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ORIGINAL PAPER

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The effects of clomethiazole on polysomnographically recorded sleep in healthy subjects

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Abstract Clomethiazole is widely used in European countries to treat alcohol withdrawal symptoms including delirium tremens. The current study aimed to explore the effects of clomethiazole on the sleep of healthy volunteers. We postulated both a hypnotic and a REM suppressive effect as well as the occurrence of a rebound phenomenon following three days of treatment with clomethiazole. The study group was composed of five men and five women. The probands were examined in the sleep laboratory throughout a course of seven nights. The first night was considered as the adaptation night and the second as the baseline night. Prior to nights 3 to 5, probands took 384 mg clomethiazole at 22 hours. The 6th and 7th nights served to record potential effects of medication discontinuation.

The current study confirms the indication in the scientific literature with regard to hypnotic and REM-suppressive effects of clomethiazole, as well as a rebound phenomenon following discontinuation of the medication. The effect of clomethiazole on the sleep EEG was most obvious in the first half of the night. The analysis of the polysomnogram in terms of each half of the night gave no indication of a rebound phenomenon during the second half.

The REM sleep-suppressing component of clomethiazole is of great interest in connection with its use in treating delirium tremens. The rebound phenomenon in healthy controls after only three days of medication at a relatively low dosage of clomethiazole underscores the need to administer it in doses individually tailored to the extent of the alcohol withdrawal syndrome in the individual patient.

Key words polysomnography · clomethiazole

Introduction

Clomethiazole is widely used in European countries to treat alcohol withdrawal symptoms, including delirium tremens (Majumdar 1990; Morgan et al. 1995; Gann et al. 2004). It is a derivative of the thiazole compound of thiamine and has sedative, sleep-inducing, anxiolytic, neuroprotective and anticonvulsant properties. The mechanism by which it affects the brain is not entirely clear, but it appears to increase GABAergic function (Green 1998; Nelson et al. 2002).

Moreover, clomethiazole is used for the treatment of sleep disorders, agitation and restlessness in geriatric patients (Bayer et al. 1986; Overstall and Oldman 1987). In view of its short half-life, no hang-over effects are to be expected. However, since the drug can provoke at least in alcoholic patients physical dependence and withdrawal symptoms, its widespread use in gerontopsychiatric patients has stirred much debate (Reilly 1976; Gregg and Akther 1979; Dehlin 1986; Braunwarth 1990). Drugs that are associated with sleep disturbances when withdrawn carry a particularly pronounced risk for the induction of physical dependence. However, data on this important aspect of clomethiazole are scarce despite its wide usage.

Two small studies with healthy probands indicated a hypnotic and REM-suppressive effect after acute administration of clomethiazole as well as a rebound phenomenon upon discontinuation of medication (Evans et al. 1972; Liljenberg et al. 1986).

The current study aimed to explore the effects of clomethiazole on the sleep EEG of healthy probands us-

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ing a more elaborate and sophisticated study design. Based on the earlier results from the literature, we postulated both a hypnotic and REM-suppressive effect of clomethiazole as well as the occurrence of rebound phenomena following three days of treatment.

Methods

Probands

The proband population was composed of five men (mean age: 29.8 ± 6.1 years, range: 23–36 years) and five women (mean age: 29.6 ± 9.3 years, range: 23–45 years). The average age of the total population was 29.7 ± 7.4 years (range: 23–45 years). Demographic data on the amount of alcohol consumed and the alcoholism markers are given in Table 1.

All probands underwent a complete medical and psychiatric examination upon admission as well as a routine hematological laboratory examination (including CDT = carbohydrate deficient transferrin, GOT, GPT, Gamma-GT). Only subjects with normal findings were included in the study.

Psychometric investigations

Depressive symptoms were documented by means of the Beck Depression Inventory (BDI) (Hautzinger et al. 1995) and symptoms of anxiety by means of the State Anxiety Inventory (STAI) (Laux et al. 1981). The severity of withdrawal symptoms was verified by means of the Clinical Institute Withdrawal Assessment of Alcohol Scale (CIWA-A) (Stuppaeck et al. 1994).

