

Activité Physique et Qualité du Sommeil

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18^e congrès de pneumologie

de langue française

Oncologie thoracique — Sommeil

Marseille — Parc Chanot
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au dimanche 3 février 2014

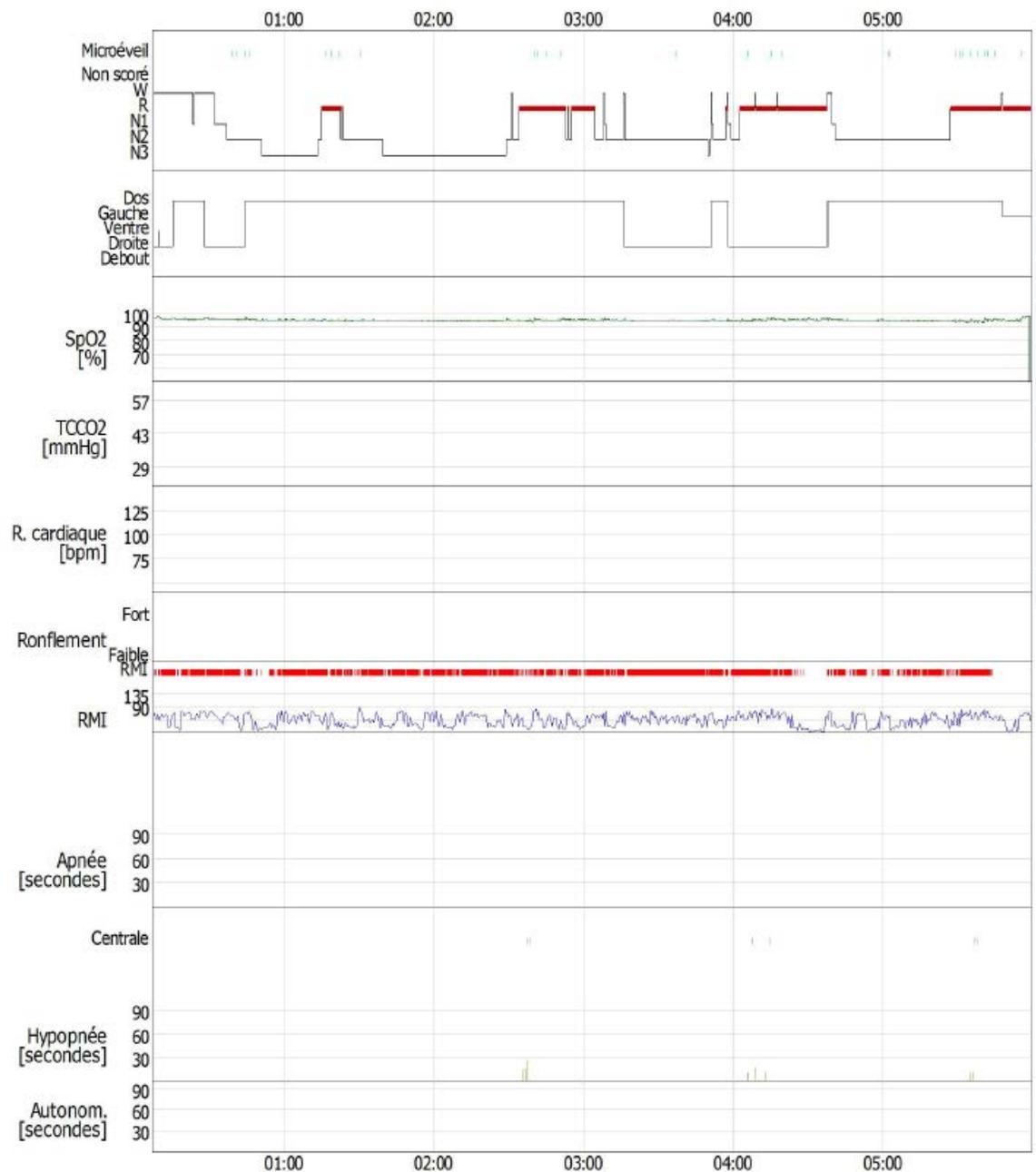
Déclaration de liens d'intérêts

J'ai actuellement, ou j'ai eu au cours des trois dernières années, une affiliation ou des intérêts financiers ou intérêts de tout ordre avec les sociétés commerciales suivantes **en lien avec la santé**.

- Philips-Respironics (financement protocole recherche; consultant; financement congrès)
- AGIR à dom. (Salaire, financement protocole de recherche)

CP9, VENTILATION NON INVASIVE

Jeune femme 27 ans; Fumeuse 13 pqts*année; IMC = 22.1 kg.m⁻²



Architecture du sommeil:

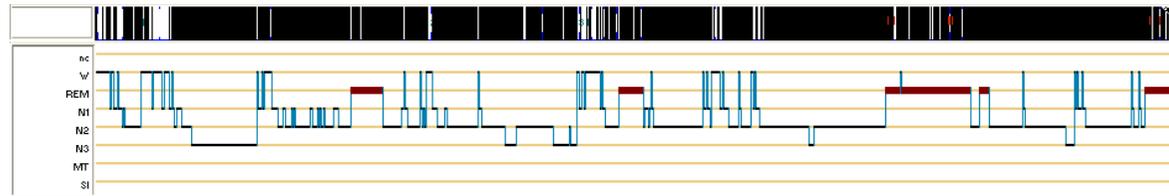
	Durée (min)	% TST	% PST
Latence (S1)	16.4		
PST	353		
TST	322		
Eveil intra sommeil	30.4	-	4.2%
Stade 1	9	2.8%	2.7%
Stade 2	137	42.5%	40.8%
Stades 1+2 (SLL)	146	45.3%	43.5%
Stades 3 (SLP)	72.5	22.5%	21.6%
REM	103.6	32.2%	30.8%

Microstructure du sommeil:

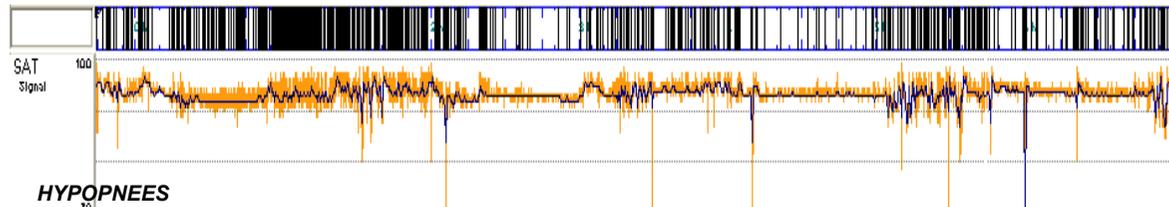
	Total	Index TST
µéveils mouvements	0	0
µéveils respiratoires	2	0.4
Réactions d'éveils non spécifiques	28	5.2

Femme 49 ans; IMC = 49.4 kg.m⁻²

HYPNOGRAMME



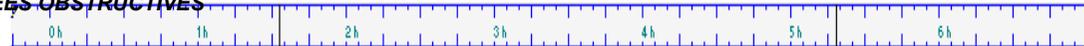
OXYMETRIE



HYPOPNEES



APNEES OBSTRUCTIVES



APNEES MIXTES



HYPOPNEES CENTRALES



HYPOPNEES MIXTES



RONFLEMENTS



REACTIONS D'EVEIL



Architecture du sommeil:

	Durée (min)	% TST	% PST
Latence S1	6		
PST	433		
TST	394		
Eveil intra sommeil	38	-	9%
Stade 1	44	11,17%	10,16%
Stade 2	230	58,38%	53,12%
Stades 1+2 (SLL)	274	69,54%	63,28%
Stades 3 (SLP)	45	11,42%	10,39%
REM	73	18,53%	16,86%

Microstructure du sommeil:

