klinisch (neuro)psychologen werkzaam in algemene en academische ziekenhuizen. Het samenwerkingsverband richt zich op informatieverzameling en kennisuitwisseling t.b.v. professionals werkzaam in de medische psychologie m.b.t. zowel specifieke slaapproblematiek als de samenhang tussen slaapproblematiek en somatische aandoeningen en hun behandeling. In dit kader brengen zij Best Practices uit met als doel collega-psychologen te informeren over de stand van zaken qua expertise en wetenschappelijk onderzoek om zodoende de praktijkvariatie in psychologische zorg aan patiënten met slaapstoornissen in het ziekenhuis te verminderen.

Tijdens huidige presentatie wordt ingegaan op de Best Practice : Psychologische zorg voor klinische patiënten met insomnie en een comorbide medische aandoening en/of aanhoudende lichamelijke klachten tijdens de ziekenhuisopname. Met deze Best Practice wordt de aandacht gevestigd op het belang van een goed slaapklimaat in het ziekenhuis en op preventie van ontwikkelen van chronische insomnie. We doen handreikingen die liggen op het psychologisch en gedragsmatig vlak bij slapeloosheid (insomnie) bij patiënten met een medische aandoening tijdens de opname in het ziekenhuis. Ter illustratie zal ook casuïstiek gepresenteerd worden.

De neuropsychologische gevolgen van OSA
Justine Aaronson, GZ-psycholoog in opleiding tot klinisch neuropsycholoog, afdeling Psychiatrie & Medische Psychologie, OLVG, Amsterdam.
Patiënten met OSA rapporteren vaak klachten van vergeetachtigheid en concentratieverlies, maar minder duidelijk is wat het effect van OSA op objectief cognitief functioneren is. Is er sprake van cognitieve stoornissen? Zo ja, wat zijn mogelijke onderliggende mechanismen en/of risicofactoren? En wat is het effect van effectieve behandeling van OSA op cognitie? In deze presentatie wordt ingegaan op de neuropsychologische gevolgen van OSA en de behandeling daarvan. Daarnaast wordt kort aandacht besteed aan OSA bij verschillende neurologische aandoeningen.

Prevalentie, ernst en kenmerken van slapeloosheid bij chronische vermoeidheid: Post Covid Gerelateerde Vermoeidheid versus het Chronisch Vermoeidheid Syndroom. Nynke Rauwerda, klinisch psycholoog-psychotherapeut en somnoloog (volwassenen en ouderen), afdeling Medische Psychologie van Ziekenhuis Gelderse Vallei.
Chronisch Vermoeidheid en chronische insomnie hebben overlappende kenmerken. Naast cognitieve klachten en lichamelijke klachten is 'slaap waarvan met niet uitrust' een frequent gerapporteerde klacht binnen het Chronisch Vermoeidheid Syndroom (CVS). Derhalve is veel wetenschappelijk onderzoek gedaan naar de slaapkwaliteit bij patiënten die kampen met CVS. In deze presentatie gaan we in op de prevalentie, ernst en kenmerken van insomnie bij chronische vermoeidheid en specifiek kijken we hoe zich dit manifesteert in Post COVID gerelateerde Vermoeidheid.

13.00 – 14.00 VERENIGING KIND & SLAAP

Infant sleep: time for a paradigm shift

Pamela Douglas, Associate Professor Adjunct

Infant sleep training approaches arose from the first wave of the behavioural school of psychology in the 1950s and 1960s and have remained a mainstay of infant-care for many decades. But does sleep training *really* work for most? Surprisingly, systematic reviews of the research find that sleep training does not decrease the frequency of night-waking for parents and infants in the first year of life. Moreover, the graduated extinction methods of sleep training have been shown to increase anxiety for many parents, who find sleep training to be in tension with their desire to respond to their baby's cues as they nurture his or her secure psychological attachment.

Since 2011, Dr Pamela Douglas and her Australian teams have been developing and delivering an alternative, science-based approach to infant sleep, known as the Possums Baby and Toddler Sleep Program. In this presentation, Dr Douglas discusses the key elements of this program, and examines the findings of the evaluations which have been conducted to date. In 2017, Professor Ball and the Durham Infancy and Sleep Centre adapted and evaluated the Possums Sleep Program for the UK as Sleep, Baby and You, and Dr Douglas discusses the findings of a large study evaluating the delivery of this adaptation. In 2021, an RCT by Professors Boran and Ozturk and their team at Lund University, Turkey, demonstrated improved breastfeeding outcomes with a Possums-based sleep intervention.

