

## EPOC y SAOS (SAHS)



**Carlos M<sup>a</sup> de San Román y de Terán**  
**Medicina Interna**  
**Hospital Comarcal de La Axarquía**  
**Vélez-Málaga (Málaga)**

# **Declaración de conflicto de intereses**

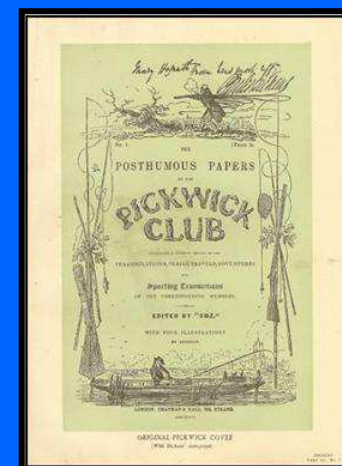
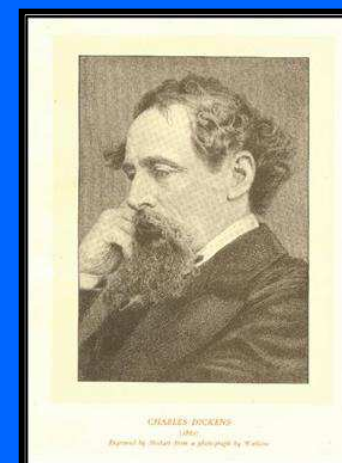
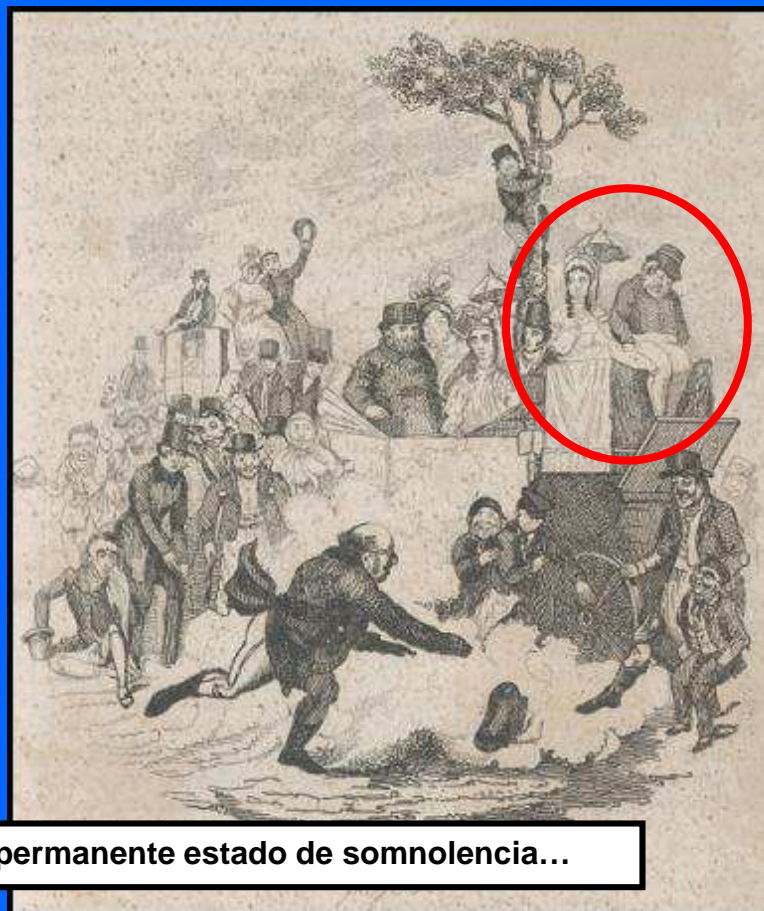
**El Dr. Carlos M<sup>a</sup> de San Román y de Terán ha recibido subvenciones económicas y facilidades destinadas a actividades de formación y científicas propias, del Servicio de Medicina Interna que dirige o de alguno de sus miembros, de las siguientes empresas: ALMIRALL, ASTRA-ZENECA, BAYER, BOEHRINGER, BRISTOL-MYERS-SQUIB, ESTEVE, GSK, JANSSEN-CILAG, LILLY, MENARINI, MSD, NOVARTIS, NOVO-NORDISK, NYCOMED, PFIZER, ROCHE, SANOFI y SERVIER.**

**No ha existido conflicto de intereses para la realización de esta presentación.**

## Charles Dickens: Impact on Medicine and Society

Meir Kryger, M.D., F.A.A.S.M.

*Yale University School of Medicine, New Haven, CT; VA Connecticut Healthcare System, West Haven, CT*



... un gordo y rubicundo mozalbete, en permanente estado de somnolencia...



# Sleep Drives Metabolite Clearance from the Adult Brain

Lulu Xie,<sup>1\*</sup> Hongyi Kang,<sup>1\*</sup> Qiwu Xu,<sup>1</sup> Michael J. Chen,<sup>1</sup> Yonghong Liao,<sup>1</sup> Meenakshisundaram Thiyagarajan,<sup>1</sup> John O'Donnell,<sup>1</sup> Daniel J. Christensen,<sup>1</sup> Charles Nicholson,<sup>2</sup> Jeffrey J. Iliff,<sup>1</sup> Takahiro Takano,<sup>1</sup> Rashid Deane,<sup>1</sup> Maiken Nedergaard<sup>1†</sup>

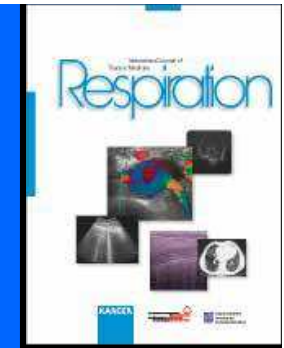
The conservation of sleep across all animal species suggests that sleep serves a vital function. We here report that sleep has a critical function in ensuring metabolic homeostasis. Using real-time assessments of tetramethylammonium diffusion and two-photon imaging in live mice, we show that natural sleep or anesthesia are associated with a 60% increase in the interstitial space, resulting in a striking increase in convective exchange of cerebrospinal fluid with interstitial fluid. In turn, convective fluxes of interstitial fluid increased the rate of  $\beta$ -amyloid clearance during sleep. Thus, the restorative function of sleep may be a consequence of the enhanced removal of potentially neurotoxic waste products that accumulate in the awake central nervous system.

**Expresión bioquímica del concepto de "sueño reparador"**

## There Is No Relationship between Chronic Obstructive Pulmonary Disease and Obstructive Sleep Apnea Syndrome: A Population Study

Michał Bednarek Robert Pływaczewski Luiza Jonczak Jan Zielinski

2nd Department of Respiratory Medicine, National Tuberculosis and Lung Diseases Research Institute, Warsaw, Poland



### Epidemiología del SAOS

**676 sujetos (356 hombres)**

**SAOS 11,3%**

**EPOC 10,7%**

**“Overlap” 9,3% (de los SAOS)**

(1% de la población total)

**Conclusions:** COPD in subjects with OSAS was as frequent as in the general population. In the OS group mean arterial blood saturation was lower and time spent in desaturation was longer than in OSAS. The presented data suggest a more severe course of sleep-disordered breathing in subjects with coexisting COPD.

In summary, our data did not confirm a higher prevalence of COPD among subjects with OSAS suggesting that the association of both diseases observed in 1% of the population studied occurs by chance. It seems that both diseases are not linked by common pathophysiological features.

REVIEW

## Association of chronic obstructive pulmonary disease and obstructive sleep apnea consequences

Carlos Zamarrón<sup>1</sup>  
Vanesa García Paz<sup>1</sup>  
Emilio Morete<sup>1</sup>  
Felix del Campo Matías<sup>2</sup>

<sup>1</sup>Servicio de Neumología, Hospital Clínico Universitario de Santiago, Santiago, Spain; <sup>2</sup>Servicio de Neumología, Hospital Universitario Río Ortega de Valladolíd, Valladolíd, Spain

### Epidemiología del SAOS

**Abstract:** Obstructive sleep apnea syndrome (OSAS) and chronic obstructive pulmonary disease (COPD) are two diseases that often coexist within an individual. This coexistence is known as overlap syndrome and is the result of chance rather than a pathophysiological link. Although there are claims of a very high incidence of OSAS in COPD patients, recent studies report that it is similar to the general population. Overlap patients present sleep-disordered breathing associated to upper and lower airway obstruction and a reduction in respiratory drive. These patients present unique characteristics, which set them apart from either COPD or OSAS patients. COPD and OSAS are independent risk factors for cardiovascular events and their coexistence in overlap syndrome probably increases this risk. The mechanisms underlying cardiovascular risk are still unclear, but may involve systemic inflammation, endothelial dysfunction, and tonic elevation of sympathetic neural activity. The treatment of choice for overlap syndrome in stable patients is CPAP with supplemental oxygen for correction of upper airway obstructive episodes and hypoxemia during sleep.

