Faut-il réentraîner les patients apnéiques ?

VOTEZ POUR!!!

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- Pas de conflit d’intérêt

Plaidoyer en 10 points…

Généralités… pour justifier

L'obésité est le principal prédicteur de SAS (Peppard JAMA 2000)

Le SAS est associé à un risque accru de maladies cardio-vasculaires (Peppard NEJM 2000)

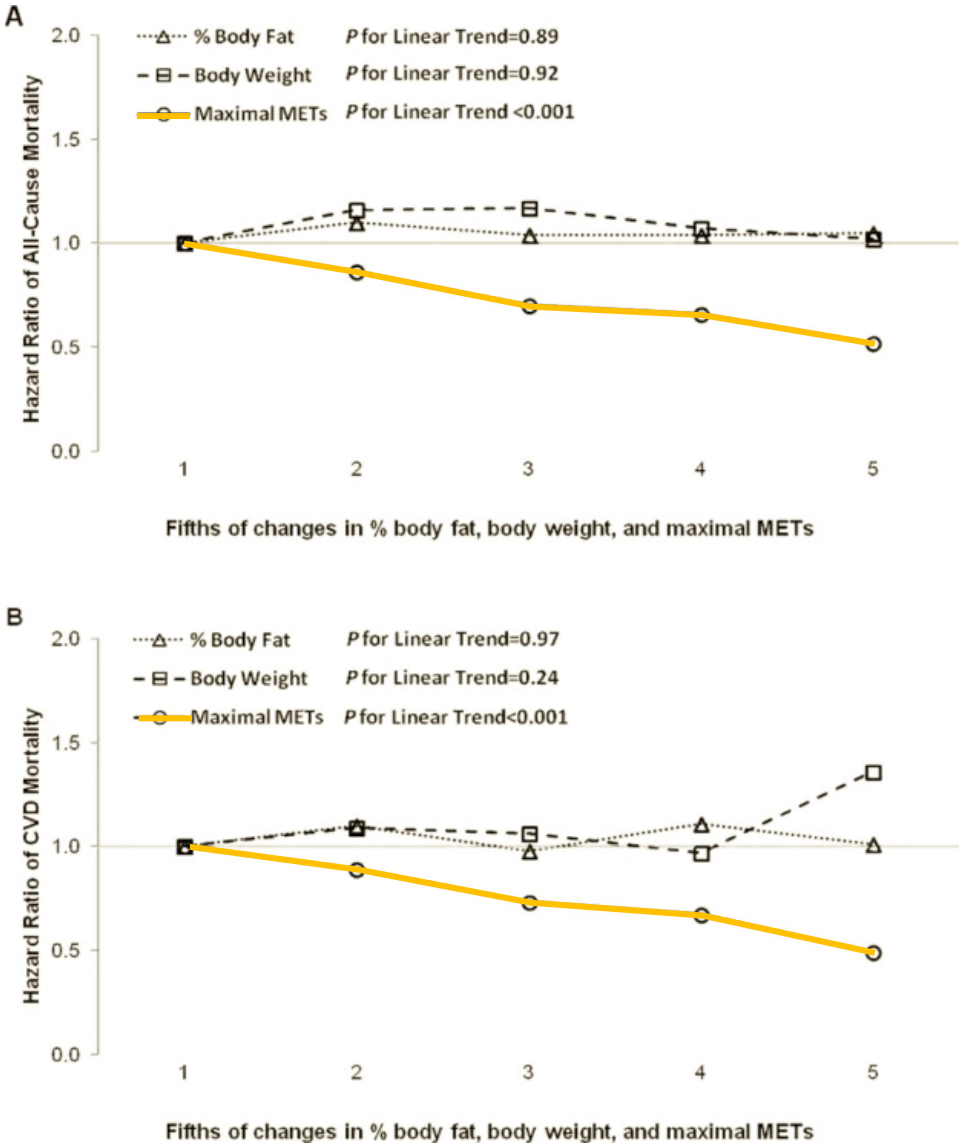
…l'obésité joue un role important au niveau de l'interaction SAS/maladies cardiovasculaires (Peppard JAMA 2000)

1. Long-Term Effects of Changes in Cardiorespiratory Fitness and Body Mass Index on All-Cause and Cardiovascular Disease Mortality in Men: The Aerobics Center Longitudinal Study

Table 4
Hazard Ratios of All-Cause and Cardiovascular Disease Mortality by Changes in Fitness Status and BMI Status in 14 345 Men.