A growing body of research demonstrates just how important it is to develop a pattern of responsiveness to infant cues in early life if we want to optimise developmental and mental health outcomes. Many families are now searching for an alternative, science-based approach to their baby's sleep – which does not interrupt breastfeeding, which repairs excessive night-waking, which educates about developmentally normal night-waking and strategies for managing this.

This talk offers a paradigm shift in the way we as clinicians manage the sleep needs of parents with babies.

Chronische insomnie bij kinderen en jongeren: analyse een aanpak middels het gevolgenmodel.

Sigrid Pillen, kinderneuroloog / somnoloog, eigenaar van kinderslaapexpert BV

Chronische insomnie komt veel voor bij kinderen en jongeren, zeker als er sprake is van co-morbiditeit zoals verstandelijke beperking of een psychiatrische stoornis. De afgelopen jaren was er maar beperkte keus qua evidence based behandelopties: optimaliseren van slaaphygiene, gedragsaanpak middels extinctiemethodes en CGTi voor adolescenten. De laatste tijd komt er toenemend aandacht voor meer gepersonaliseerde, integrale aanpak, waar de Sleeping Sound methode uit Australia, voor kinderen met ADHD of ASS, een goed voorbeeld van is. In de behandeling van somatisch onverklaarde lichamelijke klachten wordt sinds een aantal jaar gebruik gemaakt van het gevolgenmodel, een methode om oorzaken en gevolgen van klachten voor zowel het kind als het systeem systematisch in kaart te brengen, alsmede de vicieuze cirkels die hierdoor ontstaan. In deze presentatie gaan we in discussie of het gebruik van het Gevolgenmodel, leidend tot een integrale interdisciplinaire aanpak, een goede vervolgstap zou kunnen zijn in de ontwikkeling van behandelingen van insomnie.

14.25 – 15.25 NEUROLOGISCHE BEWEGINGSSTOORNISSEN EN SLAAP

Diagnostiek en behandeling van RBD

Angelique Pijpers, neuroloog- somnoloog, centrum voor slaapgeneeskunde Kempenhaeghe

REM slaap gedragsstoornis (RBD) is een parasomnie waarbij, ten gevolge van een verstoring van fysiologische spieratonie tijdens de REM slaap, levendige (vaak onaangename) dromen fysiek worden uitbeeldt. Dit wordt dream-enacting behavior genoemd en kan o.a. gepaard gaan met stemgeluiden en plotselinge, vaak gewelddadige arm- en beenbewegingen. RBD is in veel gevallen een vroege indicator van een zich ontwikkelende neurodegeneratieve ziekte, in het bijzonder Parkinson(isme).
In deze voordracht gaan we in op de diagnostiek van RBD en de vraag waarom je een de video-PSG met extra EMG beplakking zou doen. Tot slot wordt een overzicht gegeven van mogelijke (symptomatische) behandel opties.

Ethische dilemma's bij screening voor RBD

Lisanne Dommershuijsen, PhD, ErasmusMC, Rotterdam

REM slaap gedragsstoornis (RBD) is een vaak voorkomende slaapstoornis bij mensen met de ziekte van Parkinson, multipele systeem atrofie en Lewy body dementie. Klinische studies hebben bovendien aangetoond dat tot wel 90% van de mensen met RBD uiteindelijk zal worden gediagnosticeerd met een neurodegeneratieve ziekte, meestal de ziekte van Parkinson. Om deze reden biedt het screenen voor RBD een unieke kans om meer inzicht te krijgen in de prodromale fase van de ziekte van Parkinson. Binnen het Erasmus Rotterdam Gezondheid Onderzoek (ERGO) zijn we recent gestart met het screenen voor RBD door middel van vragenlijsten en een ambulante polysomnografie, met als doel te achterhalen of mensen met RBD in de algemene populatie een vergelijkbaar risico hebben op de ziekte van Parkinson, MSA of LBD als eerdere klinische studies hebben aangetoond. Het screenen voor RBD in de algemene populatie brengt echter verschillende ethische dilemma's te weeg, zoals: Moeten we deelnemers die positief screenen voor RBD informeren over het risico op het ontwikkelen van de ziekte van Parkinson? Gezien het gebrek aan richtlijnen voor het omgaan met deze dilemma's, hebben wij onze ervaringen met het opstellen van een studieprotocol en overwegingen in de bestaande literatuur gebundeld. In deze presentatie zullen de verschillende ethische dilemma's die ontstaan bij het screenen voor RBD worden besproken en zullen de huidige aanbevelingen omtrent het omgaan met deze dilemma's worden behandeld.