### HIPOXEMIA nocturna y sus consecuencias

# Nocturnal noninvasive positive pressure ventilation in stable COPD: A systematic review and individual patient data meta-analysis



F.M. Struik<sup>a,b,\*</sup>, Y. Lacasse<sup>c</sup>, R.S. Goldstein<sup>d</sup>,  
H.A.M. Kerstjens<sup>a,b</sup>, P.J. Wijkstra<sup>a,b</sup>

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Respiratory Med 2014; 108: 229-243

[Intervention Review]

## Nocturnal non-invasive positive pressure ventilation for stable chronic obstructive pulmonary disease

Fransien M Struik<sup>1</sup>, Yves Lacasse<sup>2</sup>, Roger Goldstein<sup>3</sup>, Huib M Kerstjens<sup>1</sup>, Peter J Wijkstra<sup>1</sup>

<sup>1</sup>Department of Pulmonary Diseases and Tuberculosis, University of Groningen, University Medical Center Groningen, Groningen, Netherlands. <sup>2</sup>Institut Universitaire de Cardiologie et de Pneumologie de Québec, Hôpital Laval, Québec, Canada. <sup>3</sup>Division of Respiratory Medicine, West Park Healthcare Centre, University of Toronto, Toronto, Canada

Contact address: Peter J Wijkstra, Department of Pulmonary Diseases and Tuberculosis, University of Groningen, University Medical Center Groningen, AA11, PO Box 30.001, 9700 RB, Groningen, Netherlands. p.j.wijkstra@umcg.nl



Cochrane Database Syst Rev 2013; 6: CD002878

### EPOC en situación estable

**NIPPV during the night for 3 and 12 months in people with COPD who had raised levels of carbon dioxide had no clinically or statistically significant effect on gas exchange, six-minute walking distance, health-related quality of life, lung function, respiratory muscle strength and sleep efficiency. This means we found little or no difference in the outcomes.**

**At present, there is insufficient evidence to support the application of routine NIPPV in patients with stable COPD. However, higher IPAP levels, better compliance and higher baseline PaCO<sub>2</sub> seem to improve PaCO<sub>2</sub>.**

**El S100B es un péptido ligado a calcio que se utiliza como un parámetro de activación y/o muerte de la glía en trastornos del SNC. Desempeña un papel importante en el desarrollo normal y la recuperación del SNC después de una lesión. Aunque el S100B principalmente se ve en las células astrogliales y de Schwann, aunque también tiene fuentes extracerebrales.**

**El S100B es un marcador neurobioquímico de daño cerebral útil en situaciones tales como parada circulatoria, accidente cerebrovascular y lesión cerebral traumática.**

**El S100B también se asocia con las enfermedades neurodegenerativas como la enfermedad de Alzheimer u otras enfermedades neurológicas crónicas. Por otra parte, el S100B podría tener un papel en la predicción de la eficacia del tratamiento y el pronóstico.**

Li and Fei *Respiratory Research* 2013, 14:140  
<http://respiratory-research.com/content/14/1/140>



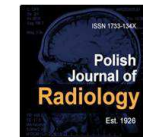
RESEARCH

Open Access

The unique alterations of hippocampus and cognitive impairment in chronic obstructive pulmonary disease

Jing Li and Guang-He Fei\*

Signature: © Pol J Radiol, 2013; 78(4): 7-14  
DOI: 10.12659/PJR.889923



Polish  
Journal of Radiology  
www.pjrad.pl.com  
ORIGINAL ARTICLE

Received: 2013.10.20  
Accepted: 2013.10.23

Proton magnetic resonance spectroscopy of periventricular white matter and hippocampus in obstructive sleep apnea patients

Volkan Kızılgöz<sup>1</sup>, Hasan Aydın<sup>2</sup>, İdil Güneş Tatar<sup>2</sup>, Baki Hekimoğlu<sup>2</sup>, Sadık Ardıç<sup>3</sup>, Hikmet Fırat<sup>3</sup>, Cem Dönmez<sup>4</sup>

**Parece que si puede haber un hecho en común entre el SAOS y la EPOC o, al menos, en la hipoxia mantenida ya que en el área del hipocampo la que parece encontrarse lesionada en los deterioros cognitivos que pueden acompañar a ambas condiciones.**



# Daytime PaO<sub>2</sub> in OSAS, COPD and the combination of the two (overlap syndrome)



D. Lacedonia<sup>a</sup>, G.E. Carpagnano<sup>a</sup>, M. Aliani<sup>b</sup>, R. Sabato<sup>a</sup>, M.P. Foschino Barbaro<sup>a</sup>, A. Spanevello<sup>c</sup>, M. Carone<sup>b</sup>, F. Fanfulla<sup>d,\*</sup>

<sup>a</sup>Institute of Respiratory Disease, Department of Medical and Surgical Sciences, University of Foggia, Foggia, Italy

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## Influencia de diversos factores en la HIPOXÉMIA diurna según las características de los pacientes.