	All-Cause Mortality		CVD Mortality	
	Hazard ratio (95% CI)		Hazard ratio (95% CI)	
	Model 1*	Model 2†	Model 1*	Model 2†
Fitness status change ‡				
Remained unfit	1.00	1.00	1.00	1.00
Became unfit	1.40 (0.97–2.02)	1.38 (0.95–1.99)	1.95 (1.07–3.56)	1.89 (1.03–3.45)
Became fit	0.52 (0.39–0.69)	0.53 (0.40–0.71)	0.58 (0.36–0.92)	0.59 (0.37–0.95)
Remained fit	0.52 (0.40–0.66)	0.52 (0.40–0.66)	0.56 (0.36–0.85)	0.56 (0.37–0.85)

Niveau physique conditionne le risque de mortalité



Duck-Chul L, Circulation. 2011 Dec 6; 124(23): 2483–2490.

2. Evaluation of short-term use of nocturnal nasal continuous positive airway pressure for a clinical profile and exercise capacity in adult patients with obstructive sleep apnea-hypopnea syndrome

Six minute walk test (6MWT) parameters: Study group compared with control group patients

Patients	Study group (n=15)			Control group (n=5)		
Parameters	Baseline	At four weeks (on CPAP)		Baseline	At four weeks (no CPAP)	
	Mean±SD	Mean±SD	*P*	Mean±SD	Mean±SD	*P*
6MWD (M)	319±56	431±73	<0.001*	364±84	362.0±66.0	0.976^{NS}
(% predicted)	62.1±10.0	83.4±8.4	<0.001*	72.2±17.0	71.6±11.5	0.940^{NS}
Heart rate (baseline)	85.5±7.5	83.9±7.3	0.128^{NS}	84.6±10.7	84.4±10.5	0.87^{NS}
Heart rate (6MWT)	115±12.1	111.0±13.9	0.045*	120.0±13.7	121.0±13.3	0.629^{NS}
SPO_2 (baseline)	96.2±1.8	96.6±1.7	0.212^{NS}	95.0±3.4	95.2±2.8	0.621^{NS}
SPO_2 (end 6MWT	88.7±6.3	91.8±5.0	<0.001*	89.4±5.0	89.4±5.6	1.0^{NS}
Blood pressure (mmHg)						
Systolic (baseline)	122.7±8.1	121.2±6.3	0.135^{NS}	119.6±8.4	120.0±8.1	0.749^{NS}
Systolic (end 6MWT)	137±19.0	131.0±11.4	0.059^{NS}	126.0±11.1	126.4±8.9	1.0^{NS}
Diastolic (baseline)	80.4±5.4	79.1±3.4	0.173^{NS}	74.0±5.6	126.4±8.9	0.374^{NS}
Diastolic (end 6MWT)	85.7±6.7	83.3±5.5	0.036*	78.0±5.1	78.4±4.8	1.0^{NS}
Fatigue (borg scale)						
(Baseline)	1.7±0.8	0.53±0.63	<0.001*	1.00±0.71	1.20±1.30	0.621^{NS}
End 6MWT	7.33±1.63	3.40.0±0.82	<0.001*	5.8±1.8	5.8±2.5	1.000^{NS}
Dyspnea (borg scale)						
Baseline	0.1±1.07	0.20±0.41	0.003*	0.80±0.83	1.00±1.22	0.749^{NS}
End 6MWT	6.60±1.45	3.46±1.12	<0.001*	5.40±0.89	5.60±1.34	0.621^{NS}

*Statistically significant, NS=Statistically not significant, MWT=Minute walk distance, CPAP=Continuous positive airway pressure, SD=Standard deviation

Tolérance à l'effort diminuée chez les patients SAS (certes améliorée par la CPAP mais pas résorbée)

Amrit G, Lung India. 2015 May-Jun; 32(3): 225–232

3.