Design

The probands were examined in the sleep laboratory throughout the course of seven nights. All probands were free of any kind of psychoactive medication. The study was approved by the local ethics committee. Each proband signed written informed consent before being included in the study.

On the first "adaptation" night, subjects were screened for sleep apnea and periodic movements during sleep (PLMS). Subjects with an apnea-hypopnea index > 10/hour or relevant PLMS (index with arousals > 10/hour) were excluded. The second night was considered as the baseline night, after which probands filled out the BDI, the STAI and the CIWA in addition to the SF-A, which they filled out every morning. Prior to nights 3–5, probands were medicated with 384 mg clomethiazole (corresponds to two capsules) at 22 h.

The sixth and seventh nights served to record the potential effects of medication discontinuation. The morning after the sixth night probands once again filled out the BDI, the STAI and the CIWA (Fig. 1).

Subjects were requested to refrain from sleeping anywhere else than in the sleep laboratory during the seven days of study and to refrain from taking any additional active psychotropic substances (including alcohol) or any kind of medication.

Sleep recording and scoring

Polysomnography encompassed EEG (C3-A2, C4-A1), horizontal and vertical eye movements and a sub-mental EMG. Activity of M. anterior tibialis and respiration (oral/nasal air flow and thoracic/abdominal respiratory effort and oxygen saturation) were recorded only during the first night in the sleep laboratory to screen for and exclude subjects with PLMS or sleep apnea. All recordings were carried out from 11 PM to 7 AM.

Experienced raters who were "blind" to the experimental conditions of the recordings scored all sleep recordings in 30-s epochs according to the criteria of Rechtschaffen and Kales (1968).

The following sleep parameters were determined: total sleep time (min); sleep efficiency (in %, i. e. total sleep time/time spent in bed × 100); latency to stage 2 (sleep latency in min, i. e. the interval between lights-out and the first occurrence of stage 2) and latency to REM stage (in min, i. e. interval between the first occurrence of stage 2 and the first occurrence of REM sleep); number of wake periods: wake, stage 1, stage 2, stages 3, 4; and REM expressed as % of SPT (Sleep Period Time, i. e. time between sleep onset and final awakening). The composite variable "REM pressure" was calculated by means of a factorial analysis (principal component analysis, PCA) based on the three parameters: REM density of the first REM period, REM percent of sleep period time (SPT), and REM latency, as suggested by Gillin et al. (1994).

To determine subjective sleep parameters, the SF-A (Görtelmeyer 1981) and the PSQI (Pittsburgh Sleep Quality Index (Buysse et al. 1988); German version (Riemann and Backhaus 1996)) were used. The SF-A was used each morning in the sleep laboratory to ascertain

Table 1 Sample description

Proband	Age	Sex	BMI (kg/m²) Norm: 20–25	Average alcohol consumption/Week g	CDT (ng/ml) Norm: f < 26 m < 20	Laboratory			Psychopathometry			
						GGT (U/l) Norm: < 28	GOT (U/l) Norm: < 19	GPT (U/l) Norm: < 23	PSQUI Score	BDI Score	STAI Score	CIWA-A
1	23	m	21.3	40	15	11	9	14	1	0	35	11
2	29	m	20.8	60	13	7	12	7	5	1	36	12
3	23	f	20.6	30	25	11	10	9	6	6	37	12
4	45	f	21.4	20	18	6	10	6	2	2	m.d.	m.d.
5	24	f	20.8	50	16	6	6	7	4	0	40	12
6	32	f	24.0	50	23	8	13	18	5	2	34	12
7	36	m	23.5	80	15	12	10	6	4	2	32	11
8	36	m	24.3	80	15	11	11	11	5	1	33	m.d.
9	25	m	23.0	100	16	20	16	21	4	0	43	11
10	24	f	21.2	20	28	7	10	7	3	0	23	11

BMI Body mass index; *CDT* Carbonhydrate deficient transferrin; *GGT* Gamma-glutamyl-transpeptidase; *GOT* Glutamatic transaminase; *GPT* Glutamatic pyruvic transaminase; *PSQI* Pittsburg Sleep Quality Index; *BDI* Beck Depression Inventory; *STAI* State Anxiety Inventory; *CIWA* Withdrawal Assessment of Alcohol Scale; *m.d.* missing data