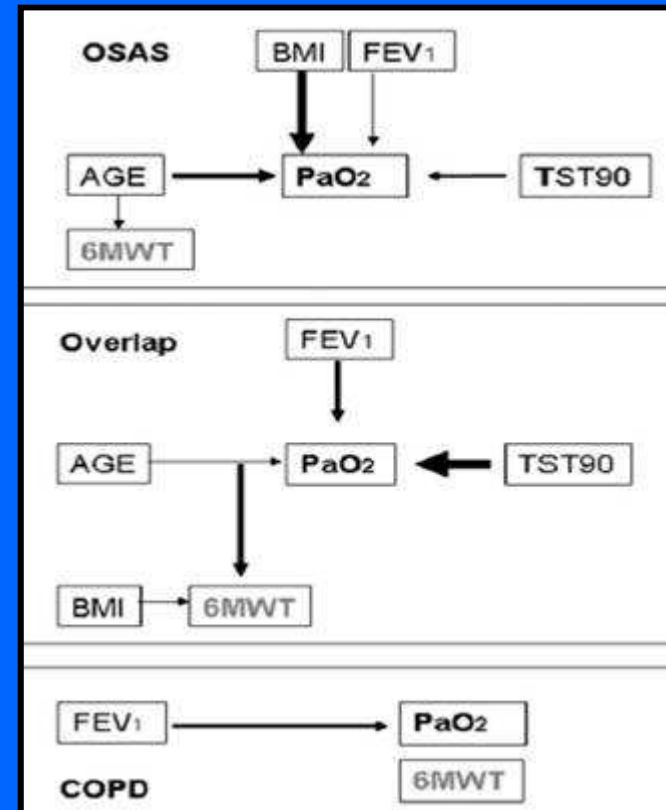
**EDAD**

**FEV<sub>1</sub>**

**HIPOVENTILACIÓN NOCTURNA**

**ÍNDICE DE MASA CORPORAL**

**MARCHA 6 MINUTOS**



## Inflammatory Processes and Effects of Continuous Positive Airway Pressure (CPAP) in Overlap Syndrome

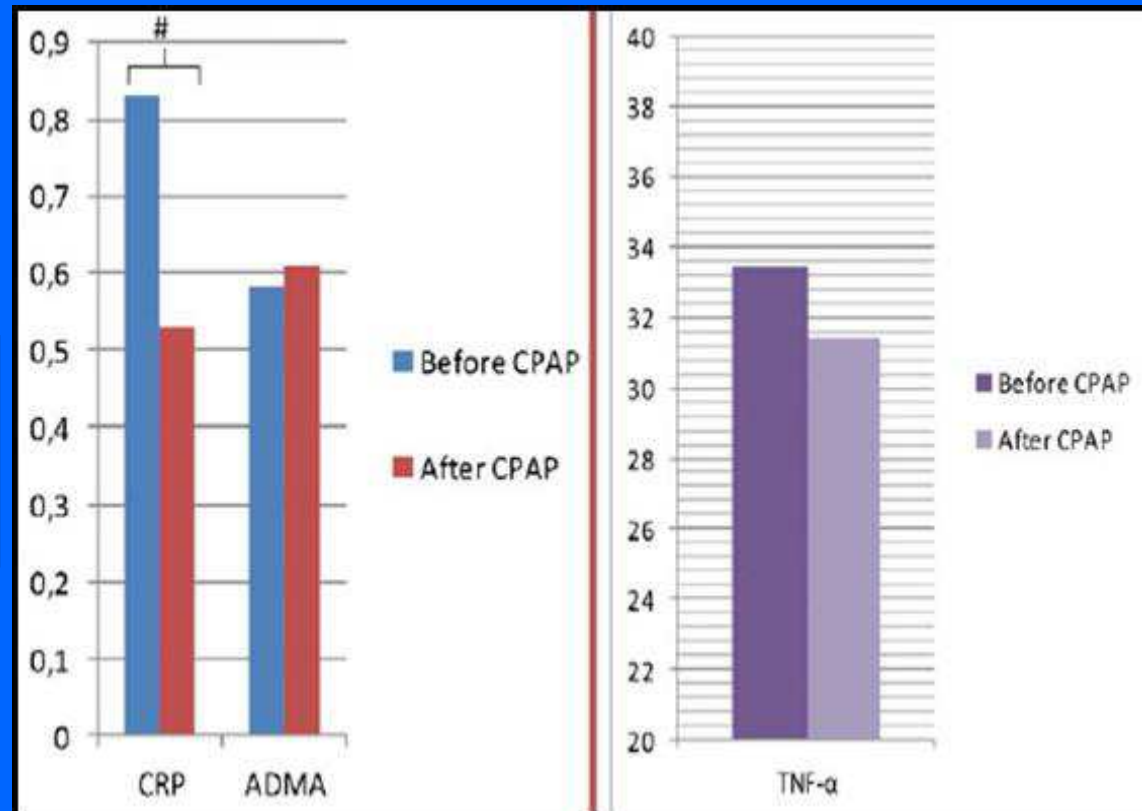
Serkan Nural,<sup>1</sup> Ersin Günay,<sup>1,3</sup> Bilal Halici,<sup>1</sup> Sefa Celik,<sup>2</sup> and Mehmet Ünlü<sup>1</sup>



<b>COPD</b>	<b>25</b>
<b>Overlap syndrome</b>	<b>25</b>
<b>SAOS</b>	<b>25</b>

**Perfil de marcadores de inflamación en los tres grupos similares.**

**Descenso con CPAP (ADMA)**



## Original Investigation

## Effect of CPAP on Blood Pressure in Patients With Obstructive Sleep Apnea and Resistant Hypertension

### The HIPARCO Randomized Clinical Trial

Miguel-Angel Martínez-García, MD, PhD; Francisco Capote, MD, PhD; Francisco Campos-Rodríguez, MD, PhD; Patricia Lloberes, MD, PhD; María Josefa Díaz de Atauri, MD, PhD; María Somoza, MD, PhD; Juan F. Masa, MD, PhD; Mónica González, MD, PhD; Lirios Sacristán, MD; Ferrán Barbé, MD, PhD; Joaquín Durán-Cantolla, MD, PhD; Felipe Aizpuru, PhD; Eva Mañas, MD, PhD; Bienvenido Barreiro, MD, PhD; Mar Mosteiro, MD, PhD; Juan J. Cebrián, MD, PhD; Mónica de la Peña, MD, PhD; Francisco García-Río, MD, PhD; Andrés Maimó, MD, PhD; Jordi Zapater, MD; Concepción Hernández, MD, PhD; Nuria Grau SanMartí, MD, PhD; Josep María Montserrat, MD, PhD; for the Spanish Sleep Network

in blood pressure over the study period were compared between groups by ITT, the CPAP group achieved a greater decrease in 24-hour mean blood pressure (3.1 mm Hg [95% CI, 0.6 to 5.6];  $P = .02$ ) and 24-hour DBP (3.2 mm Hg [95% CI, 1.0 to 5.4];  $P = .005$ ), but not in 24-hour SBP (3.1 mm Hg [95% CI, -0.6 to 6.7];  $P = .10$ ) compared with the control group. Moreover, the percentage of patients displaying a nocturnal blood pressure dipper pattern at the 12-week follow-up was greater in the CPAP group than in the control group (35.9% vs 21.6%; adjusted odds ratio [OR], 2.4 [95% CI, 1.2 to 5.1];  $P = .02$ ). There was a significant positive correlation between hours of CPAP use and the decrease in 24-hour mean blood pressure ( $r = 0.29$ ,  $P = .006$ ), SBP ( $r = 0.25$ ;  $P = .02$ ), and DBP ( $r = 0.30$ ,  $P = .005$ ).

**CONCLUSIONS AND RELEVANCE** Among patients with OSA and resistant hypertension, CPAP treatment for 12 weeks compared with control resulted in a decrease in 24-hour mean and diastolic blood pressure and an improvement in the nocturnal blood pressure pattern. Further research is warranted to assess longer-term health outcomes.

**Hipertensos tratados  
Disminución discreta**



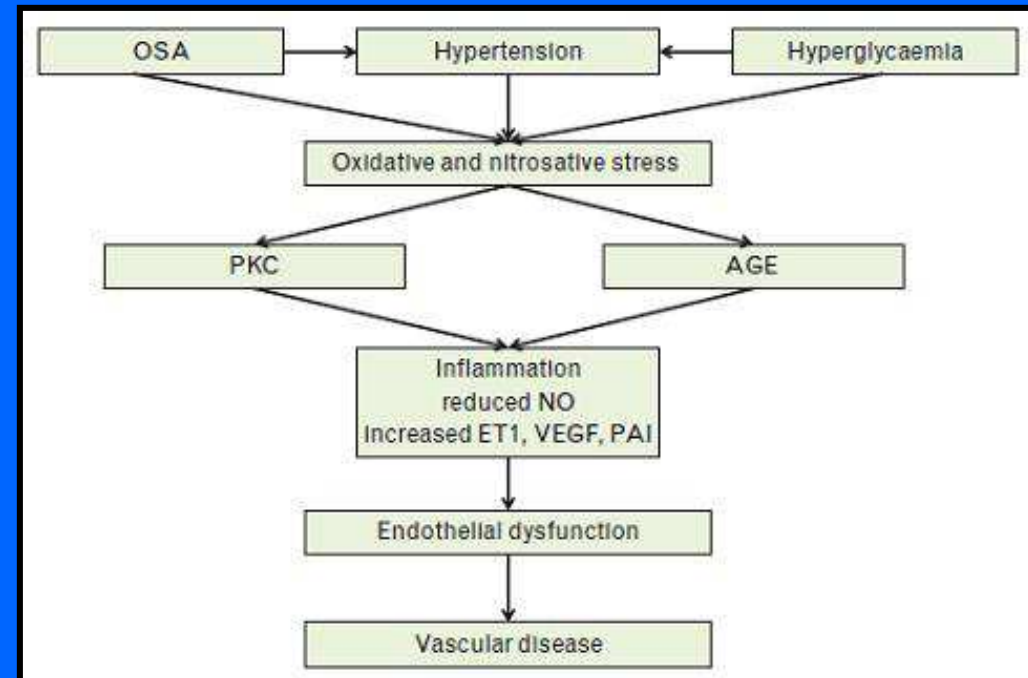


## Obstructive sleep apnoea and diabetes: an update

Abd A. Tahrani<sup>a,b</sup>, Asad Ali<sup>c</sup>, and Martin J. Stevens<sup>a,b</sup>

### KEY POINTS

- OSA is associated with insulin resistance,  $\beta$ -cell dysfunction, and incident T2D.
- The relationship between OSA and insulin resistance is independent of obesity.
- OSA is very common in patients with T2D and is associated with worse metabolic profile.
- OSA is associated with increased oxidative stress, nitrosative stress, and impaired microvascular regulation in patients with T2D over and above that caused by hyperglycaemia per se.
- CPAP treatment improves insulin resistance, but the impact of CPAP on  $\beta$ -cell dysfunction and metabolic control and vascular disease in patients with T2D is unclear.



### Summary

OSA is associated with insulin resistance and  $\beta$ -cell dysfunction independent of obesity. OSA is associated with HbA1c and vascular complications in patients with T2D. CPAP might improve insulin resistance and glycaemic measures. Lifestyle intervention has a significant impact on AHI in patients with T2D.