	Total	Index TST
μéveils mouvements	64	9,75
μéveils respiratoires	146	22,23
Réactions d'éveils non spécifiques	63	9,59

Architecture du sommeil:

	Durée (min)	% TST	% PST
Latence S1	16.4		
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Microstructure du sommeil:

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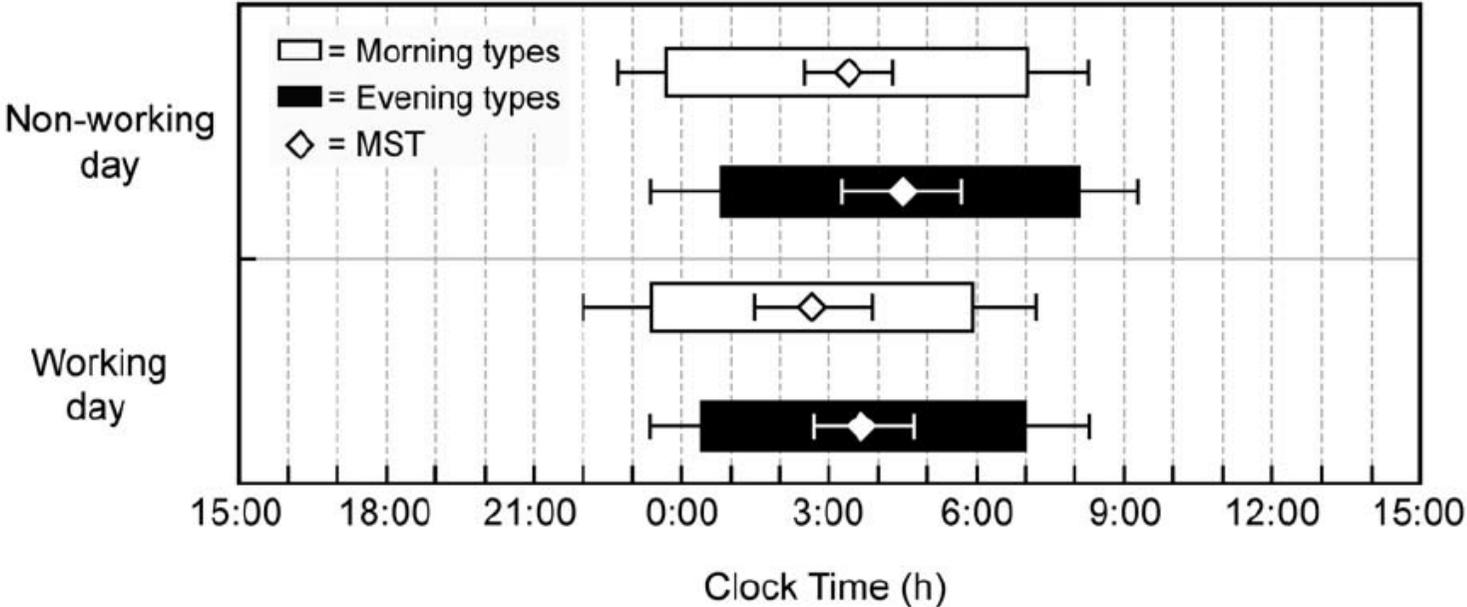
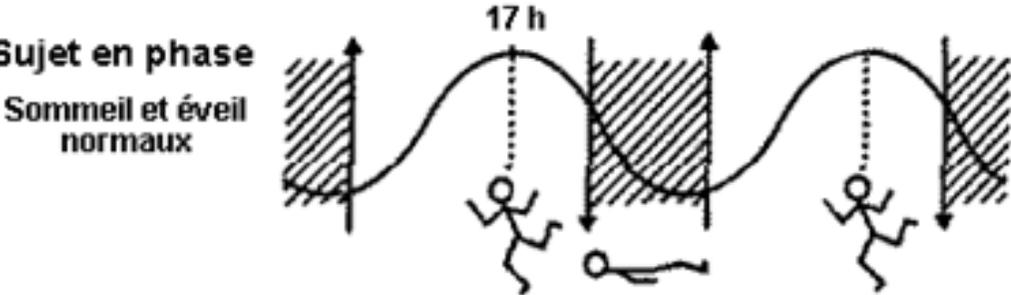
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Rythme circadien et Chronotype

Alternance
JOUR/NUIT



Alternance Veille/Sujet en phase
sommeil



Chronotype

MCTQ - Main Page - Windows Internet Explorer

https://www.bioinfo.mpg.de/mctq/core_work_life/core/introduction.jsp?language=eng

File Edit View Favorites Tools Help

MCTQ - Main Page

Ludwig-Maximilians-Universität München
Institut für Medizinische Psychologie
Goethestr. 31 D-80336 München

 **MUNICH CHRONOTYPE QUESTIONNAIRE**

How and why does the biological clock tick? We all know that individuals show distinct preferences for various activities over the course of a day. A simple example is the time at which an individual prefers to go to bed and to get up. With the help of this questionnaire, we aim to understand the underlying complexity of the biological clock and individual differences in the biological clock, as shown in everyday behaviour. Once your questionnaire has been submitted, an automatic evaluation of your CHRONOTYPE (your personal profile) will be sent to you via email. You will see how your results compare to the ones of more than 50,000 other individuals that have so far filled out the questionnaire. After submission of your questionnaire, you will also be provided with a link to relevant literature. If you are interested in this feedback, make sure to provide a correct email address.

We kindly ask you to provide your name and address to enable us to contact you again in case your CHRONOTYPE is of particular interest to our study. Please also give your exact postal code, so that we can compare chronotypes living in different geographical locations (longitude and latitude).

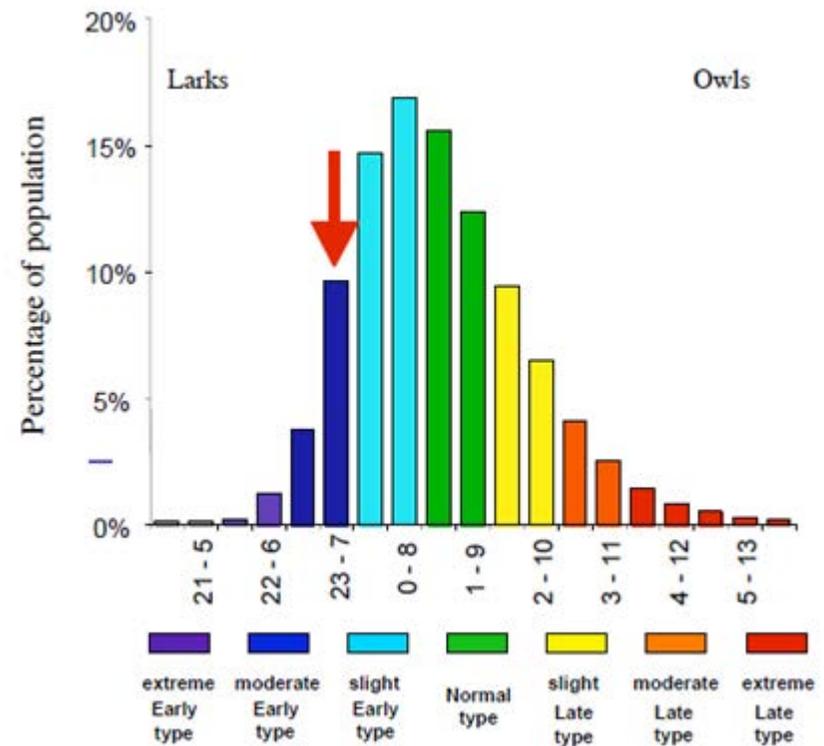
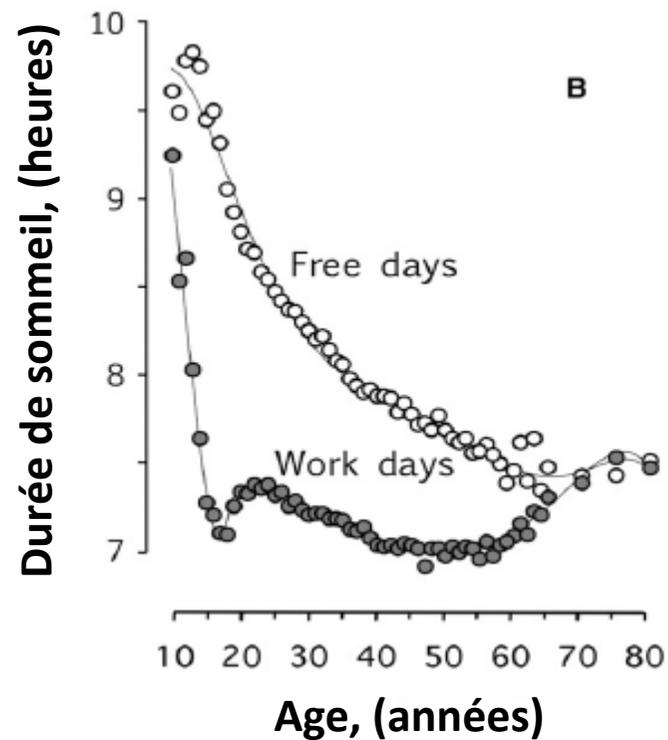
We ask you to provide information as to your age, height and weight, in order to see whether these influence your sleep habits. ALL personal information is strictly protected by the rules of the University of Munich Ethics Commission and will not be visible during data analysis. Your address can only be accessed by Prof. Roenneberg and will only be retrieved in case we are interested in more specific information from your part. Please read the separate document about confidentiality prior to filling out the questionnaire.