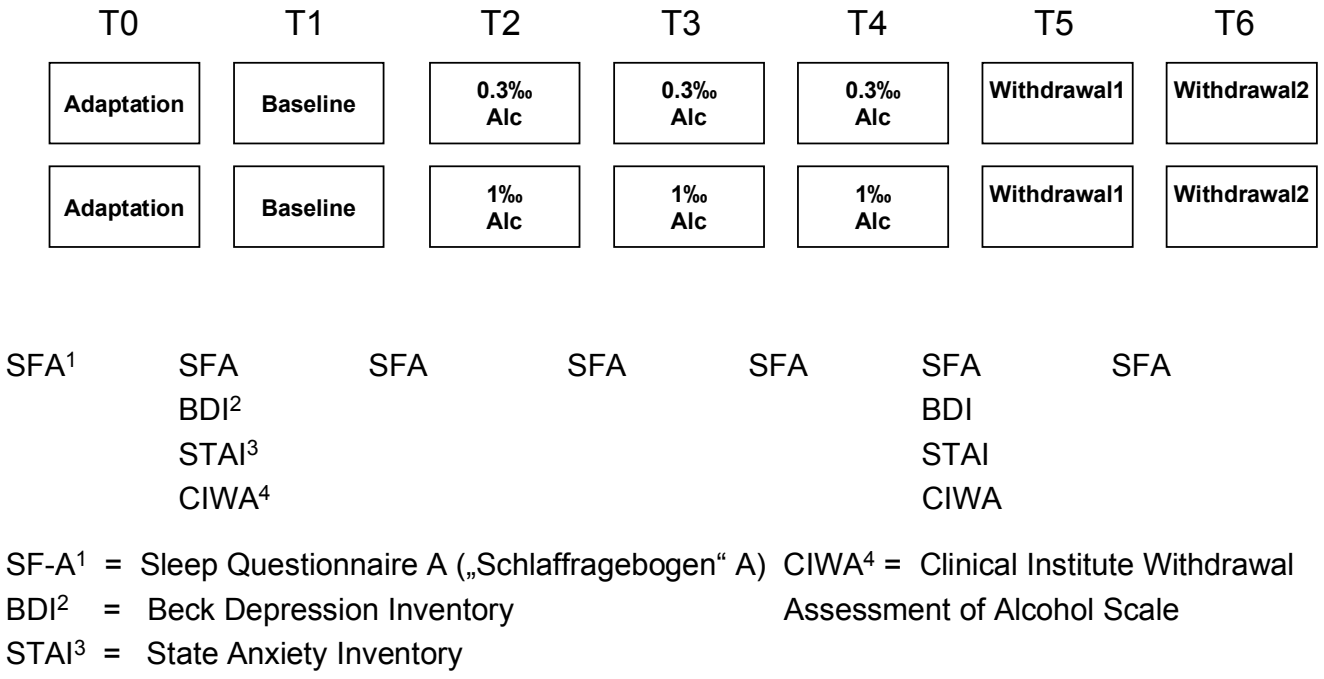

Fig. 1 Study design. During each block of study (Alcohol 1 ‰, Alcohol 3 ‰, Clomethiazole) the probands slept in the sleep laboratory on all 7 nights (adaptation, baseline, 3 treatment nights, 2 withdrawal nights)

the sleep quality of the previous night. The PSQI was applied prior to the first night in the sleep laboratory. It was used to judge several aspects of sleep and overall sleep quality in the preceding two weeks. The sum score of the PSQI (range: 0–21; 0 meaning no sleep disturbance, 21 meaning severe sleep disturbance) was included in the data analysis.

The SF-A subscales "sleep quality","feeling refreshed in the morning", "well-being in the evening", "exhaustion in the evening" and "psychosomatic symptoms during sleep" were analyzed. These scales range from 1 to 5, with 1 denoting impaired quality etc., while 5 represents positive estimates ("psychosomatic symptoms", i. e. inverse scaling).