## Obstructive sleep apnea in chronic obstructive pulmonary disease patients

Ruth Lee and Walter T. McNicholas

Pulmonary and Sleep Disorders Unit, St. Vincent's University Hospital, Conway Institute of Biomolecular and Biomedical Research, University College Dublin, Dublin, Ireland

### Recent findings

The severity of obstructive ventilatory impairment and hyperinflation, especially the inspiratory capacity to total lung capacity (TLC) ratio, correlates with the severity of sleep-related breathing disturbances. Early treatment with continuous positive airway pressure (CPAP) improves survival, reduces hospitalization and pulmonary hypertension, and also reduces hypoxemia. Evidence of systemic inflammation and oxidative stress in COPD and sleep apnea provides insight into potential interactions between both disorders that may predispose to cardiovascular disease. Long-term outcome studies of overlap patients currently underway should provide further evidence of the clinical significance of the overlap syndrome.

### Summary

Studies of overlap syndrome patients at a clinical, physiological and molecular level should provide insight into disease mechanisms and consequences of COPD and sleep apnea, in addition to identifying potential relationships with cardiovascular disease.



**EPOC  
SAOS  
S de "superposición"  
E cardiovascular  
Obesidad**

**Rasgos de enfermedad sistémica**



European Journal of Internal Medicine 19 (2008) 390–398

EUROPEAN JOURNAL OF  
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Review article

## Obstructive sleep apnea syndrome is a systemic disease. Current evidence

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<sup>b</sup> *Servicio de Laboratorio Central, Hospital Clínico Universitario, Santiago, Spain*

Received 23 May 2007; received in revised form 19 November 2007; accepted 15 December 2007

Available online 13 February 2008

### Abstract

Obstructive sleep apnea syndrome (OSAS) is a highly prevalent sleep disorder, characterized by repeated disruptions of breathing during sleep. This disease has many potential consequences including excessive daytime sleepiness, neurocognitive deterioration, endocrinologic and metabolic effects, and decreased quality of life. Metabolic syndrome is another highly prevalence emerging public health problem that represents a constellation of cardiovascular risk factors. Each single component of the cluster increases the cardiovascular risk, but the combination of factors is much more significant. It has been suggested that the presence of OSAS may increase the risk of developing some metabolic syndrome features. Moreover, OSAS patients are at an increased risk for vascular events, which represent the greatest morbidity and mortality of all associated complications.

Although the etiology of OSAS is uncertain, intense local and systemic inflammation is present. A variety of phenomena are implicated in this disease such as modifications in the autonomic nervous system, hypoxemia–re-oxygenation cycles, inflammation, and coagulation–fibrinolysis imbalance. OSAS patients also present increased levels of certain biomarkers linked to endocrine-metabolic and cardiovascular alterations among other systemic consequences. All of this indicates that, more than a local abnormality, OSAS should be considered a systemic disease.

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## Clinical Guideline for the Evaluation, Management and Long-term Care of Obstructive Sleep Apnea in Adults

Adult Obstructive Sleep Apnea Task Force of the American Academy of Sleep Medicine

Task Force Members: Lawrence J. Epstein, M.D.<sup>1</sup>(Chair); David Kristo, M.D.<sup>2</sup>; Patrick J. Strollo, Jr., M.D.<sup>2</sup>; Norman Friedman, M.D.<sup>3</sup>; Atul Malhotra, M.D.<sup>4</sup>; Susheel P. Patil, M.D., Ph.D.<sup>5</sup>; Kannan Ramar, M.D.<sup>6</sup>; Robert Rogers, D.M.D.<sup>7</sup>; Richard J. Schwab, M.D.<sup>8</sup>; Edward M. Weaver, M.D., M.P.H.<sup>9</sup>; Michael D. Weinstein, M.D.<sup>10</sup>

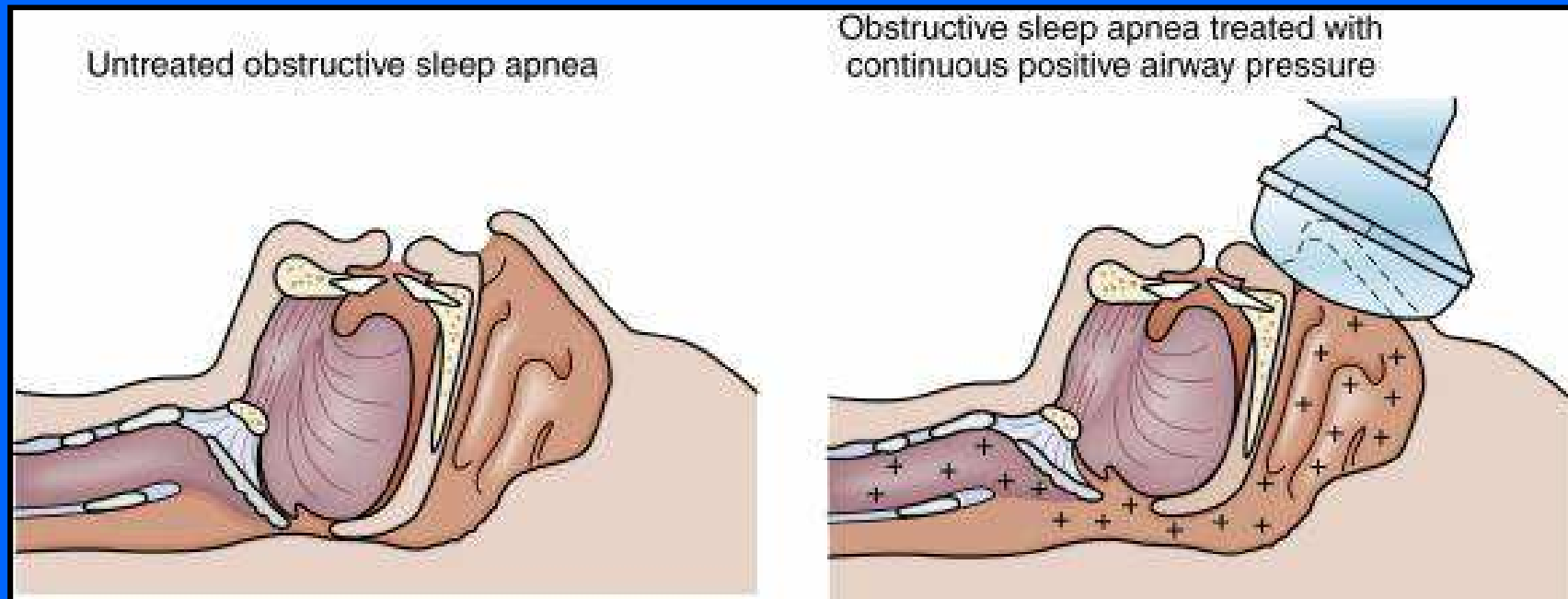


establish the effectiveness of subsequent treatment. Once the diagnosis is established, the patient should be included in deciding an appropriate treatment strategy that may include positive airway pressure devices, oral appliances, behavioral treatments, surgery, and/or adjunctive treatments. OSA should be approached as a chronic disease requiring long-term, multidisciplinary management. For each treatment option, appropriate outcome measures and long-term follow-up are described.

### Riesgo

Obesity (BMI > 35)  
Congestive heart failure  
Atrial fibrillation  
Treatment refractory hypertension  
Type 2 diabetes  
Nocturnal dysrhythmias  
Stroke  
Pulmonary hypertension  
High-risk driving populations  
Preoperative for bariatric surgery

**CPAP**  
**Adecuación oral**  
**Pérdida de peso**  
**Reconstrucción via aérea superior**  
**Cirugía bariátrica**  
**Tratamiento enfermedad de base**



**Efecto de la Presión de Aire Continua Positiva (CPAP) en la Apnea Obstructiva de Sueño (SAOS).  
El principal mecanismo de la CPAP en el tratamiento del SAOS es la conducción del aire y la dilatación de los segmentos laríngeos obstruidos.**





apnea de sueño



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[¿Qué es la apnea del sueño? - NHLBI, NIH](#)

[https://www.nhlbi.nih.gov/health-spanish/health-topics/.../sleep\\_apnea/](https://www.nhlbi.nih.gov/health-spanish/health-topics/.../sleep_apnea/) ▾

Casi siempre la **apnea del sueño** es un problema crónico (constante) de salud que altera el sueño. La persona pasa de un **sueño** profundo a un **sueño** liviano ...