High Prevalence of Obstructive Sleep Apnea in Patients with Moderate to Severe Chronic Obstructive Pulmonary Disease

Xavier Soler[1], Eduardo Gaio[2,3], Frank L. Powell[3], Joe W. Ramsdell[4], Jose S. Loredo[1], Atul Malhotra[1*], and Andrew L. Ries[1*]

Table 3. Baseline results on dyspnea, exercise tolerance, health-related quality of life, quality of sleep, and sleepiness (N = 44)

	All Patients (*N* = 44)	COPD and OSA (*n* = 29)	COPD no OSA (*n* = 15)	*P* Value
St. George's Respiratory Questionnaire	45.8 ± 15.5	45.9 ± 16.1	45.5 ± 15.0	0.94
UCSD Shortness of Breath Questionnaire.	50.2 ± 19.1	51.1 ± 19.8	48.4 ± 18.3	0.67
6-min-walk test				
Distance, m	376 ± 106	379 ± 105	369 ± 111	0.77
Resting Sp_{O_2}, %	95.5 ± 2.0	95.4 ± 1.8	95.6 ± 2.5	0.77
Short Form-36 Health Survey				
Physical	35.2 ± 10.0	35.5 ± 10.3	34.5 ± 9.7	0.77
Mental	52.9 ± 9.3	53.6 ± 8.8	51.5 ± 10.4	0.50
Pittsburgh Sleep Quality Index	8.3 ± 4.3	7.7 ± 3.9	9.3 ± 4.9	0.26
Epworth Sleepiness Scale	7.8 ± 4.4	8.7 ± 4.4	6.2 ± 4.1	0.08

Definition of abbreviations: COPD = chronic obstructive pulmonary disease; OSA = obstructive sleep apnea; Sp_{O_2} = oxygen saturation as measured by pulse oximetry; UCSD = University of California, San Diego.
Data are presented as mean ± SD.

No differences in measures of dyspnea, exercise tolerance, health-related quality of life, quality of sleep, and sleepiness between patients with COPD only and patients with COPD-OSA "overlap"

Ann Am Thorac Soc. 2015 ;12(8):1219-25

4. Effects of Exercise and Weight Loss in Older Adults with Obstructive Sleep Apnea

Devon A. Dobrosielski[1,4], **Susheel Patil**[2], **Alan R. Schwartz**[2], **Karen Bandeen-Roche**[3], and **Kerry J. Stewart**[4]

Cardiorespiratory training and resistance exercise

-Moderate and vigorous intensity exercise (treadmill, stationary cycle or)

-3 supervised sessions per week (12w)