Done

Internet 105%

Démarrer E:\Exercice e... Connexion ré... Activité-Physi... Physical activi... The effect of ... Chronobiolog... google - Yaho... MCTQ - Mai... Sans titre - P... 07:00

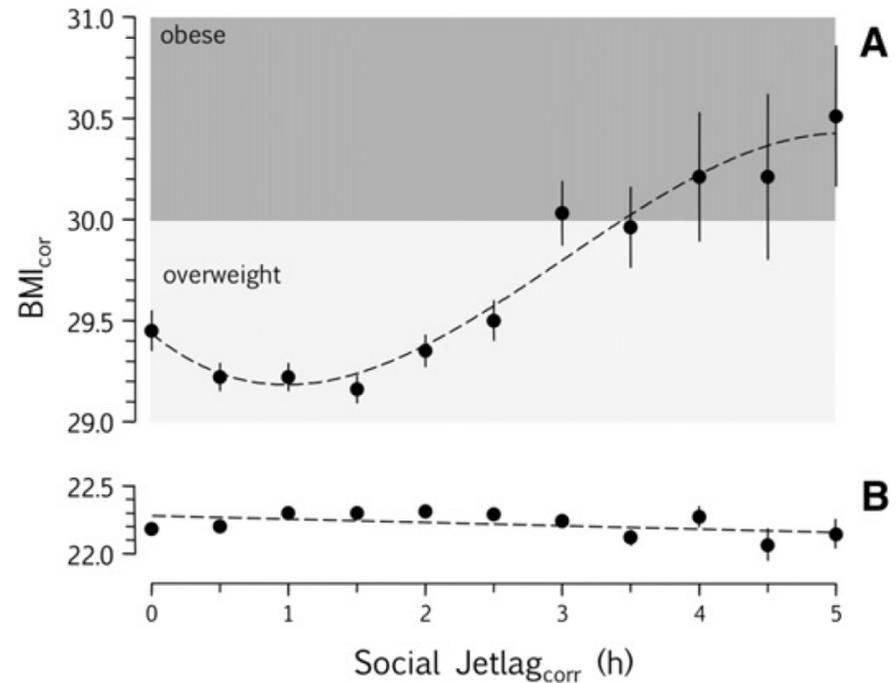
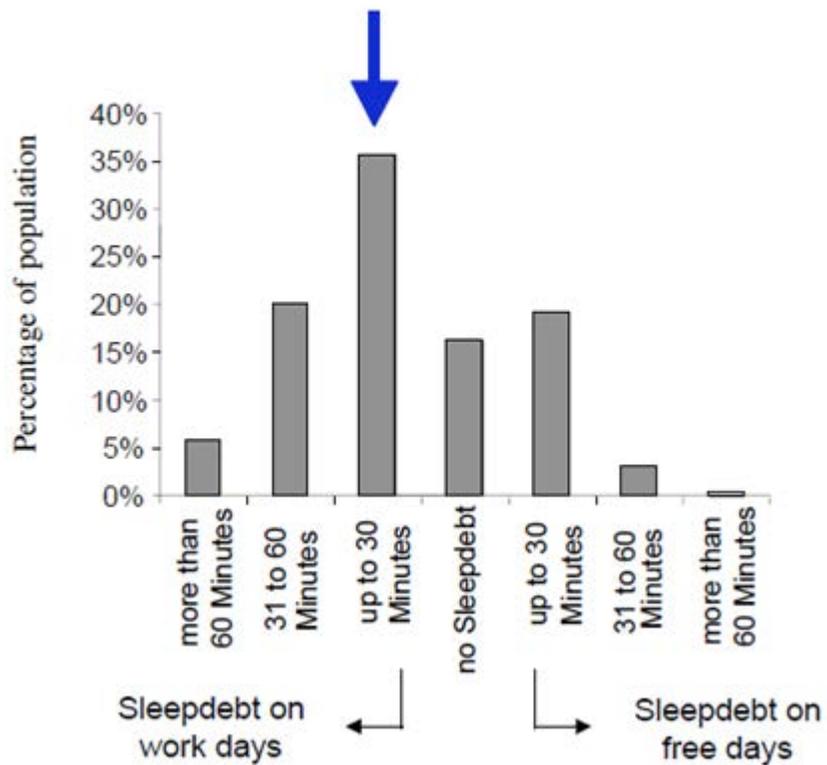
Chronotype