Slaap en de ziekte van Parkinson

Karin van Dijk, Neuroloog Somnoloog, Slaap-Waakcentrum SEIN, Heemstede

Regelmatig wakker worden, te vroeg ontwaken en slaperigheid overdag. Kenmerkende problemen die ervaren worden door patiënten met de ziekte van Parkinson. Ze blijken een grote impact te hebben op de kwaliteit van leven. Bovendien heeft een deel van de Parkinsonpatiënten een REM-slaap gedragsstoornis. Door het ontbreken van atonie in de REM-slaap zijn zij in staat hun (veelal gewelddadige) dromen letterlijk uit te voeren. Deze presentatie gaat in op de diverse oorzaken, zoals motorische en niet-motorische symptomen, medicatie en het neurodegeneratieve proces zelf. Tot slot komen de diverse behandelmogelijkheden aan bod, inclusief praktische toepassingen.

14.25 – 15.25 ABSTRACT SESSION: SLEEP & MENTAL HEALTH / COGNITION

The longitudinal association of sleep and 24-hour activity rhythms with cortisol response to a very low dose of dexamethasone

AI Luik 1, M De Feijter 1, Tiemensma , Ikram , Stricker
1 Erasmus MC Universitair Medisch Centrum Rotterdam Netherlands

Background: Poor sleep is common in the general population, with hyperarousal and stress often suggested as causal factors. Conversely, sleep might also affect the stress system, in which the hypothalamic-pituitary-adrenal (HPA) axis plays a key role. We assessed the longitudinal association of sleep and 24-hour activity rhythms with functioning of the negative feedback loop of the HPA axis, as indicated by the cortisol response to a very low-dose of dexamethasone, in a population-based cohort.
Methods: This study included 410 participants (mean age: 56.1 ± 5.5 years, 59% women) from the population-based Rotterdam Study. Between 2004 and 2007, sleep and 24-hour activity rhythms were estimated with actigraphy (mean duration: 146 ±19.6 hours) and sleep quality with the Pittsburgh Sleep Quality Index. To assess the negative feedback loop of the HPA axis we measured cortisol before and after the intake of a very low-dose of dexamethasone (0.25 mg). For 217 participants, the response to dexamethasone was assessed again after a median follow-up of 5.7 years (IQR: 5.5–5.8). Temporal associations were assessed using linear mixed models.
Results: Unstable (B=1.64, 95% CI 0.78; 2.50) and fragmented (B= -1.31, 95% CI -2.17; -0.45) 24-hour activity rhythms and poor self-rated sleep quality (B -0.02, 95% CI -0.04; 0.00) were associated with an enhanced response to dexamethasone over time, also in those without clinically relevant depressive symptoms and those not using psychoactive medicines.
Conclusions: This study demonstrates a longitudinal association of disturbed 24-hour activity rhythms and poor self-rated sleep quality with an enhanced response to dexamethasone, independent of indicators of depression.
Funding: This research project was made possible by an award from the Sleep Research Society Foundation awarded to AI Luik.

Chronotherapy in adult ADHD: results from the PhASE study

E. Andel 1, Bijlenga 2, Vogel 2, Beekman 3, Kooij 2,
1 PsyQ The Hague Netherlands, 2 PsyQ Expertise Center Adult ADHD The Hague, 3 Amsterdam Public Health research institute, VU University Medical Center Amsterdam