-Gradual progression of duration until 45'/session

-Intensity between 60% and 85% HR

Dietary advise

Baseline and post intervention values for primary outcomes among completers

Variable	Baseline	Post Intervention	p-value
Body composition			
Weight, kg	97.5 (82.0 to 114.2)	88.4 (78.4 to 105.3)	<0.01
BMI, kg/m^2	33.8 (32.6 to 36.9)	31.6 (30.3 to 34.7)	<0.01
Waist Circumference, cm	108 (101 to 114)	102 (97 to 113)	<0.01
Total Body Fat, %	42.2 (38.3 to 47.6)	39.9 (34.4 to 46.9)	<0.01
Trunk Fat, %	46.6 (41.9 to 49.4)	43.0 (37.9 to 48.2)	<0.01
Aerobic capacity			
VO_{2max} ml/kg/min	22.3 (18.8 to 25.4)	26.8 (23.1 to 28.6)	<0.01
* VO_{2max} L/min	1.91 (1.79 to 2.80)	2.17 (2.05 to 2.97)	<0.01
Vascular parameters			
SBP, mmHg	129 (114 to 147)	123 (112 to 131)	0.20
DBP, mmHg	69 (65 to 76)	67 (65 to 72)	0.50
AI, AU	36 (22 to 44)	26 (10 to 49)	0.84
Sleep parameters			
Total Sleep Time, min	389 (323 to 401)	416 (395 to 444)	<0.01
Mean SaO_2, %	94.9 (94 to 95.4)	95.2 (94.4 to 95.7)	0.02
Average Low SaO_2, %	89.9 (88.5 to 91.5)	91.0 (89.4 to 92)	0.02
AHI, events/hour	22 (14 to 44)	12 (5 to 26)	0.03

Data are presented as median (interquartile range)

*Absolute VO_{2max} at baseline for women (mean=1.78 L/min), men (mean=2.89 L/min)

BMI; Body Mass Index, SBP: systolic blood pressure, DBP; diastolic blood pressure, AHI: apnea-hypopnea Index

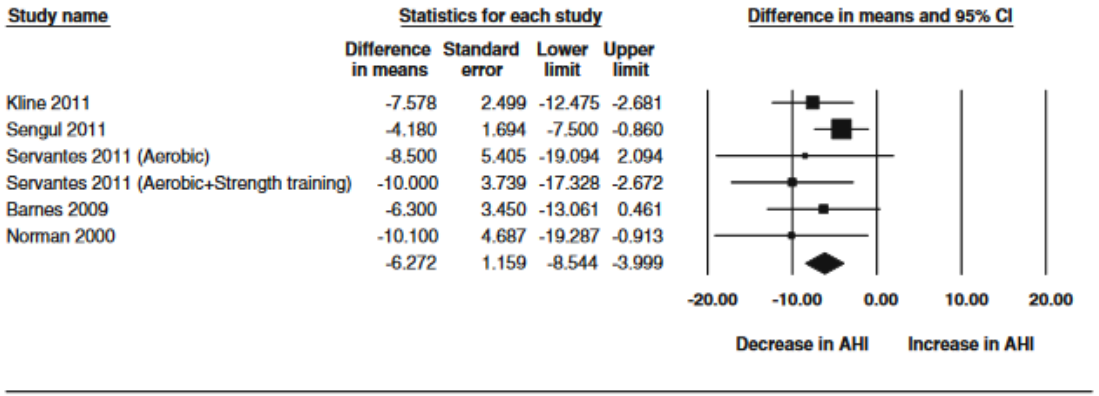
Improvement in body composition, aerobic capacity and sleep parameters

Med Sci Sports Exerc. 2015;47(1): 20–26

5.

Effects of Exercise Training on Sleep Apnea: A Meta-analysis

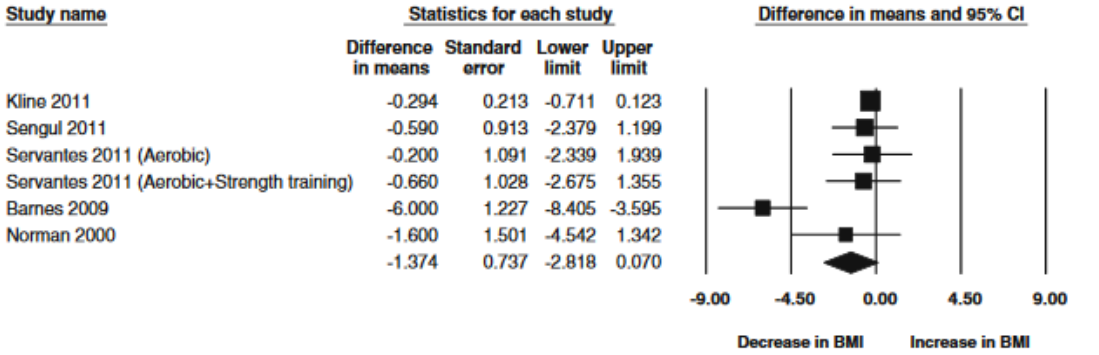
Imran H. Iftikhar · Christopher E. Kline · Shawn D. Youngstedt