Otros nombres de la apnea del ... - ¿Cómo se trata la apnea del ... - Estudios clínicos

[Apnea obstructiva del sueño: MedlinePlus enciclopedia médica](#)

[www.nlm.nih.gov/medlineplus/spanish/ency/article/000811.htm](http://www.nlm.nih.gov/medlineplus/spanish/ency/article/000811.htm) ▾

El ronquido en personas con **apnea** obstructiva del **sueño** es causado por el aire que trata de escurirse a través de la vía respiratoria estrecha o bloqueada.

[Apnea del sueño: MedlinePlus en español](#)

[www.nlm.nih.gov/medlineplus/spanish/sleepapnea.html](http://www.nlm.nih.gov/medlineplus/spanish/sleepapnea.html) ▾

La **apnea del sueño** es un trastorno común en donde la respiración se interrumpe o se hace muy superficial. Estas interrupciones pueden durar desde unos ...

Anuncios ⓘ

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Home > Información sobre salud para el público > Temas de salud > Apnea del sueño > ¿Qué es...?

### Explorar Apnea del sueño

**¿Qué es...?**

OTROS NOMBRES

CAUSAS

¿CÓMO SE CORRE EL RIESGO?

SÍNTOS Y SEÑALES

DIAGNÓSTICO

TRATAMIENTOS

VIVIR CON...

ESTUDIOS CLÍNICOS

ENLACES

VERSIÓN EN INGLÉS

**Temas relacionados**

[Apnea obstructiva del sueño](#)

[Apnea obstructiva del sueño](#)

## ¿Qué es la apnea del sueño?

La apnea del sueño es un trastorno común en el que la persona que lo sufre hace una o más pausas en la respiración e tiene respiraciones superficiales durante el sueño.

Las pausas pueden durar entre unos pocos segundos y varios minutos. A menudo ocurren entre 30 veces o más por hora. Por lo general, la respiración vuelve a la normalidad, a veces con un ronco fuerte o con un sonido parecido al que una persona hace cuando se estrangula.

Casi siempre la apnea del sueño es un problema crónico (constante) de salud que altera el sueño. La persona pasa de un sueño profundo a un sueño ligero cuando hay una pausa en la respiración o cuando la respiración se vuelve superficial.

Por esta razón, el sueño es de mala calidad y se siente cansancio durante el día. La apnea del sueño es una de las principales razones por las cuales una persona puede sentir mucho sueño durante el día.

**Revisión general**

A menudo la apnea del sueño se queda sin diagnóstico. Por lo general, los médicos no pueden detectar durante las consultas conexas. Además, no hay pruebas de sangre para este problema.

La mayoría de las personas que sufren apnea del sueño no saben que lo tienen porque solo ocurre durante el sueño. El primero en notar los signos de la apnea del sueño puede ser un familiar o quien duerme en la misma cama con la persona afectada.

El tipo más común de apnea del sueño es la apnea obstructiva del sueño. En ella las vías respiratorias se estrechan o bloquean durante el sueño. Esto causa respiración superficial o pausas en la respiración.

Cuando la persona trata de respirar, el aire que logra pasar por la parte estrechada puede causar "roncos" fuertes. La apnea obstructiva del sueño es más frecuente en personas con sobrepeso, pero puede afectar a cualquiera. Por ejemplo, los niños obesos que tienen las amígdalas inflamadas pueden tener apnea obstructiva de sueño.

La siguiente secuencia animada muestra cómo ocurre la apnea obstructiva del sueño. Pulse en el botón "Inicio" para verla. Cada ilustración está acompañada de explicaciones escritas y verbales. Use los botones de la esquina inferior derecha para hacer una pausa, reiniciar o volver a ver la secuencia desde el principio, o use la barra de desplazamiento que se encuentra debajo de las imágenes para desplazarse a una imagen o otra.

**Apnea obstructiva del sueño**

La secuencia animada muestra cómo puede bloquearse el flujo de aire que va de los pulmones y causar la apnea del sueño.

La apnea central del sueño es un tipo menos frecuente de apnea del sueño. Ocurre cuando la parte del cerebro que controla la respiración no envía las señales correctas a los músculos respiratorios. A consecuencia de esto, la persona no hace esfuerzos por respirar durante períodos cortos.

La apnea central del sueño puede presentarse en cualquier persona. Sin embargo, es más frecuente en quienes sufren ciertas enfermedades o usan ciertas medicinas.

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## Pulmonary Perspective

### Access to Diagnosis and Treatment of Patients with Suspected Sleep Apnea

W. Ward Flemons, Neil J. Douglas, Samuel T. Kuna, Daniel O. Rodenstein, and John Wheatley

Faculty of Medicine, University of Calgary, Calgary, Alberta, Canada; Respiratory Medicine, Royal Infirmary, Edinburgh, Scotland, United Kingdom; Philadelphia Veterans Affairs Medical Center, Philadelphia, Pennsylvania; Pneumology Department, Cliniques Universitaires Saint-Luc, Université Catholique de Louvain, Brussels, Belgium; and Department of Respiratory Medicine, Westmead Hospital, Wentworthville, New South Wales, Australia

Patient access to appropriate investigation and treatment for sleep apnea is clearly restricted. Resources in the five countries that are included in this report, including the estimated resources in the United States (9), are inadequate to deal with conservative estimates of demand based on known prevalence and incidence data. Because treatment of sleep apnea provides many benefits to patients and society, it is imperative that strategies be developed, and research evidence gathered to support them, that address the current demand–capacity chasm.

#### ESPAÑA (SEPAR)

**Unidades Multidisclipinares 31**  
**Unidades respiratorias 34**  
**Unidades Básicas 23**

	Nº	Población	Razón
Reino Unido	84	58.000.000	690.476
Belgica	50	10.000.000	200.000
Australia	65	18.970.000	291.846
USA	1.292	280.000.000	216.718
Canada	100	31.400.000	314.000
España*	88	47.000.000	534.091