N= 20735 sujets avec BMI ≥ 25

N= 43308 sujets avec BMI < 25

Chronotype et Décalage horaire « Social » et Obésité



N= 20735 sujets avec BMI \geq 25
N= 43308 sujets avec BMI < 25

Roenneberg T, Current Biology 2012. 22, 939–943

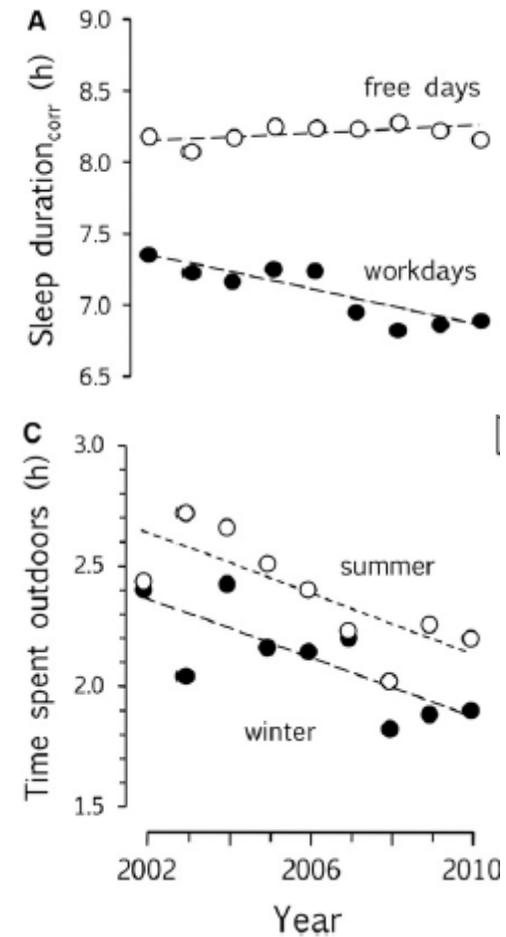
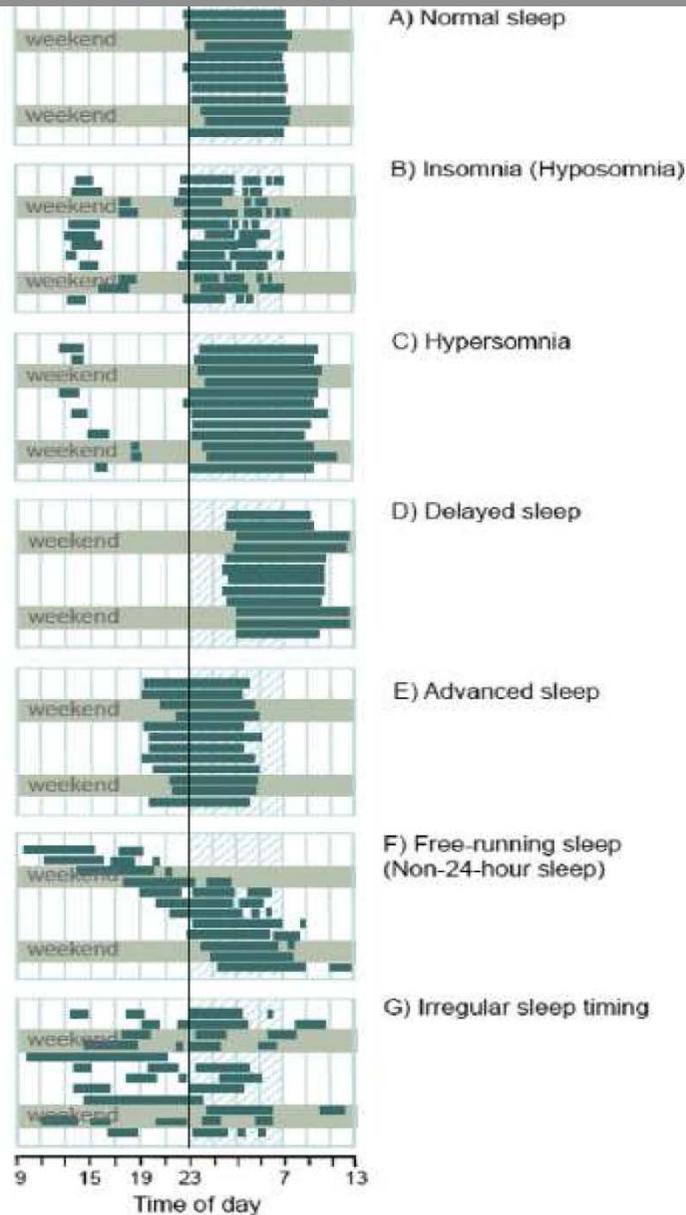
Chronotype et Décalage horaire « Social »



http://www.youtube.com/watch?v=iZ_VH2Zh1IU

https://www.bioinfo.mpg.de/mctq/core_work_life/core/introduction.jsp?language=eng

Durées de sommeil



**Activité
physique**



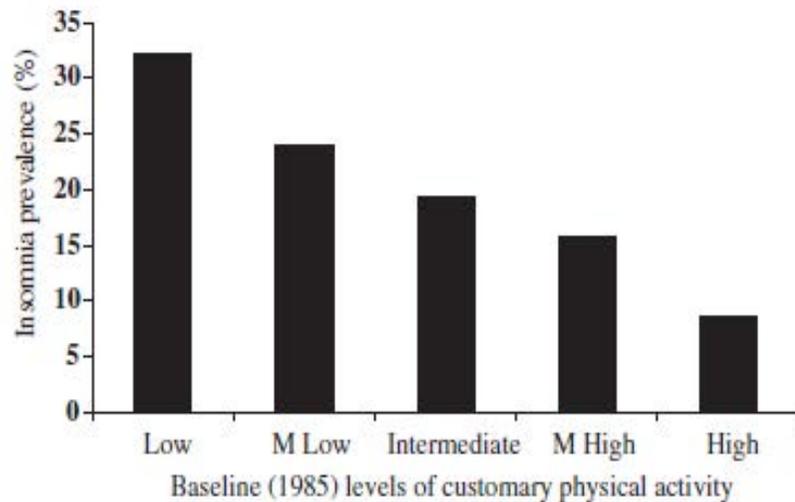
Sommeil

**Organisation du sommeil:
(Rythme Circadien, chronotype,
durée de sommeil)**

**Architecture du
sommeil**

**Micro-structure
du sommeil**

Activité physique basse, facteur de risque d'une mauvaise qualité de sommeil



[Morgan K et al. J Sleep Res. 2003;12:231-8.](#)

- Etudes « épidémiologiques » : corrélation >0 entre qualité du sommeil (subjectif) et activité physique
- **Mais**
- Les sujets qui ont une activité physique régulière présentent style de vie plus favorables à un meilleur sommeil (- tabac, - alcool...)
- Covariant(s) associé(s) à l'activité physique
Ex: exposition à la lumière du jour lors d'une activité physique extérieur
- Etudes expérimentales sont nécessaires pour étayer le rôle propre de l'activité physique

**Activité
physique**



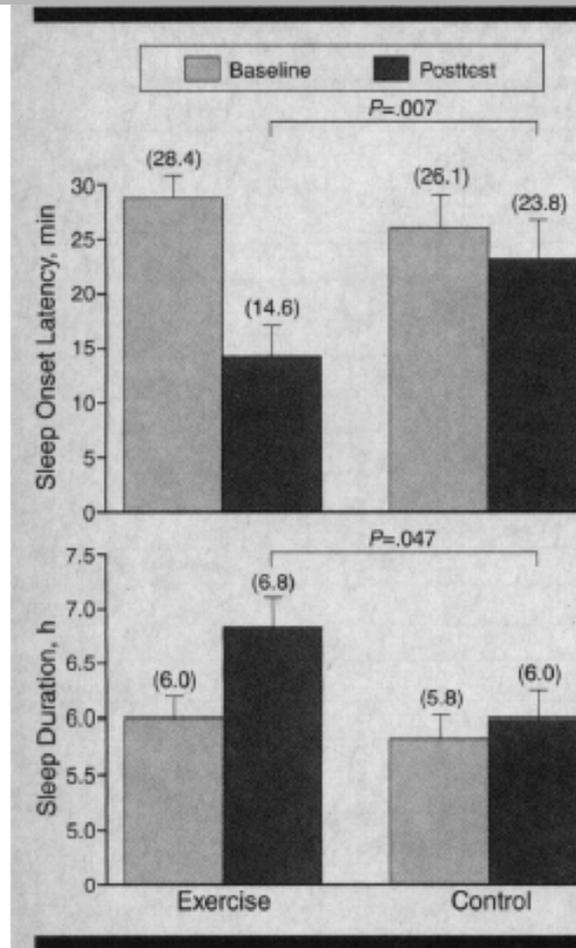
Sommeil

Effet d'un exercice en endurance chez des sujets sédentaires (non SAOS) 16 semaines; 30-60 min; 4/ semaines (60% Fcmax)....avant le diner

Sédentaires
Sans évidence;
-patho cardio-vasculaires
-troubles respiratoires du sommeil;
-psychiatrique, neuro-μ,
Musculo-squelettique