Study name	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

AHI: 32 % reduction compared to baseline



Study name	Difference in means	Standard error	Lower limit	Upper limit
Kline 2011	-0.294	0.213	-0.711	0.123
Sengul 2011	-0.590	0.913	-2.379	1.199
Servantes 2011 (Aerobic)	-0.200	1.091	-2.339	1.939
Servantes 2011 (Aerobic+Strength training)	-0.660	1.028	-2.675	1.355
Barnes 2009	-6.000	1.227	-8.405	-3.595
Norman 2000	-1.600	1.501	-4.542	1.342
	-1.374	0.737	-2.818	0.070

Mean difference= -1.374 (95% CI: -2.818 to -0.070), p = 0.062

BMI: no difference compared to baseline

Similar improvement than CPAP for sleep efficiency and daytime sleepiness

Lung (2014) 192:175–184

6.

Effects of Exercise Training on Sleep Apnea: A Meta-analysis

Imran H. Iftikhar · Christopher E. Kline · Shawn D. Youngstedt

Table 3 Difference in outcomes between control and exercise groups in randomized, controlled trials

Outcomes	Mean difference	*p* value
AHI (events/h)	−7.174 (95 % CI: −1.867 to −12.482)	0.008
BMI (kg/m^2)	−0.573 (95 % CI: −1.34 to 2.486)	0.557
Sleep efficiency %	6.188 (95 % CI: 2.021 to 10.354)	0.004
VO_2 peak (mL/kg/min)	5.695 (95 % CI: 1.698 to 9.692)	0.005

AHI apnea hypopnea index, *BMI* body mass index, VO_2 peak cardiorespiratory fitness, *CI* confidence interval

AHI: 42 % improvement compared to control
VO2max: 18 % improvement compared to control
Sleep efficiency: 6 % improvement compared to control

Conclusion: Effect of exercise in reducing the severity of sleep apnea in patients with OSA with minimal changes in body weight. Additionally, the significant effects of exercise on cardiorespiratory fitness, daytime sleepiness, and sleep efficiency indicate the potential value of exercise in the management of OSA

Lung (2014) 192:175–184

7. Effectiveness of inspiratory muscle training on sleep and functional capacity to exercise in obstructive sleep apnea: a randomized controlled trial

Table 4 Epworth Sleepiness Scale and Pittsburgh Sleep Quality Index (PSQI) in IMT and P-IMT groups