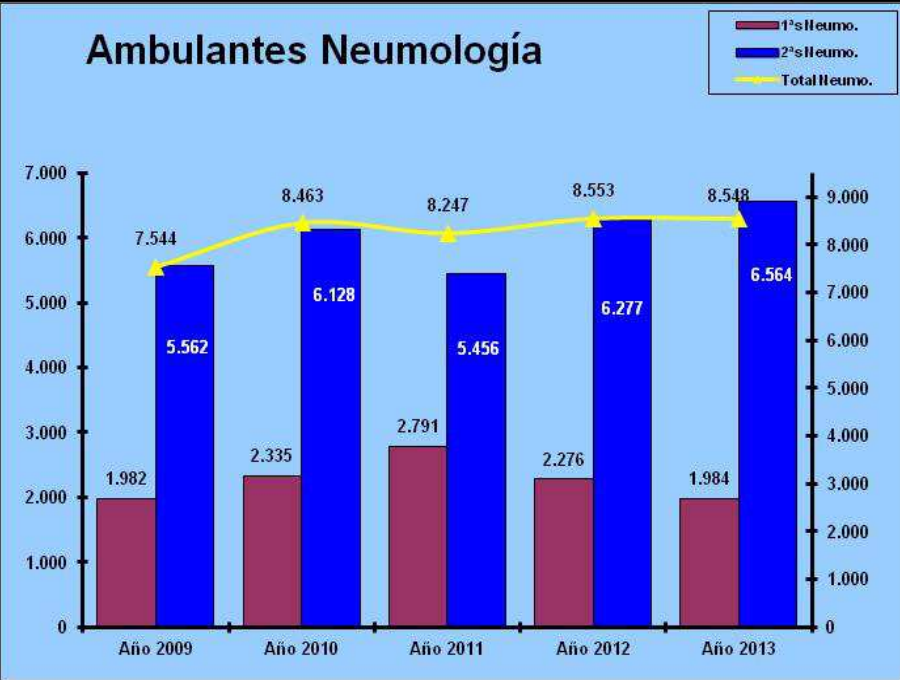
\* año 2013

**Infradiagnóstico**

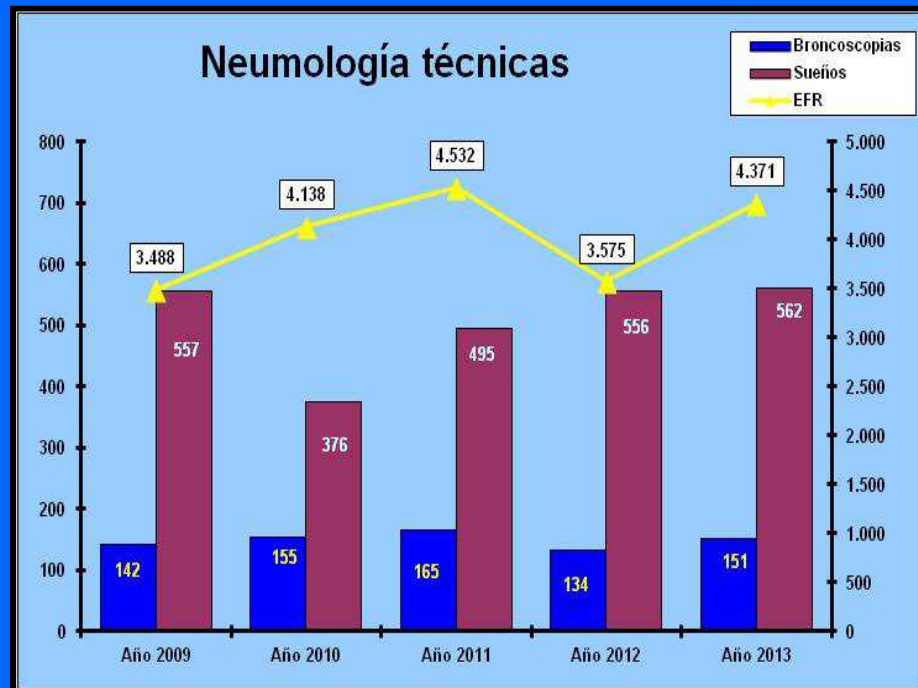
## Experiencia de nuestro Servicio

**180.000 habitantes\***  
**Unidad Básica acreditada**  
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**1 enfermera a tiempo parcial**  
**Estudios de sueño básicos**  
**1433 pacientes activos**  
**550 estudios al año**

### Ambulantes Neumología



### Neumología técnicas



# Management of Obstructive Sleep Apnea in Adults: A Clinical Practice Guideline From the American College of Physicians

Amir Qaseem, MD, PhD, MHA; Jon-Erik C. Holty, MD, MS; Douglas K. Owens, MD, MS; Paul Dallas, MD; Melissa Starkey, PhD; and Paul Shekelle, MD, PhD, for the Clinical Guidelines Committee of the American College of Physicians\*

**Description:** The American College of Physicians (ACP) developed this guideline to present the evidence and provide clinical recommendations on the management of obstructive sleep apnea (OSA) in adults.

**Methods:** This guideline is based on published literature from 1966 to September 2010 that was identified by using MEDLINE, the Cochrane Central Register of Controlled Trials, and the Cochrane Database of Systematic Reviews. A supplemental MEDLINE search identified additional articles through October 2012. Searches were limited to English-language publications. The clinical outcomes evaluated for this guideline included cardiovascular disease (such as heart failure, hypertension, stroke, and myocardial infarction), type 2 diabetes, death, sleep study measures (such as the Apnea-Hypopnea Index), measures of cardiovascular status (such as blood pressure), measures of diabetes status (such as hemoglobin A<sub>1c</sub> levels), and quality of life. This guideline grades the evidence and recommendations using ACP's clinical practice guidelines grading system.

**Recommendation 1:** ACP recommends that all overweight and obese patients diagnosed with OSA should be encouraged to lose weight. (Grade: strong recommendation; low-quality evidence)

**Recommendation 2:** ACP recommends continuous positive airway pressure treatment as initial therapy for patients diagnosed with OSA. (Grade: strong recommendation; moderate-quality evidence)

**Recommendation 3:** ACP recommends mandibular advancement devices as an alternative therapy to continuous positive airway pressure treatment for patients diagnosed with OSA who prefer mandibular advancement devices or for those with adverse effects associated with continuous positive airway pressure treatment. (Grade: weak recommendation; low-quality evidence)

*Ann Intern Med.* 2013;159.

[www.annals.org](http://www.annals.org)

For author affiliations, see end of text.

This article was published at [www.annals.org](http://www.annals.org) on 24 September 2013.

# Outcomes in Patients with Chronic Obstructive Pulmonary Disease and Obstructive Sleep Apnea The Overlap Syndrome

Jose M. Marin<sup>1,2\*</sup>, Joan B. Soriano<sup>2,3\*</sup>, Santiago J. Carrizo<sup>1\*</sup>, Ana Boldova<sup>2\*</sup>, and Bartolome R. Celli<sup>4\*</sup>

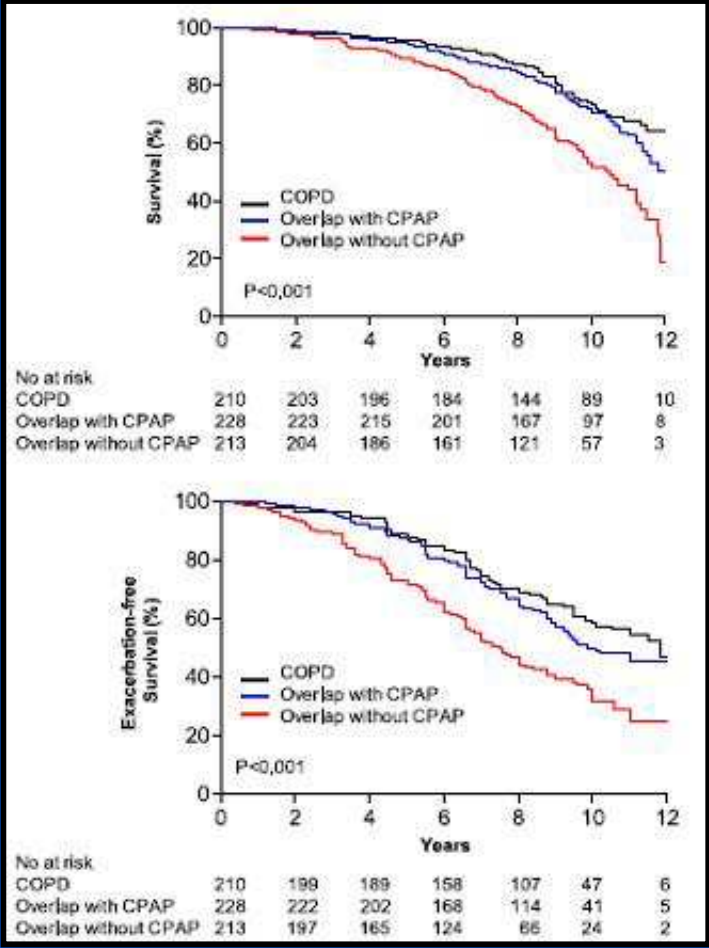
<sup>1</sup>Respiratory Service, Hospital Universitario Miguel Servet and Instituto Aragonés de Ciencias de la Salud, Zaragoza, Spain; <sup>2</sup>CIBER in Respiratory Diseases (CIBERES), Madrid, Spain; <sup>3</sup>Program of Epidemiology and Clinical Research, Fundació Caubet-CIMERA Illes Balears, Banyola, Spain; and <sup>4</sup>Pulmonary and Critical Care Medicine, Brigham and Women's Hospital, Harvard Medical School, Boston, Massachusetts



**Scientific Knowledge on the Subject**  
The coexistence of chronic obstructive pulmonary disease (COPD) and obstructive sleep apnea (OSA) is denominated "overlap syndrome." Long-term outcomes in patients with overlap syndrome remain unknown.

**Methods:** We included 228 patients with overlap syndrome treated with CPAP, 213 patients with overlap syndrome not treated with CPAP, and 210 patients with COPD without OSA. All were free of heart failure, myocardial infarction, or stroke. Median follow-up was 9.4 years (range, 3.3–12.7). End points were all-cause mortality and first-time COPD exacerbation leading to hospitalization.