Statistics

Objective and subjective sleep parameters for all nights were analyzed using SPSS 9.0 for Windows. First, a repeated measures analysis was performed for each parameter across 6 nights (leaving out the adaptation night). For those parameters in which the ANOVA indicated a significant dependence upon the repeated measures factor NIGHT, Greenhouse-Geisser corrected contrasts to the baseline night were derived for each post-baseline night. Differences were considered as significant with $p < 0.05$, highly significant with $p < 0.01$ and as tendencies with $p < 0.1$. The parameters sleep efficiency (objective and subjective), sleep onset latency and percentage of wake time showed asymmetric distributions and were transformed logarithmically before statistical analysis. For sleep efficiency, the formula $\log10(101-x)$ was used; for sleep onset latency and percentage of wake time, we used $\log10(x+1)$. Where displayed, mean values for these parameters were derived using the corresponding inverse of the mean transformed values. For the objective sleep parameters, the statistical analysis was performed on entire nights and on night halves which were derived by splitting each night in the middle of the sleep period time.

Results

Side effects

Probands 1, 2, 6 and 7 reported side effects associated with the first night of treatment, probands 1 and 6 as well as with the second night of treatment. Side effects were a "burning" feeling in the nasal mucous membranes coupled with an increased flow of nasal mucus.

Polysomnographically recorded sleep

With respect to variables of sleep continuity the ANOVA revealed significant effects on sleep latency, sleep efficiency and number of wake periods, as well as a slight effect on the total sleep time. The hypnotic effect of clomethiazole manifested itself as a shortening of sleep latency, a significant increase in sleep efficiency, a decrease in the number of wake periods and a slight increase in total sleep time. Slight indications of withdrawal effects on sleep latency and the number of wake periods were noted.

With regard to sleep architecture the ANOVA revealed a significant effect on stage 2 (%SPT). Upon discontinuation of clomethiazole, there was a slight (first withdrawal night), respectively a significant (second withdrawal night) decrease in stage 2 (%SPT).

With regard to REM sleep the ANOVA revealed significant effects on REM latency, REM density and REM pressure. Clomethiazole exhibited REM sleep-suppressing effects which include a significant increase in REM

latency and a significant decrease in REM pressure. A slight increase in REM density during the second withdrawal night indicated a rebound phenomenon.

Subjective measures of sleep

With regard to SF-A the ANOVA revealed significant effects on sleep quality, total sleep time and sleep efficiency. Under clomethiazole a slight increase in the quality of sleep as well as a significant increase in total sleep time and sleep efficiency were observed (Table 2).

Analysis in terms of half-nights (Table 3) (1st and 2nd halves of the recording)

While with regard to the second half of the night the ANOVA revealed no significant effects at all; with regard to the first half of the night there were indeed significant effects on total sleep time, stage 1 (% SPT), stage 2 (% SPT) and REM density (Table 3). The hypnotic effects of clomethiazole became evident as a significant increase in the total sleep time, a significant (second treatment night), respectively a slight decrease (first treatment night) in the number of wake periods and a significant increase in stage 2 (% SPT). Moreover, the REM-suppressing effect of clomethiazole showed as a slight (first treatment night), or significant decrease (second treatment night) respectively in REM density. On the second withdrawal night there were indications of a rebound phenomenon in terms of a slight increase in REM density and a significant decrease in stage 2 (% SPT).

Psychopathometry (BDI, STAI, CIWA)

The respective values at T1 (baseline) and T5 (withdrawal night 1) were within the normal range and did not differ significantly (data not shown).

Discussion

The data presented in this study underscore the pronounced hypnotic effect of clomethiazole described earlier (Dehlin 1986; Bayer et al. 1986; Overstall and Oldman 1987; Pathy et al. 1986).

The subjective assessment of the hypnotic effects correlates with the results of the polysomnogram. The effect of clomethiazole on the sleep EEG was most obvious during the first half of the night, in keeping with its relatively short half-life (4 hours). The analysis of the polysomnogram in terms of each half of the night did not indicate a rebound phenomenon during the second half of the night. Thus, for clomethiazole, a bi-phasic course on sleep, such as the one found following alcohol (Gann et al. 2004), could not be verified. However, similar to alcohol, three days after discontinuation of even a relatively low dosis of clomethiazole rebound phenomena occurred indicating that, similar to alcohol and benzodiazepines, clomethiazole also induces adaptive changes in neurotransmission that persist for some time after the drug is withdrawn. Similar to alcohol these rebound effects of clomethiazole mainly consisted of arousal reactions that manifest, e. g. as sleep disruption, and may be subjectively experienced as withdrawal symptoms.