	IMT			P-IMT				
	PRE	POST	Mean differences (95% CI)	PRE	POST	Mean differences (95% CI)	Intergroups differences (95% CI)	*p*
ESS total score	11.1 ± 4.5	6.4 ± 3.7	4.7 (1.4 to 8.1)	11.1 ± 6.8	9.8 ± 8.0	1.4 (− 1.2 to 4.0)	3.4 (− 3.3 to 10.0)	0.29
PSQI global score subscores	7.0 ± 4.7	4.1 ± 3.0	2.9 (0.7 to 5.0)	8.8 ± 4.2	7.9 ± 2.9	0.9 (− 2.0 to 3.7)	3.7 (0.6 to 6.9)*	0.02
C1 sleep quality	1.1 ± 0.9	0.7 ± 0.7	0.4 (−0.4 to 1.1)	1.5 ± 0.5	1.6 ± 0.9	− 0.1 (− 0.9 to 0.7)	− 0.9 (− 1.7 to 0.0)	0.049
C2 sleep on set latence	0.8 ± 0.9	0.8 ± 0.8	0.0 (−0.4 to 0.4)	1.5 ± 1.4	1.7 ± 1.0	− 0.2 (− 1.3 to 0.8)	− 0.9 (− 1.9 to 0.1)	1.00
C3 sleep duration	1.0 ± 1.1	0.7 ± 1.0	0.2 (− 0.1 to 0.6)	1.1 ± 1.0	0.7 ± 0.7	0.4 (0.0 to 0.8)	0.0 (− 0.9 to 0.9)*	0.04
C4 habitual sleep efficiency	0.1 ± 0.3	0.0 ± 0.0	0.1 (− 0.2 to 0.4)	0.5 ± 1.0	0.0 ± 0.0	0.5 (−0.4 to 1.4)	0.0 (0.0 to 0.0)	
C5 sleep disturbance	1.9 ± 0.6	1.1 ± 0.6	0.7 (− 0.1 to 1.3)	2.1 ± 0.3	1.7 ± 0.5	0.4 (0.0 to 0.8)	− 0.6 (− 1.2 to 0.0)*	0.15
C6 use of sleep medication	0.6 ± 1.2	0.0 ± 0.0	0.6 (−0.4 to 1.6)	1.0 ± 1.4	0.7 ± 1.4	0.2 (− 0.3 to 0.8)	− 0.7 (− 1.8 to 0.3)	0.22
C7 daytime dysfunction	1.4 ± 1.1	0.6 ± 0.7	0.7 (0.1 to 1.3)	1.0 ± 0.9	1.2 ± 1.2	− 0.2 (− 1.1 to 0.6)	− 0.6 (− 1.7 to 0.4)*	0.02

Results are shown as mean ± standard deviation and mean differences (confidence interval 95%)

AHI apnea-hypopnea index, *ESS* Epworth Sleepiness Scale, *PSQI* Pittsburgh Sleep Quality Index

*Post IMT vs. post P-IMT, $p < 0.05$

IMT: 12 weeks with a moderate load (50–60% of MIP)

P-IMT: load < 20% of MIP.

Souza, Al. Sleep Breath 2017

8.

Didgeridoo playing as alternative treatment for obstructive sleep apnoea syndrome: randomised controlled trial

Milo A Puhan, Alex Suarez, Christian Lo Cascio, Alfred Zahn, Markus Heitz, Otto Braendli

Table 2 Effects of intervention on sleep related outcomes

Outcome	Didgeridoo group	Control group	Raw difference* (95% CI)	Adjusted difference† (95% CI)
Epworth scale				
At 4 months	7.4 (2.3)	9.6 (6.0)		
Change from baseline	−4.4 (3.7)	−1.4 (2.6)	−3.0 (−5.7 to −0.3), P=0.03	−2.8 (−5.4 to −0.2), P=0.04
Pittsburgh quality of sleep index				
At 4 months	4.3 (2.1)	5.6 (2.7)		
Change from baseline	−0.9 (1.6)	−0.2 (1.7)	−0.7 (−2.1 to 0.6), P=0.27	−0.8 (−2.3 to 0.8), P=0.30
Partner rating of sleep disturbance				
At 4 months	2.3 (1.4)	4.8 (2.2)		
Change from baseline	−3.4 (2.4)	−0.6 (1.9)	−2.8 (−4.7 to −0.9), P<0.01	−2.7 (−4.2 to −1.2), P<0.01
Apnoea-hypopnoea index				
At 4 months	11.6 (8.1)	15.4 (9.8)		
Change from baseline	−10.7 (7.7)	−4.5 (6.9)	−6.2 (−12.3 to −0.1), P=0.05	−6.6 (−13.3 to −0.1), P=0.05

*Two sample *t* tests.
†Analysis of covariance with adjustment for severity of disease (apnoea-hypopnoea index and Epworth scale) and weight change during study period.

20 minutes on at least five days a week for 4 months

BMJ 2005;332:266–270.

9.