**En pacientes con EPOC, la coexistencia de SAHS se asocia con un mayor riesgo de muerte por cualquier causa, de muerte cardiovascular y de hospitalización por exacerbación de la EPOC. Sin embargo, el tratamiento efectivo con CPAP presentó una mejor supervivencia y disminución de los ingresos. La búsqueda de SAOS en los pacientes EPOC debe ser sistemática ya que el tratamiento de aquella mejora claramente la evolución.**



ORIGINAL ARTICLE

# Therapeutic Electrical Stimulation of the Hypoglossal Nerve in Obstructive Sleep Apnea

Alan R. Schwartz, MD; Marc L. Bennett, MD; Philip L. Smith, MD; Wilfried De Backer, MD; Jan Hedner, MD; An Boudewyns, MD; Paul Van de Heyning, MD; Hasse Ejnell, MD; Walter Hochban, DDS, MD; Lennart Knaack, MD; Thomas Podszus, MD; Thomas Penzel, PhD; J. Hermann Peter, MD; George S. Goding, MD; Donald J. Erickson; Roy Testerman, PhD; Frans Ottenhoff, PhD; David W. Eisele, MD

**Background:** Hypoglossal nerve stimulation has been demonstrated to relieve upper airway obstruction acutely, but its effect on obstructive sleep apnea is not known.

**Objective:** To determine the response in obstructive sleep apnea to electrical stimulation of the hypoglossal nerve.

**Methods:** Eight patients with obstructive sleep apnea were implanted with a device that stimulated the hypoglossal nerve unilaterally during inspiration. Sleep and breathing patterns were examined at baseline before implantation and after implantation at 1, 3, and 6 months and last follow-up.

**Results:** Unilateral hypoglossal nerve stimulation decreased the severity of obstructive sleep apnea throughout the entire study period. Specifically, stimulation significantly reduced the mean apnea-hypopnea indices in

non-rapid eye movement (mean  $\pm$  SD episodes per hour,  $52.0 \pm 20.4$  for baseline nights and  $22.6 \pm 12.1$  for stimulation nights;  $P < .001$ ) and rapid eye movement ( $48.2 \pm 30.5$  and  $16.6 \pm 17.1$ , respectively;  $P < .001$ ) sleep and reduced the severity of oxyhemoglobin desaturations. With improvement in sleep apnea, a trend toward deeper stages of non-rapid eye movement sleep was observed. Moreover, all patients tolerated long-term stimulation at night and did not experience any adverse effects from stimulation. Even after completing the study protocol, the 3 patients who remained free from stimulator malfunction continued to use this device as primary treatment.

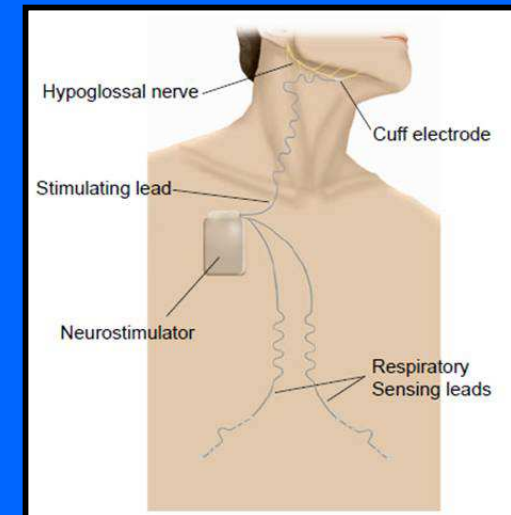
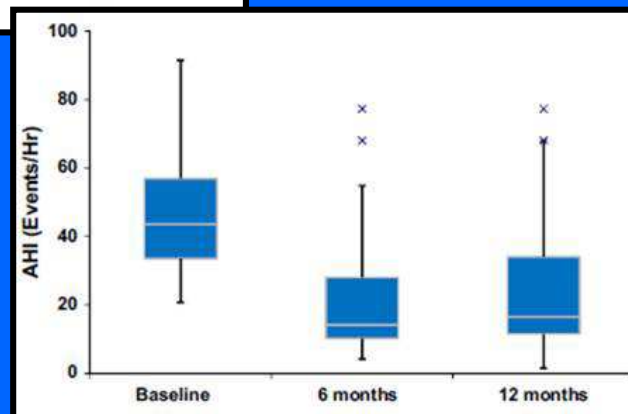
**Conclusion:** The findings demonstrate the feasibility and therapeutic potential for hypoglossal nerve stimulation in obstructive sleep apnea.

*Arch Otolaryngol Head Neck Surg.* 2001;127:1216-1223

## Hypoglossal nerve stimulation improves obstructive sleep apnoea: 12-month outcomes

ERIC J. KEZIRIAN<sup>1</sup>, GEORGE S. GODING JR<sup>2</sup>, ATUL MALHOTRA<sup>3</sup>, FERGAL J. O'DONOGHUE<sup>4,5</sup>, GARY ZAMMIT<sup>6</sup>, JOHN R. WHEATLEY<sup>7</sup>, PETER G. CATCHESIDE<sup>8,9,10</sup>, PHILIP L. SMITH<sup>11</sup>, ALAN R. SCHWARTZ<sup>11</sup>, JENNIFER H. WALSH<sup>12,13</sup>, KATHLEEN J. MADDISON<sup>12,13</sup>, DAVID M. CLAMAN<sup>14</sup>, TOD HUNTLEY<sup>15</sup>, STEVEN Y. PARK<sup>16</sup>, MATTHEW C. CAMPBELL<sup>4</sup>, CARSTEN E. PALME<sup>7</sup>, CONRAD IBER<sup>2</sup>, PETER R. EASTWOOD<sup>12,13</sup>, DAVID R. HILLMAN<sup>12,13</sup> and MAREE BARNES<sup>4,5</sup>

night. There was a significant improvement ( $P < 0.001$ ) from baseline to 12 months in apnoea-hypopnoea index ( $45.4 \pm 17.5$  to  $25.3 \pm 20.6$  events  $h^{-1}$ ) and Functional Outcomes of Sleep Questionnaire score ( $14.2 \pm 2.0$  to  $17.0 \pm 2.4$ ), as well as other polysomnogram and symptom measures. Outcomes were stable compared with 6 months following implantation. Three serious device-related adverse events occurred: an infection requiring device removal; and two stimulation lead cuff dislodgements requiring replacement. There were no significant adverse events with onset later than 6 months following implantation. Hypoglossal nerve stimulation demonstrated favourable safety, feasibility and efficacy.





ORIGINAL ARTICLE

## Upper-Airway Stimulation for Obstructive Sleep Apnea

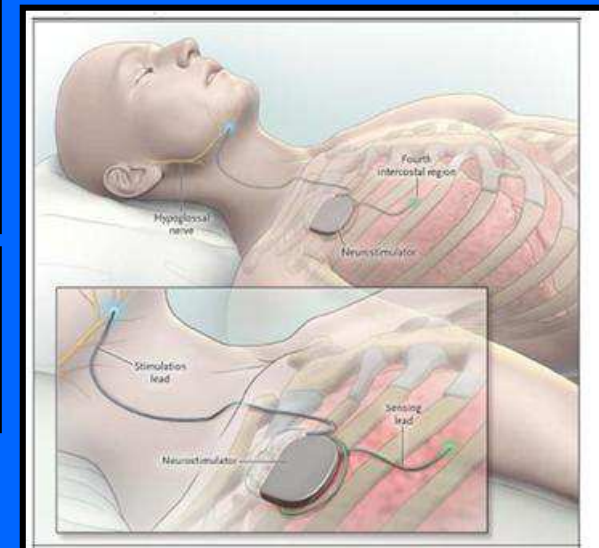
Patrick J. Strollo, Jr., M.D., Ryan J. Soose, M.D., Joachim T. Maurer, M.D., Nico de Vries, M.D., Jason Cornelius, M.D., Oleg Froymovich, M.D., Ronald D. Hanson, M.D., Tapan A. Padhya, M.D., David L. Steward, M.D., M. Boyd Gillespie, M.D., B. Tucker Woodson, M.D., Paul H. Van de Heyning, M.D., Ph.D., Mark G. Goetting, M.D., Oliver M. Vanderveken, M.D., Ph.D., Neil Feldman, M.D., Lennart Knaack, M.D., and Kingman P. Strohl, M.D., for the STAR Trial Group\*

### RESULTS

The study included 126 participants; 83% were men. The mean age was 54.5 years, and the mean body-mass index (the weight in kilograms divided by the square of the height in meters) was 28.4. The median AHI score at 12 months decreased 68%, from 29.3 events per hour to 9.0 events per hour ( $P<0.001$ ); the ODI score decreased 70%, from 25.4 events per hour to 7.4 events per hour ( $P<0.001$ ). Secondary outcome