Variables	Exercise		Control	
	Women (n=12)	Men (n=8)	Women (n=17)	Men (n=6)
Age, y	62.4 (6.4)	62.3 (8.4)	61.2 (7.5)	58.8 (5.6)
High school education or greater (frequency)	12	8	17	6
Global sleep quality index (PSQI)	8.8 (3.4)	8.5 (2.3)	9.2 (2.7)	7.8 (4.2)
16-wk change (P<.001)	-3.0 (2.4)	-3.6 (3.4)	0.4 (2.8)	-0.5 (1.9)
Sleep-onset latency, min (PSQI)	31.0 (22.2)	21.1 (17.2)	26.8 (20.3)	23.8 (19.3)
16-wk change (P=.007)	-15.2 (12.3)	-13.7 (13.0)	-2.2 (14.1)	-2.7 (12.0)
Sleep duration, h (PSQI)	6.2 (1.1)	5.5 (1.1)	5.7 (1.2)	6.2 (1.0)
16-wk change (P=.05)	0.7 (1.1)	1.2 (1.4)	0.2 (1.2)	0.2 (0.4)
Subjective sleep quality rating (PSQI)	1.5 (0.5)	1.5 (0.5)	1.9 (0.8)	1.5 (0.8)
16-wk change (P=.03)	-0.6 (0.7)	-0.3 (0.5)	-0.2 (0.7)	0.0 (0.0)
Habitual sleep efficiency rating (PSQI)	1.1 (1.2)	1.4 (1.2)	1.5 (1.2)	1.0 (1.1)
16-wk change (P=.08)	-0.5 (1.1)	-0.8 (1.4)	0.0 (0.8)	-0.2 (0.5)
Sleep efficiency, %†	78.7 (13.9)	76.7 (16.8)	74.0 (16.2)	79.7 (13.4)
16-wk change (P=.04)	9.0 (12.9)	8.8 (12.9)	2.5 (15.5)	2.1 (5.1)
Mean sleep disturbances rating (PSQI)	1.6 (0.6)	1.4 (0.5)	1.3 (0.6)	1.0 (0.1)
16-wk change (P=.22)	-0.3 (0.5)	-0.3 (0.5)	0.1 (0.6)	0.0 (0.0)
Mean daytime dysfunction rating (PSQI)	1.2 (0.8)	1.1 (0.6)	1.2 (0.6)	1.8 (0.8)
16-wk change (P=.08)	-0.8 (0.8)	-0.5 (0.5)	-0.3 (0.5)	-0.6 (0.8)
Mean sleep medication rating (PSQI)	0.56 (0.89)	0.21 (0.46)	0.44 (0.92)	0.17 (0.41)
16-wk change (P=.25)	-0.50 (0.80)	-0.20 (0.46)	-0.27 (0.94)	-0.07 (0.46)
% Taking sleeping medications (prescribed or over-the-counter)	33.3	12.5	29.4	16.7
16-wk change (P=.35)	-8.3	-12.5	0.0	0.0
Total daily naptime, min	17.1 (18.7)	14.4 (18.7)	10.6 (16.4)	14.4 (12.4)
16-wk change (P=.33)	-7.6 (19.4)	-9.8 (16.2)	-1.9 (12.5)	-5.8 (15.3)
Mean alcoholic drinks consumed per day (sleep diary)	0.14 (0.35)	0.50 (0.76)	0.17 (0.38)	0.60 (0.89)
16-wk change (P=.47)	0.00 (0.00)	0.00 (0.54)	-0.06 (0.42)	0.00 (0.00)
Mean caffeinated drinks consumed per day (sleep diary)	1.67 (1.68)	0.88 (1.73)	0.94 (1.06)	2.00 (1.41)
16-wk change (P=.33)	0.25 (1.22)	-0.25 (0.46)	-0.05 (0.46)	-0.00 (0.71)
VO ₂ max, mL·min ⁻¹ ·kg ⁻¹	21.1 (3.7)	25.8 (4.5)	21.8 (4.4)	25.0 (6.4)
16-wk change (P=.05 for women)	0.8 (3.5)	1.7 (4.1)	-1.3 (3.2)	-0.8 (5.7)
Treadmill duration, min	13.8 (3.9)	18.2 (5.2)	14.4 (4.7)	16.7 (4.4)
16-wk change (P=.39)	0.7 (3.7)	1.0 (2.0)	-1.5 (3.5)	0.5 (2.0)
Mean exercise adherence rate, %	92.2 (13.7)	97.3 (19.0)

Effet d'un exercice en endurance chez des sujets sédentaires (non SAOS)
30-60 min 4/ semaines (60-85% FCmax)....avant le diner



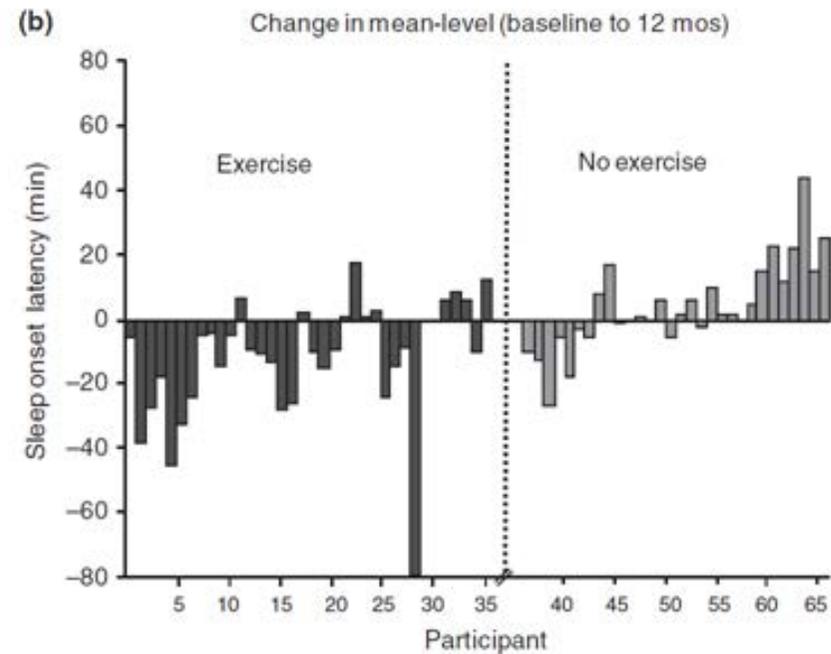
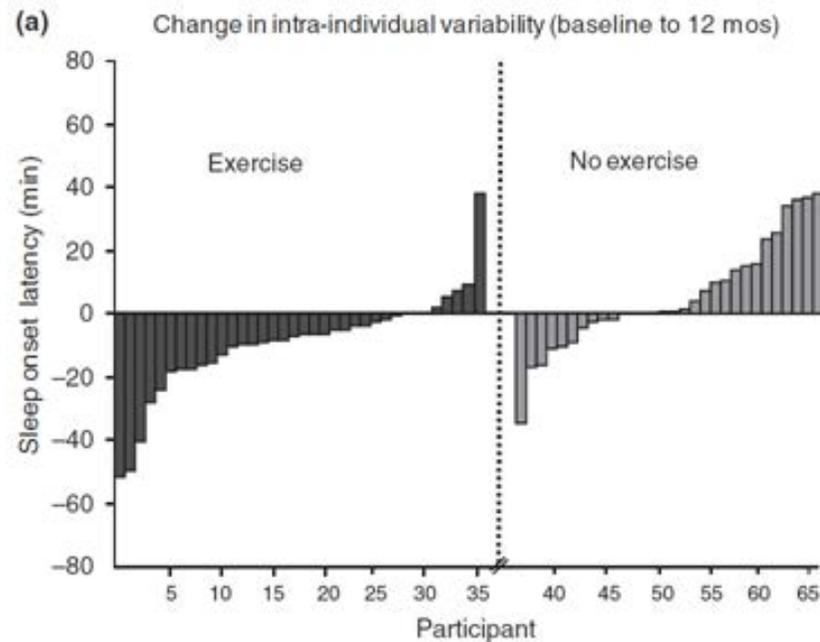
Amélioration sommeil
(PSQI) corrélée à
l'amélioration VO₂ max,
Adhérence exercice

King AC et al. JAMA. 1997;277:32-7

$\dot{V}O_2$ max, mL·min ⁻¹ ·kg ⁻¹	21.1 (3.7)	25.8 (4.5)	21.8 (4.4)	25.0 (6.4)
16-wk change (P=.05 for women)	0.8 (3.5)	1.7 (4.1)	-1.3 (3.2)	-0.8 (5.7)
Treadmill duration, min	13.8 (3.9)	18.2 (5.2)	14.4 (4.7)	16.7 (4.4)
16-wk change (P=.39)	0.7 (3.7)	1.0 (2.0)	-1.5 (3.5)	0.5 (2.0)
Mean exercise adherence rate, %	92.2 (13.7)	97.3 (19.0)

Effet d'un exercice en endurance chez des sujets sédentaires (non SAOS) 1an; 30-60 min; 4/ semaines

Réduction de la latence d'endormissement et de sa variabilité jour à jour.