Effects of Oropharyngeal Exercises on Patients with Moderate Obstructive Sleep Apnea Syndrome

Kátia C. Guimarães[1], Luciano F. Drager[1], Pedro R. Genta[1], Bianca F. Marcondes[1], and Geraldo Lorenzi-Filho[1]

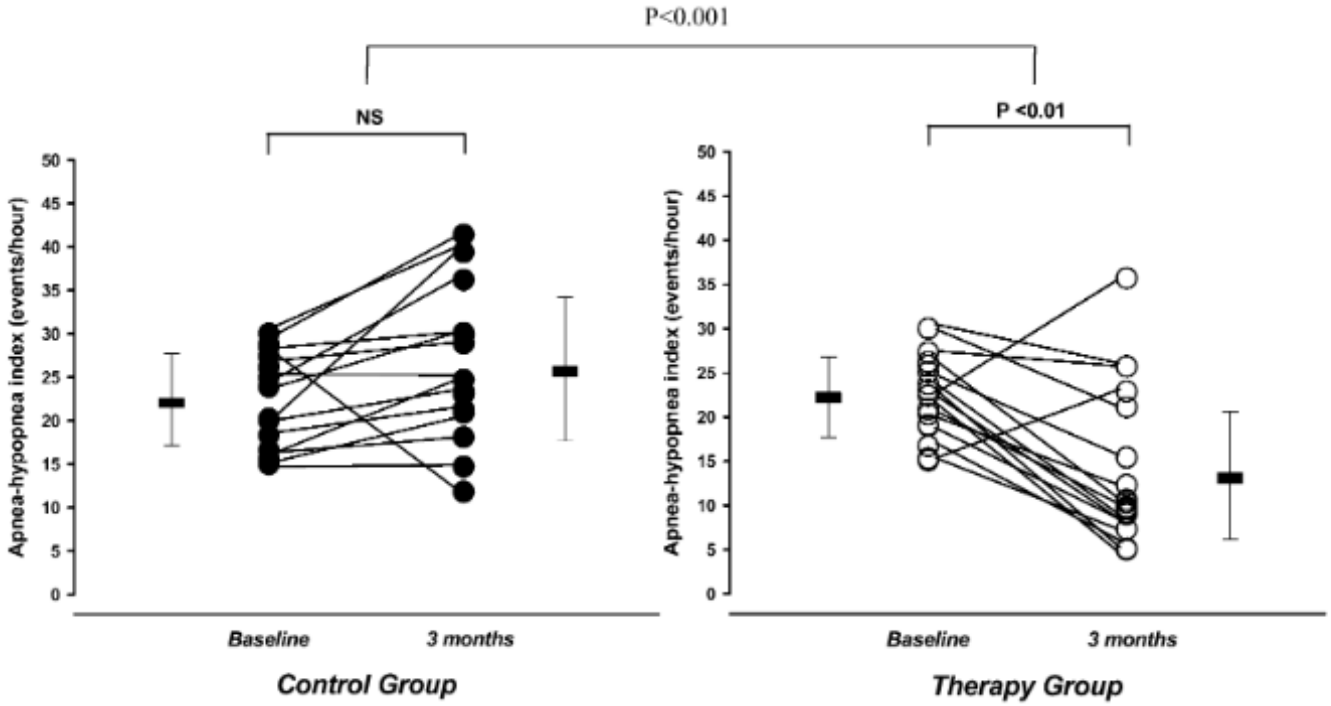


Figure 1. Individual values for apnea-hypopnea index (AHI). In the control group, the AHI from baseline to 3 months (from 22.4 ± 5.4 to 25.9 ± 8.5 events/h) was similar. In contrast, the AHI significantly decreased in the group randomized to oropharyngeal exercises (from 22.4 ± 4.8 to 13.7 ± 8.5 events/h; $P < 0.01$). The differences between groups remained significant ($P < 0.001$). Short horizontal lines and bars are mean ± SD. NS = not significant.