The hypnotic effects of clomethiazole are accompanied by a REM sleep-suppressing component that is reminiscent of that observed under the acute influence of alcohol (Roehrs et al. 1999). After discontinuation of the drug rebound effects manifest also with regard to REM sleep as evident from the increase in REM density (Table 3). Similarly, increased REM sleep pressure is well documented also after alcohol withdrawal (Gann et al. 1997, 1998, 1999, 2001, 2002; Gillin et al. 1994). Thus there are close similarities between alcohol and clormethiazole in both their acute effects on REM sleep and in the manifestation of REM rebound phenomena after withdrawal. Therefore neurobiological actions common to both compounds such as reinforcement of $GABA_A$-receptor mediated neuronal inhibition (Aguayo 2002; Nelson et al. 2002; Usala et al. 2003) could be involved in these actions. Indeed, recent findings indicate that GABAergic neurotransmission plays a prominent role in the regulation of REM and nonREM sleep (for review see Pace-Schott and Hobson 2002).

Subjectively experienced sleep latency and polysomnographically assessed sleep latency have been shown to be of predictive value for the course of alcohol dependence. Two polysomnography studies found a correlation between prolonged sleep latency and an increased risk of relapse (Brower et al. 1998; Drummond et al. 1998). With respect to subjectively measured sleep latency, similar results were observed (Brower et al. 1998; Foster and Peters 1999). In a similar vein, a predictive value for an increased risk of relapse was described for the polysomnographic variables total sleep time and sleep efficiency (Clark et al. 1998; Drummond et al. 1998).

The findings of our study in healthy probands show that at least with respect to effects on sleep clomethiazole appears to share several properties with alcohol, the drug which is meant to be substituted, including the provocation of withdrawal symptoms. Indeed, the well known propensity of clomethiazole to cause addiction (Gregg and Akther 1979; Reilly 1976) may be worsened or even partially mediated by the sleep disturbances elicited by withdrawal of the drug. Furthermore, there are clinical experience reports which describe a development of a sleep apnea syndrome under treatment with clomethiazole (Kaldune et al. 1999; Grace J 1999). This underscores the need to administer clomethiazole in doses individually tailored to the respective alcohol withdrawal syndrome. In many cases there will be no need for medication support of the withdrawal process, which is in contrast to the frequent practice of administering clomethiazole in standardized dosages to alcohol-dependent patients as a prophylactic against alcohol withdrawal symptoms.

Table 2 Objective and subjective sleep variables (mean ± SD) with regard to the entire night