Effet d'un exercice en résistance chez des sujets sédentaires (non SAOS) 30 à 45' d'effort en résistance (50% RM) Membres inf/sups/tronc

Table 2 – Description of the PSG parameters of the 2 nights (Basal and Exercise) to morning group

Morning	n	Basal	Exercise	p
SOL (min)	7	7.73 ± 4.65	18.27 ± 27.04	0.36
REM sleep latency (min)	7	87.29 ± 45.57	73.14 ± 18.70	0.32
TST (min)	7	367.79 ± 44.50	363.21 ± 54.12	0.64
Sleep efficiency (%)	7	86.23 ± 7.69	86.26 ± 7.54	0.99
Stage 1 (%)	7	4.46 ± 2.61	4.74 ± 2.76	0.78
Stage 2 (%)	7	53.80 ± 4.38	55.24 ± 4.86	0.52
Stage 3 (%)	7	3.59 ± 1.65	4.64 ± 2.85	0.22
Stage 4 (%)	7	17.67 ± 4.52	16.96 ± 4.92	0.57
SWS (Stage 3 + 4) (%)	7	21.26 ± 4.66	21.60 ± 4.95	0.82
REM sleep (%)	7	20.50 ± 6.03	18.43 ± 3.54	0.36
Wake (min)	7	50.61 ± 29.9	37.87 ± 21.2	0.42

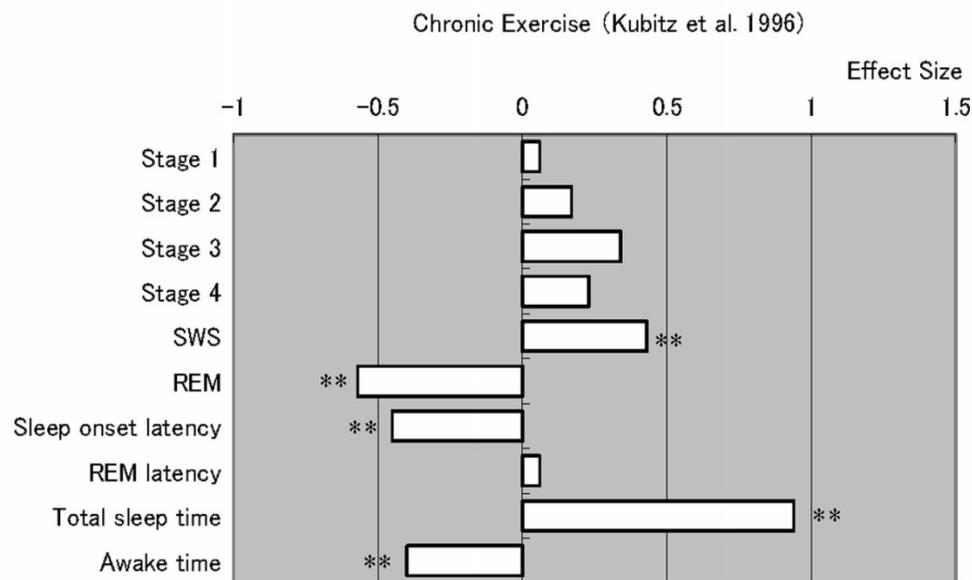
7h00-9h00 AM

Table 4 – Description of the PSG parameters of the 2 nights (Basal and Exercise) to evening group

Evening	n	Basal	Exercise	P
SOL (min)	10	6.59 ± 5.17	3.02 ± 4.15	0.06
REM sleep latency (min)	10	99.0 ± 39.12	86.41 ± 37.59	0.17
TST (min)	10	380.05 ± 35.75	383.26 ± 31.77	0.68
Sleep efficiency (%)	10	92.49 ± 3.27	94.21 ± 1.74	0.06
Stage 1 (%)	10	2.79 ± 1.61	2.46 ± 1.67	0.25
Stage 2 (%)	10	54.89 ± 4.42	55.02 ± 3.50	0.95
Stage 3 (%)	10	4.33 ± 1.69	4.17 ± 1.57	0.76
Stage 4 (%)	10	18.24 ± 5.15	18.04 ± 7.24	0.91
SWS (Stage 3 + 4) (%)	10	22.57 ± 5.30	22.21 ± 7.50	0.83
REM sleep (%)	10	19.74 ± 4.18	20.25 ± 6.14	0.78
Wake (min)	10	23.79 ± 8.92	20.33 ± 6.24	0.24

6h00-8h00 PM

Activité physique (endurance) programmée au long cours



- Amélioration TST
- Augmentation SL3
- Diminution Latence S1
- Efficace population adulte sédentaire, avec des plaintes de sommeil
- Réduction veille intra-sommeil

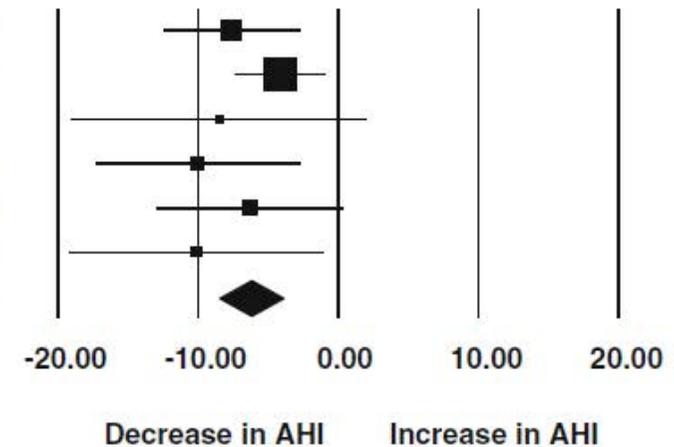
Impact d'une activité Physique programmée sur le SAOS (IAH) (sujets non traités par CPAP)