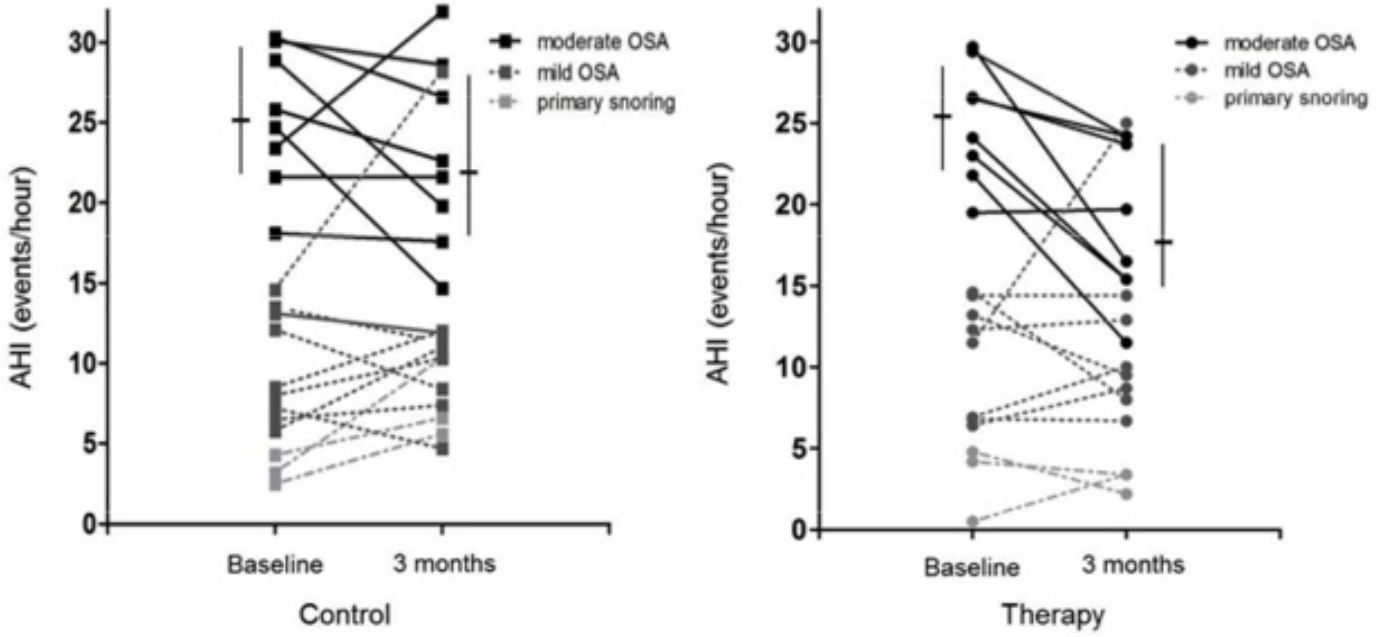
Oropharyngeal exercises significantly reduce OSAS severity and symptoms

AJRCCM 2009;179(10):962-6

10.

Effects of Oropharyngeal Exercises on Snoring
A Randomized Trial

Vanessa Ieto, PhD; Fabiane Kayamori, SLP; Maria I. Montes, MD; Raquel P. Hirata, MS; Marcelo G. Gregório, MD, PhD; Adriano M. Alencar, PhD; Luciano F. Drager, MD, PhD; Pedro R. Genta, MD, PhD; and Geraldo Lorenzi-Filho, MD, PhD



AHI significantly declined in the group of patients with moderate OSA (15<AHI<30) randomized to oropharyngeal exercises (from 25.4 [22.1±28.7] to 18.1 [15.4±24.1] events/h; p = 0.017).

CHEST 2015; 148 (3): 683 - 691

Conclusion

- Bénéfices évidents de l’exercice physique
- Pas uniquement des exercices cardio-respiratoires
- Mécanismes explicatifs restent peu évidents