Background: The majority of adults with Attention-Deficit/Hyperactivity Disorder (ADHD) have a delayed circadian rhythm that is a characteristic of Delayed Sleep Phase Syndrome (DSPS). Treatment of DSPS may improve both the circadian rhythm and ADHD symptoms.
Methods: In this three-armed randomised clinical trial, 51 adults (18-55y) with ADHD and DSPS received sleep education and 3 weeks of (1) 0.5 mg/d placebo, (2) 0.5 mg/d melatonin, or (3) 0.5 mg/d melatonin plus 30 minutes of 10,000 lux bright light therapy (BLT) between 07:00 and 08:00h. Placebo/melatonin conditions were double-blind. Treatment took place in the participants' naturalistic home settings. Dim-light melatonin onset (DLMO) was measured in saliva as marker of internal circadian rhythm. Melatonin or placebo administration followed individual schedules, starting 3 hours before the individual DLMO and weekly advancing by one hour. DLMO and ADHD Rating Scale score were assessed at baseline, directly after 3-week treatment, and two weeks after the end of treatment.
Results: At baseline, 77% had a DLMO after 21:00h with an average DLMO at 23:43h ± 1h46. Directly after treatment, melatonin had advanced DLMO by 1h28 ($p = .001$), and melatonin plus BLT by 1h58 ($p < .001$). Placebo did not affect DLMO. ADHD symptoms reduced by 14% ($p = .062$) directly after melatonin treatment.
Two weeks after end of treatment, ADHD symptoms and DLMO had returned to baseline levels. Placebo did not impact ADHD symptoms. Neither did melatonin plus BLT, which

could be due to BLT timing being fixed rather than individualised.
Conclusion: Low doses of melatonin advanced the circadian rhythm and reduced self-reported ADHD symptoms. Given the large number of adult ADHD patients with concurrent DSPS, treating delayed sleep with melatonin is an important component of effective ADHD treatment.

Sleep, 24-Hour Activity Rhythms and Cognitive Reserve: A population-based study of middle-aged and elderly persons

J.L. Zijlmans 1 Riemens 1, Vernooij 1, Ikram 1, Luik 1
1 Erasmus MC Rotterdam Netherlands
Background: The cognitive reserve hypothesis aims to explain individual differences in the susceptibility to the functional impact of dementia-related pathology. Considering that sleep and 24-hour activity rhythms are known to be disturbed in those with Alzheimer's disease and dementia, it has been proposed that sleep might also relate to levels of cognitive reserve. However, it is unknown whether actigraphy-estimated sleep and 24-hour rhythms are associated with cognitive reserve.
Methods: This cross-sectional study included 1002 participants from the Rotterdam Study (mean age: 64.95 (SD: 7.08) between January 2009 and July 2014. Sleep and 24-hour activity rhythms were measured using actigraphy (mean days: 6.7 SD: 0.5). Additionally, participants completed five cognitive tests and a brain MRI scan. Cognitive reserve was estimated through variance decomposition and defined as a latent variable that captures variance common across these five cognitive tests while adjusting for demographic and neuropathological factors.
Results: A longer sleep onset latency (adj. mean dif.: -0.16, 95% CI -0.24; -0.08) and higher sleep efficiency (adj. mean dif.: 0.14, 95% CI 0.05; 0.22) were associated with higher cognitive reserve. Total sleep time and wake after sleep onset were not significantly associated with cognitive reserve. After mutual adjustment, only the association of longer sleep onset latency remained significant (adj. mean dif.: -0.12, 95% CI -0.20; -0.04). The 24-hour activity rhythm was not significantly associated with cognitive reserve.
Conclusion: Our study suggested that a longer sleep onset latency is particularly associated with a lower cognitive reserve. Future longitudinal work is needed to assess whether targeting sleep could enhance cognitive reserve, in order to limit the susceptibility to the functional impact of dementia-related pathology.

Subjective Cognitive Decline and Self-Reported Sleep at a Memory Clinic: the SCIENCe project