		ANOVA			Baseline mean±SD	Clomethiazole 1 mean±SD	p	Clomethiazole 2 mean±SD	p	Clomethiazole 3 mean±SD	p	Withdrawal 1 mean±SD	p	Withdrawal 2 mean±SD	p
		df	F	p											
Sleep continuity															
Sleep latency (min, logarithmic transformation)	log. transf.	3.08; 27.73	6.15	**0.002**	1.201±0.34	1.118±0.37	0.600	**0.915±0.33**	**0.032**	0.942±0.37	0.059	1.376±0.40	0.149	1.318±0.25	0.072
Total sleep time (min)		2.63; 23.67	2.82	0.067	448.55±14.14	443.85±28.61	0.616	460.05±13.96	0.060	455.25±15.34	0.311	427.30±41.97	0.127	424.35±52.43	0.177
Sleep efficiency (%)	log. transf.	3.08; 27.70	4.94	**0.007**	0.87±0.16	0.862±0.30	0.938	**0.676±0.20**	**0.014**	0.755±0.25	0.238	0.996±0.27	0.143	0.991±0.29	0.147
Number of wake periods (SPT)		5.45	2.92	**0.023**	12.34±5.27	10.72±5.90	0.324	10.16±4.61	0.169	11.08±3.37	0.402	15.04±5.79	0.086	12.79±6.8	0.812
Early morning awakenings (min)		1.33; 11.97	0.86	0.404	0.90±1.29	4.40±12.17		1.60±3.49		1.35±3.27		0.00±0.00		0.15±0.34	
Sleep architecture															
Awake (% SPT)	log. transf.	1.92; 17.24	2.30	0.132	0.54±0.16	0.585±0.27		0.437±0.17		0.541±0.26		0.616±0.28		0.666±0.41	
Stage 1 (% SPT)		2.40; 21.61	1.73	0.197	5.54±2.57	5.56±2.05		5.3±1.59		6.11±2.05		7.02±1.79		6.23±1.38	
Stage 2 (% SPT)		2.76; 24.87	7.84	**0.001**	57.98±4.57	57.42±7.12	0.819	60.8±5.14	0.146	60.10±4.20	0.227	54.42±5.41	*0.061*	**52.23±6.38**	**0.016**
SWS (% SPT)		2.26; 20.33	1.99	0.158	10.62±6.16	9.99±6.99		9.8±6.89		8.69±5.35		10.70±6.15		12.22±5.89	
REM sleep															
REM (% SPT)		3.39; 30.49	0.59	0.645	22.53±5.20	22.75±5.34		21.43±3.77		21.26±5.76		23.17±5.44		21.71±7.28	
REM density		2.99; 26.87	4.12	**0.016**	24.43±3.81	22.55±4.47	0.310	22.59±1.85	0.194	22.31±5.586	0.297	26.08±4.92	0.496	*28.31±5.34*	0.060
REM latency		3.18; 28.61	4.92	**0.006**	75.85±39.56	93.20±48.02	0.098	**129.45±58.13**	**0.009**	**114.60±53.40**	**0.015**	79.75±31.41	0.834	67.40±14.94	0.522
REM pressure		3.31; 29.81	3.05	**0.039**	0.24±1.04	0.08±1.02	0.561	**–0.58±1.22**	**0.031**	**–0.38±1.23**	**0.027**	0.30±1.94	0.891	0.25±1.02	0.990
SFA															
Sleep quality		2.23; 20.89	4.19	**0.025**	3.84±0.53	3.9±0.48	0.620	4.25±0.36	0.063	4.16±0.47	0.169	3.48±0.87	0.166	3.7±0.55	0.331
Feeling rested in the morning		2.25; 20.28	1.93	0.168	3.21±0.57	3.51±0.46		3.55±0.49		3.41±0.49		3.18±0.79		3.45±0.54	
Feeling well-balanced in the morning		2.48; 22.34	0.43	0.696	3.64±0.78	3.74±0.68		3.88±0.52		3.84±0.72		3.18±0.79		3.7±0.81	
Exhaustion in the evening		2.77; 24.88	1.33	0.286	2.38±0.81	2.3±0.47		2.46±0.54		2.54±0.67		3.76±0.83		2.02±0.54	
Psychosomatic symptoms		3.09; 27.76	1.57	0.219	1.28±0.29	1.26±0.27		1.14±0.19		1.22±0.2		2.24±0.86		1.38±0.51	
Total sleep time (min)		2.11; 18.9	3.32	**0.056**	453.4±11.23	437.7±47.66	0.269	**465.7±12.64**	**0.047**	**472.4±25.09**	**0.031**	428.8±45.76	0.112	443.8±21.24	0.134
Sleep efficiency (%)	log. transf.	2.18; 19.62	6.56	**0.006**	0.79±0.17	0.85±0.28	0.281	**0.51±0.24**	**0.005**	**0.54±0.29**	**0.030**	0.91±0.36	0.358	0.87±0.21	0.270

SPT Sleep period time; *SFA* Sleep questionnaire according to Görtelmeyer (see Methods)

Table 3 Objective sleep variables (mean±SD) concerning first and second half of the night