Study name

Statistics for each study

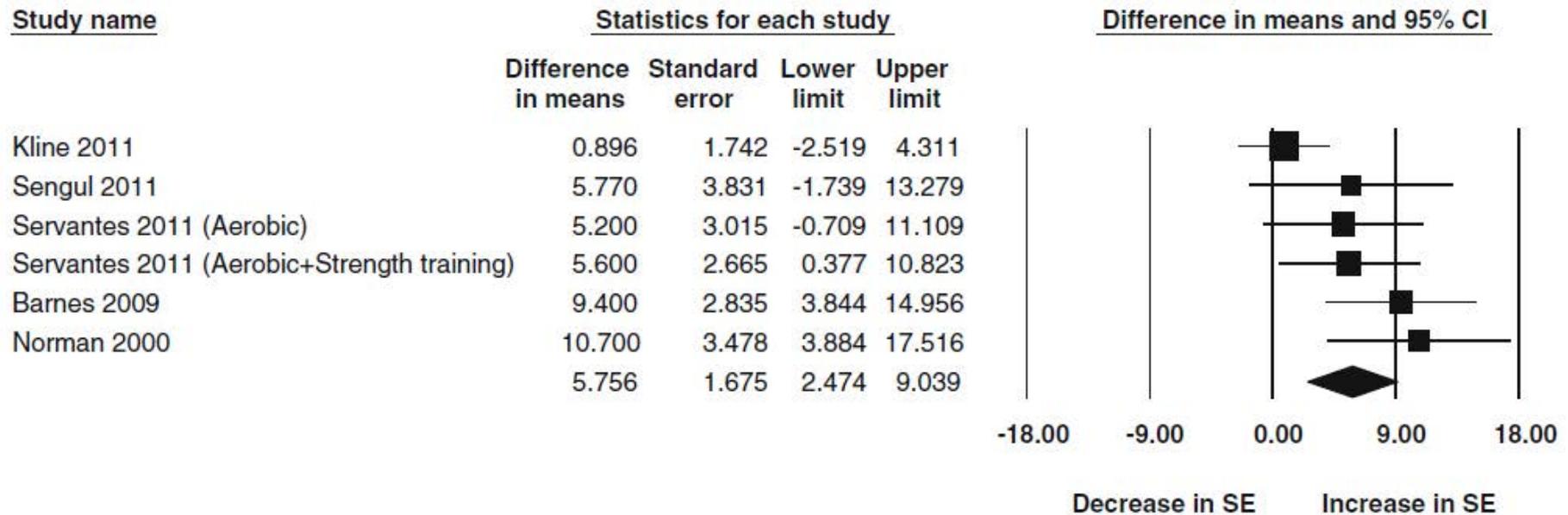
Difference in means and 95% CI

	Difference in means	Standard error	Lower limit	Upper limit
Kline 2011	-7.578	2.499	-12.475	-2.681
Sengul 2011	-4.180	1.694	-7.500	-0.860
Servantes 2011 (Aerobic)	-8.500	5.405	-19.094	2.094
Servantes 2011 (Aerobic+Strength training)	-10.000	3.739	-17.328	-2.672
Barnes 2009	-6.300	3.450	-13.061	0.461
Norman 2000	-10.100	4.687	-19.287	-0.913
	-6.272	1.159	-8.544	-3.999



Mean difference= -6.272 (95% CI: -8.544 to -3.999), p = 0.000

Impact d'une activité Physique programmée sur l'efficacité du sommeil (TST/ Temps passé au lit) chez des sujets SAOS (sujets non traités par CPAP)



Mean difference= -5.756 (95% CI: 2.474 to 9.039), p = 0.001

**Activité
physique**

Sommeil



Effet du traitement du SAOS (PPC) sur Activité physique

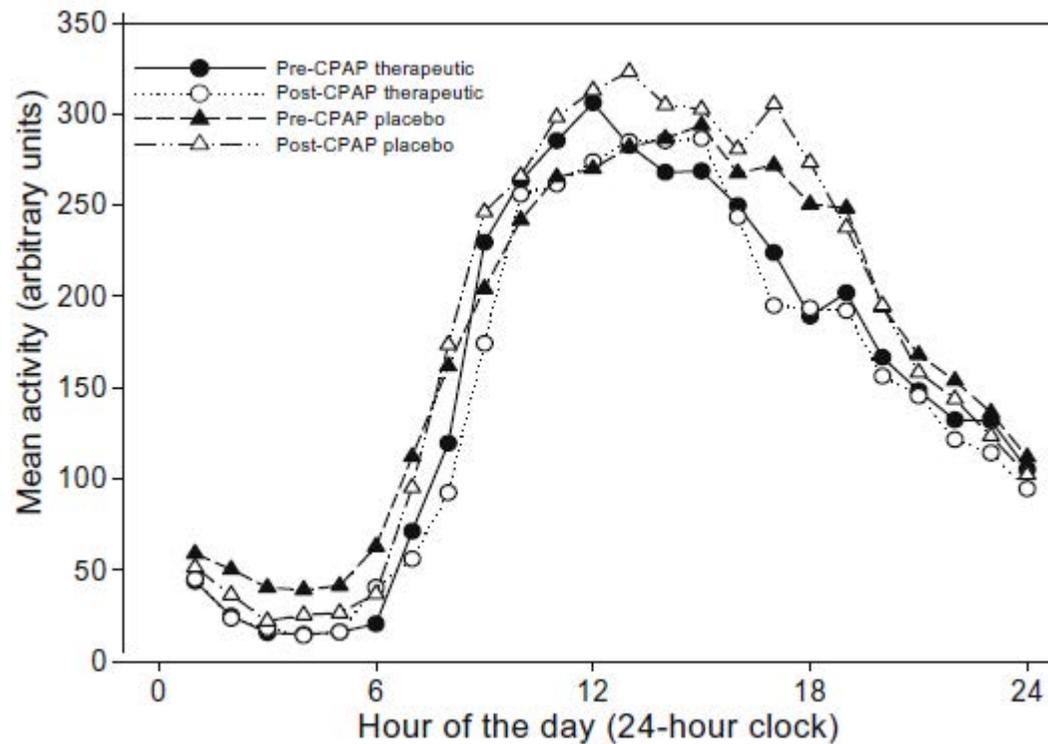
Table 1

Baseline measurements and changes from baseline in patients randomised to therapeutic and placebo CPAP.

	Baseline		Change from baseline		P value
	Therapeutic CPAP <i>n</i> = 16	Placebo CPAP <i>n</i> = 20	Therapeutic CPAP <i>n</i> = 16	Placebo CPAP <i>n</i> = 20	
Age (years)	57.2 (11.2)	54.1 (9.8)			
>4% SaO ₂ dips/hr	35.2 (20.5)	36.4 (19.8)			
ESS	13.4 (2.6)	13.3 (3.4)	-6.1 (4.4)	-2.8 (5.0)	0.04
OSLER (min)	23.5 (12.7)	33.9 (9.2)	+10.4 (14.4)	-5.0 (12.0)	0.003
BMI (kg/m ²)	37.4 (4.4)	36.2 (4.3)	-0.1 (0.9)	-0.2 (1.1)	0.6
Neck size (cm)	46.8 (1.9)	47.0 (2.7)	-0.2 (1.1)	-0.1 (1.4)	0.9
Waist to hip ratio	1.0 (0.04)	1.1 (0.1)	0 (0.3)	0 (0.4)	0.6

SaO₂, oxygen saturation dips; ESS, Epworth sleepiness score; OSLER, modified maintenance of wakefulness test; BMI, body mass index. *P* values are for comparisons of changes between the groups.

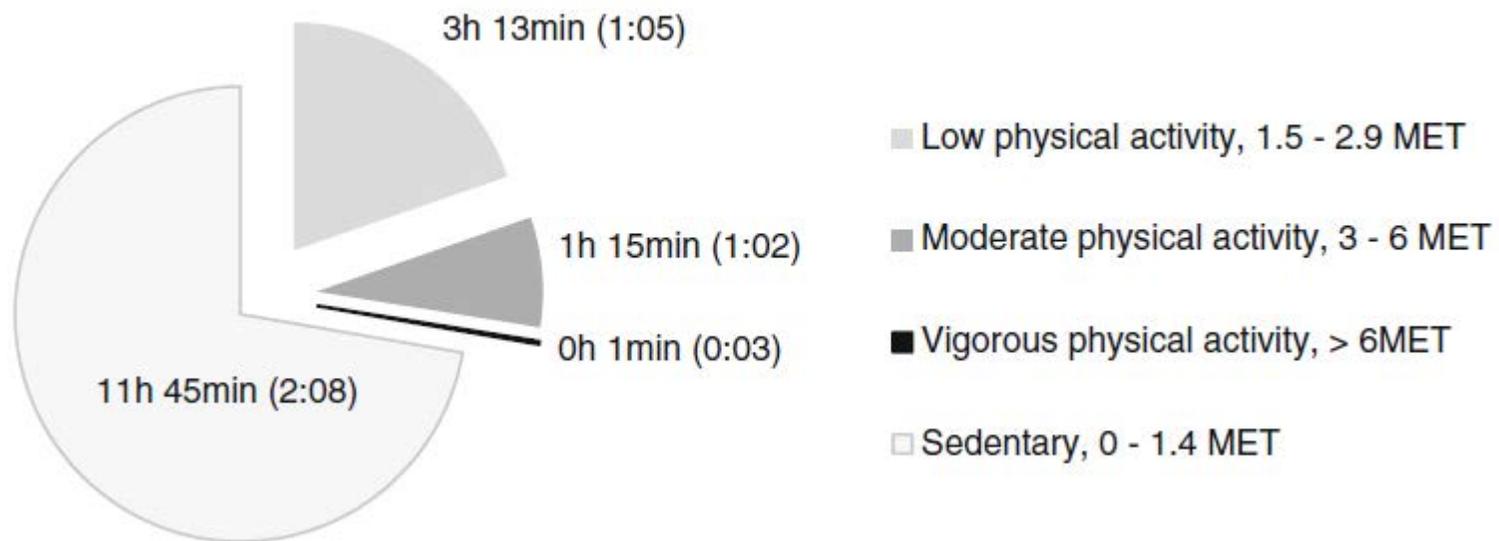
Effet du traitement du SAOS (PPC) sur Activité physique