Hendriksen 1, L.G. Exalto 2, Barkhof 3, Bosch 1, Ebenau 1, Leeuwenstijn-Koopman 1, Prins 4, Teunissen 5, Visser 6, Scheltens 1, Flier 1
1 Alzheimer Center Amsterdam, Amsterdam UMC Amsterdam Netherlands
2 UMCU Brain Centre, University Medical Center Utrecht Utrecht Netherlands
3 Department of Radiology and Nuclear Medicine, Amsterdam UMC Amsterdam Netherlands, 4 Brain Research Center Amsterdam Netherlands
5 Neurochemistry Laboratory, Amsterdam UMC Amsterdam Netherlands
6 Center for Alzheimer Research, Karolinska Institutet Stockholm Sweden
Background: sleep problems have been associated with cognitive decline, ranging from subjective cognitive decline (SCD) to objective deficits and incident Alzheimer's disease (AD). We aimed to investigate whether frequency and type of sleep problems in memory clinic patients with SCD are associated with objective cognition, mental health, MRI measures, and AD CSF biomarkers.
Methods: 308 subjects (65±8yrs, 44% female, MMSE 29±1) from the Subjective Cognitive Impairment Cohort (SCIENCe) project with available information on sleep were included. Sleep problems were defined by sleep apnea (Berlin Questionnaire 3 categories; ?2) and/or poor sleep quality (Pittsburgh Sleep Quality Index 0-21; ?5). Subjects were classified as having a sleep problem when ?1 sleep questionnaires were above the cut-off. All underwent a standardized memory clinic work-up. Sociodemographics, objective cognitive performance (attention, memory, language, and

executive functioning), self-reported cognitive decline, anxiety, depressive symptoms, medial temporal lobe atrophy, global cortical atrophy, white matter hyperintensities, and CSF levels of A?42, t-tau, p-tau were compared between subjects with and without sleep problems.
Results: 198/308 (64%) subjects reported sleep problems, based on 107 (35%) positive results for sleep apnea and 164 (53%) for poor sleep quality. Subjects with sleep problems reported more severe depressive symptoms (CES-D median (IQR): 10 (5-16) versus 4 (2-7)), more anxiety (HADS-A 5 (2-10) versus 2 (0.25-4)) and more severe subjective cognitive decline (Cognitive Change Index: 43 (31-56) versus 35 (25-47)), all p<.002. Sociodemographics, objective cognitive performance, MRI measures and AD CSF biomarkers did not differ between groups.
Conclusion: sleep problems are common in subjects with SCD and are associated with higher levels of anxiety, depression and self-reported cognitive decline, but not with AD biomarkers. Our results suggest that poor sleep quality and hygiene are a potentially reversible cause of the subjective experience of cognitive decline and potential leads for treatment in many subjects with SCD.

14.25 – 15.25 RESIDUAL EDS IN OSA

Residual excessive daytime sleepiness in patients treated for obstructive sleep apnea: guidance for assessment, diagnosis, and management

Jean-Louis Pépin, Professor of Clinical Physiology, Grenoble Alpes University

Excessive daytime sleepiness (EDS) affects approximately half of patients with obstructive sleep apnea (OSA) and can persist in some despite normalization of breathing, oxygenation, and sleep quality with primary OSA therapy, such as continuous positive airway pressure (CPAP). EDS is often overlooked and under discussed in the follow-up of CPAP-treated patients due to difficult assessment of such a multi-dimensional symptom. The presentation will provide suggestions for procedures that can be implemented into routine clinical practice to identify, evaluate, and manage EDS in patients treated for OSA, including how to appropriately use various self-report and objective assessments along the clinical pathway and options for pharmacotherapy.

Treatment of residual EDS in OSA

Johan Verbraecken, longarts, Dienst Longziekten en Multidisciplinair Slaapcentrum, Universitair Ziekenhuis Antwerpen

Behandeling van residuele slaperigheid bij patiënten met obstructief slaapapneu is een uitdaging. Na doorgedreven evaluatie van lifestyle en comorbiditeiten is een farmacologische behandeling in een aantal gevallen geïndiceerd. Hiertoe behoren stimulerende middelen zoals amfetamines, modafinil (indicatie OSA echter door EMA geschrapt), solriamfetol en pitolisant. Het veiligheidsprofiel van deze middelen wordt toegelicht.

Clinical management of residual EDS in OSA

Rolf Fronczek, neurologist/somnologist Leiden University Medical Centre and Sleep-Wake Centre SEIN in Heemstede

It is expected that new medication options will become available in the near future for the treatment of residual excessive daytime sleepiness in obstructive sleep apnea, despite treatment with continuous positive airway pressure (C-PAP) or other currently available treatment modalities. However, in general practice it is not always easy to clearly assess whether there is true excessive daytime sleepiness or if there is fatigue instead, or if there is a cause for the complaints other than (treated) obstructive sleep apnea. This lecture will focus on the clinical management of the complaint residual excessive daytime sleepiness in obstructive sleep apnea. What other causes are known and should be ruled out? What approach would work best in clinical practice? And which patients should then be treated with the soon-to-be-available new medication options?