	ANOVA			Baseline		Clomethiazole 1			Clomethiazole 2			Clomethiazole 3			Withdrawal 1			Withdrawal 2		
	df	F	p	mean	SD	mean	SD	p	mean	SD	p	mean	SD	p	mean	SD	p	mean	SD	p
1st half of the night																				
Sleep continuity																				
Total sleep time (min)	2.93; 26.40	3.47	**0.031**	223.75	8.79	223.95	13.84	0.959	**231.20**	**6.81**	**0.040**	**230.65**	**6.02**	**0.042**	217.00	20.08	0.269	218.15	11.91	0.174
Sleep efficiency (%)	1.59; 14.26	2.28	0.145	97.20	1.53	97.41	2.56		98.68	1.06		98.34	1.54		97.57	1.68		95.82	4.73	
Number of wake periods	2.63; 23.65	3.04	*0.055*	7.40	4.53	5.80	4.37	0.175	**4.40**	**4.01**	**0.040**	*4.50*	*4.25*	*0.091*	7.70	6.29	0.814	8.50	6.31	0.389
Sleep architecture																				
Awake (% SPT)	1.57; 14.09	2.26	0.147	2.70	1.56	2.54	2.52		1.25	1.06		1.60	1.54		2.37	1.70		4.11	4.75	
Stage 1 (% SPT)	2.92; 26.32	3.26	**0.038**	4.76	3.30	3.92	1.59	0.401	*3.12*	*1.52*	*0.099*	3.85	1.54	0.339	5.55	1.96	0.337	4.87	2.31	0.881
Stage 2 (% SPT)	3.04; 27.36	8.10	**0.000**	60.11	5.56	61.67	9.03	0.545	64.76	10.54	0.149	**65.98**	**7.32**	**0.048**	57.98	7.82	0.265	**55.03**	**7.51**	**0.013**
SWS (% SPT)	2.76; 24.85	1.09	0.367	17.32	9.27	17.86	12.03		17.73	12.71		16.18	9.85		18.12	10.37		20.51	9.50	
REM sleep																				
REM (% SPT)	3.55; 31.98	1.86	0.147	14.66	4.25	13.40	3.84		12.46	4.26		11.71	4.77		15.27	4.40		14.68	5.47	
REM density	3.56; 32.38	6.51	**0.001**	21.12	5.25	18.00	4.37	0.077	15.49	4.50	**0.033**	**15.79**	**6.29**	**0.045**	22.63	5.90	0.589	26.81	8.535	0.091
2nd half of the night																				
Sleep continuity																				
Total sleep time (min)	1.82; 16.36	2.22	0.143	223.50	5.82	219.20	15.90		227.95	7.47		223.85	10.77		209.55	23.28		205.35	41.80	
Sleep efficiency (%)	1.11; 9.95	1.27	0.293	97.13	1.68	95.34	4.09		97.29	1.76		95.44	4.16		94.24	6.03		90.26	18.36	
Number of wake periods	2.83; 25.44	1.59	0.217	7.80	4.10	12.30	9.91		8.00	4.47		11.10	9.34		10.30	9.06		9.40	6.22	
Sleep architecture																				
Awake (% SPT)	1.11; 9.95	1.27	0.293	2.77	1.68	4.61	4.08		2.63	1.74		4.50	4.13		5.69	6.05		9.66	18.35	
Stage 1 (% SPT)	2.06; 18.54	1.37	0.274	6.31	2.49	7.22	3.05		7.48	2.69		8.36	2.79		8.49	2.15		7.62	1.17	
Stage 2 (% SPT)	2.75; 24.77	1.90	0.159	55.77	6.00	53.12	7.53		56.91	5.71		54.30	7.40		50.95	4.40		49.44	10.28	
SWS (% SPT)	2.26; 20.31	2.30	0.121	3.98	5.19	2.13	2.99		1.87	2.46		1.16	2.12		3.27	3.33		3.93	3.71	
REM sleep																				
REM (% SPT)	3.57; 32.11	0.29	0.862	30.44	8.19	32.10	9.47		30.35	7.13		30.81	9.58		30.96	7.46		28.68	10.91	
REM density	2.93; 4.50	1.49	0.242	25.67	4.61	24.69	5.78		25.50	2.60		24.80	6.55		27.49	5.31		28.80	4.27	

SPT Sleep period time

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