Moyenne d'une journée (1 semaine
d'enregistrement / sujet avant et après 3 mois
PPC ou PPC placebo

Activité Physique quotidienne sujet SAOS

Daily average time spent on different intensities



« Peur du mouvement » et Activité Physique quotidienne sujet SAOS

Table 5 Multiple linear regression model (backward) with coefficient of determination (R^2), F ratio, regression coefficient b , p values for b , 95 % CI for b , p values for F , and adjusted coefficient of determination (Adj R^2) for daily average number of steps ($n=62$)

Model	Independent variables	R^2	b	p	95 % CI for b		F	p	Adj R^2
					Lower	Upper			
1	Daytime sleepiness	0.115	-40.065	0.681	-234.598	154.467	1.456	0.219	0.036
	Body mass index		135.023	0.108	-30.398	300.445			
	Exercise self-efficacy		-0.297	0.981	-25.674	25.081			
	Fear of movement		-221.982	0.100	-488.143	44.178			
	Depressive symptoms		-54.666	0.381	-178.734	69.402			
4	Body mass index	0.096	79.139	0.148	-42.418	274.294	3.134	0.051	0.065
	Fear of movement		-260.786	0.043*	-512.865	-8.707			
5	Fear of movement	0.063	-255.668	0.049*	-509.957	-1.379	4.045	0.049*	0.048

* $p < 0.05$

Volume targeted versus pressure support non-invasive ventilation in patients with super obesity and chronic respiratory failure: a randomised controlled trial

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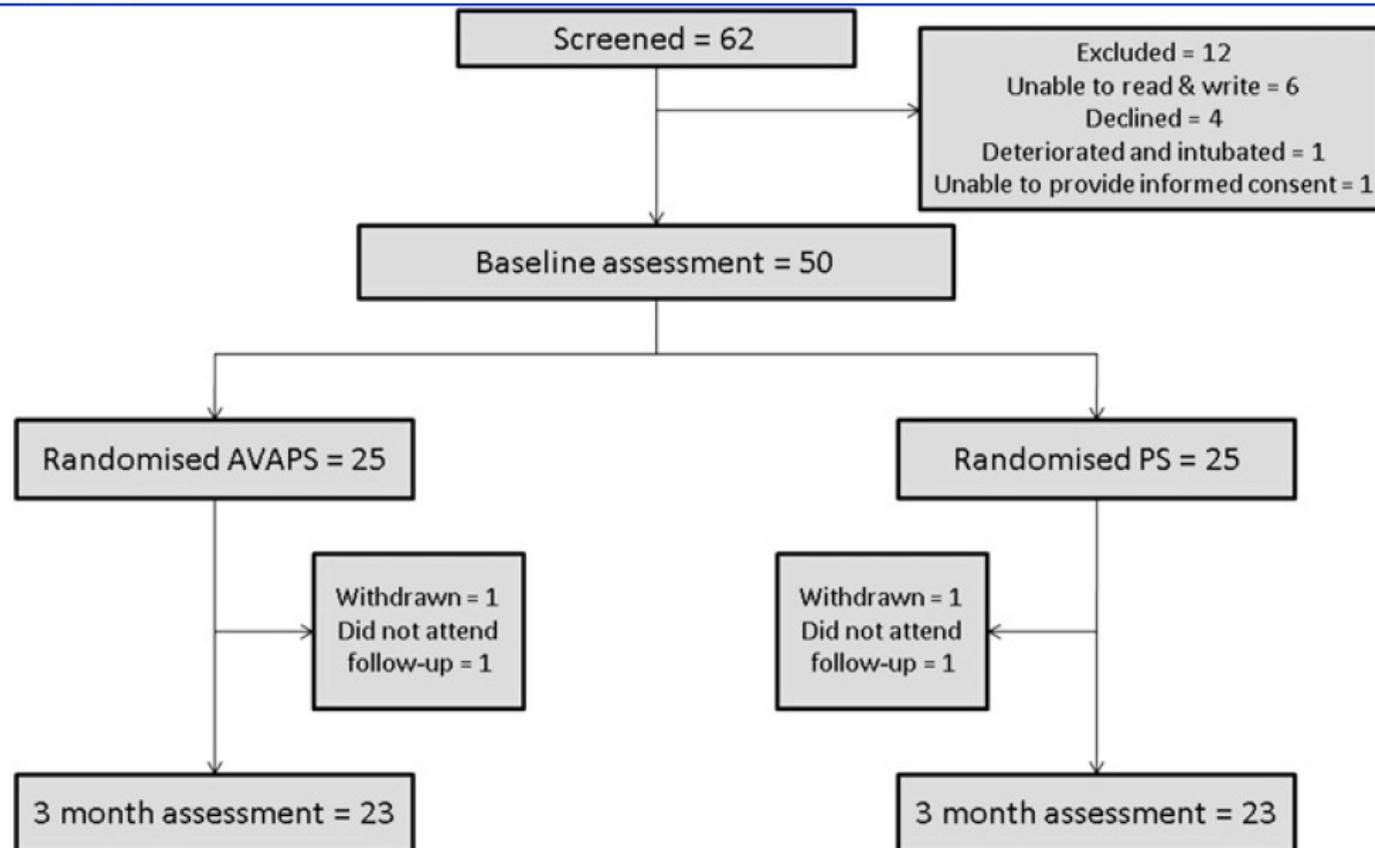


Table 7 Actigraphy (n=28) and anthropometric variables (n=46) at baseline and 3-month follow-up

	Baseline	Follow-up at 3 months	p Value
Weight (kg)	141±28	137±28	0.001
Fat-free mass (kg)	70±17	69±17	0.593
Fat mass (kg)	70±21	67±19	0.041
Waist circumference (cm)	142±15	140±16	0.003
Mean activity counts (counts/day)	232±100	263±94	0.016
Max activity counts (counts/day)	1797±507	2100±553	0.006
Immobile time (min/day)	201±93	161±84	0.028
Mobile time (min/day)	771±86	785±110	0.417

Actigraphy analysed for the first week at home following initiation of non-invasive ventilation (NIV) compared with the first week following the 3-month assessment of NIV.

Conclusion

- Altération du sommeil (qualité / quantité) est associée à une altération de l'activité physique**
- Augmentation de l'activité physique améliore la qualité du sommeil, l'efficacité du sommeil**
- L'amélioration de la qualité du sommeil peut améliorer l'activité physique...mais nécessite sûrement un accompagnement (kiné)**
- **La mise en place d'un traitement approprié des troubles respiratoires du sommeil est probablement le bon moment pour débiter un programme d'activité physique (réhabilitation)**
- **Il est important de monitorer l'activité physique et le sommeil de nos patients**