### CONCLUSIONS

In this uncontrolled cohort study, upper-airway stimulation led to significant improvements in objective and subjective measurements of the severity of obstructive sleep apnea. (Funded by Inspire Medical Systems; STAR ClinicalTrials.gov number,



## Adult obstructive sleep apnoea

Amy S Jordan, David G McSharry, Atul Malhotra

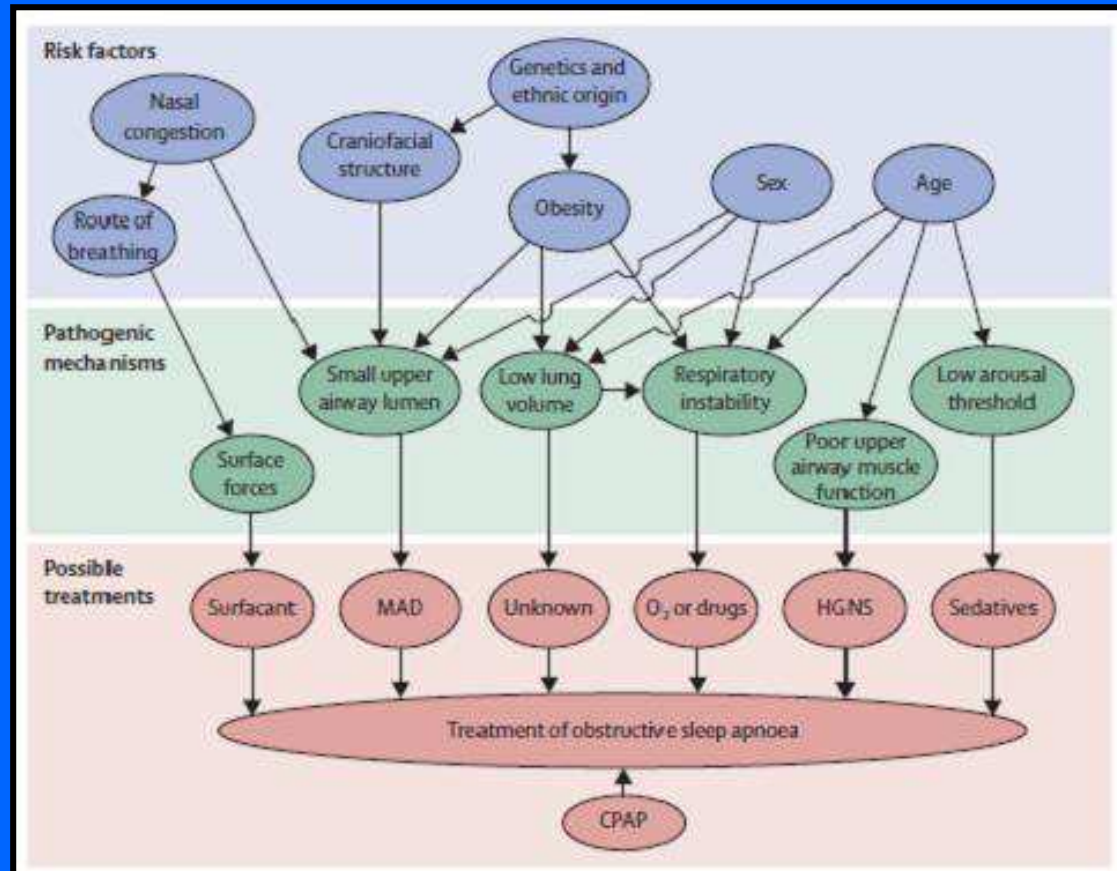
Obstructive sleep apnoea is an increasingly common disorder of repeated upper airway collapse during sleep, leading to oxygen desaturation and disrupted sleep. Features include snoring, witnessed apnoeas, and sleepiness. Pathogenesis varies; predisposing factors include small upper airway lumen, unstable respiratory control, low arousal threshold, small lung volume, and dysfunctional upper airway dilator muscles. Risk factors include obesity, male sex, age, menopause, fluid retention, adenotonsillar hypertrophy, and smoking. Obstructive sleep apnoea causes sleepiness, road traffic accidents, and probably systemic hypertension. It has also been linked to myocardial infarction, congestive heart failure, stroke, and diabetes mellitus though not definitively. Continuous positive airway pressure is the treatment of choice, with adherence of 60–70%. Bi-level positive airway pressure or adaptive servo-ventilation can be used for patients who are intolerant to continuous positive airway pressure. Other treatments include dental devices, surgery, and weight loss.



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[http://dx.doi.org/10.1016/S0140-6736\(13\)60734-5](http://dx.doi.org/10.1016/S0140-6736(13)60734-5)  
University of Melbourne, Melbourne, VIC, Australia (A S Jordan PhD); Institute for Breathing and Sleep, Melbourne, VIC, Australia (A S Jordan); Brigham and Women's Hospital and Harvard Medical School, Boston, MA, USA (D G McSharry MB)

"The UK Government Development Finance for development of China: does a health service an advantage or a hindrance to sustained growth? (Public Health Strategy)"

**MAD dispositivo de avance mandibular  
HGNS Estimulación del hipogloso**





Sociedad Española de Medicina Interna

# PROTOCOLOS

## MANEJO DIAGNÓSTICO Y TERAPÉUTICO DE LAS COMORBILIDADES EN LA EPOC

Coordinadores  
Jesús Díez Manglano  
Francisco López García

### Síndrome de apnea-hipopnea obstructiva del sueño

F.J. SÁNCHEZ LORA Y C. LÓPEZ CALDERÓN

#### Prevalencia

La prevalencia del síndrome de apnea-hipopnea obstructiva del sueño (SAHOS) en la población general es del 2 al 14% y del 21 al 90% en los pacientes remitidos para evaluación a unidades específicas de trastornos del sueño. La prevalencia varía en función del punto de corte empleado en el índice de apnea-hipopnea (IAH), definido como el número de episodios de apneas-hipopneas por hora de sueño: en el caso de un IAH  $\geq 5$  episodios/h, la prevalencia es del 9-17% y en el supuesto de un IAH  $\geq 15$  episodios/h, alcanza el 6%. Si en la definición se incluyen síntomas asociados a la presencia de un IAH  $\geq 5$  episodios/h, la prevalencia es del 2-4%, con claro predominio en varones<sup>1</sup>.

Por otra parte, la coexistencia de enfermedad pulmonar obstructiva crónica (EPOC) y SAHOS (síndrome de *overlap*) tiene una prevalencia de alrededor del 1% de los adultos en la población general<sup>1</sup>. La prevalencia del SAHOS diagnosticado en pacientes con EPOC grave es de hasta un 20%<sup>1</sup>, mientras que en los pacientes con EPOC ligera-moderada no varía de la población general adulta<sup>1</sup>. La prevalencia de EPOC en pacientes con SAHOS es de un 10-40% y suelen ser varones, generalmente de mayor edad, con mayor valor de presión arterial de anhídrido carbónico ( $\text{PaCO}_2$ ) y de presión arterial pulmonar, y un valor de presión arterial de oxígeno ( $\text{PaO}_2$ ) menor<sup>1</sup>.

229

**Javier Sánchez Lora**  
**Cristina López Calderón**



Hospital Universitario Virgen de la Victoria  
Servicio Andaluz de Salud  
CONSEJERÍA DE IGUALDAD, SALUD Y POLÍTICAS SOCIALES



# CONCLUSIONES

**EPOC y SAOS procesos diferentes.**

**S. "overlap", no mas frecuente en EPOC, pero mas severo.**

**Importancia del sueño para algo más que la calidad de vida.**

**Factores de riesgo CV.**

**Obesidad y Resistencia insulínica.**

**Marcadores de inflamación.**

**Aspectos de enfermedad sistémica.**

**Oferta "popular" de dispositivos.**

**HIPOXIA nocturna**

**Pérdida de peso.**

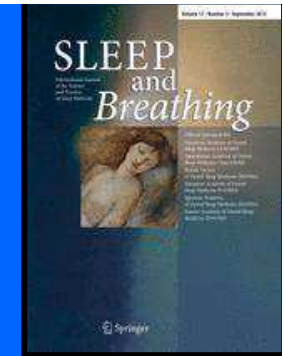
**Tratamiento de los factores de riesgo.**

**CPAP.**

**Correcciones anatómicas.**

**Consejos higiénicos.**

***Sistemas experimentales de estimulación eléctrica.***



Sleep and Breathing

January 2002, Volume 6, Issue 1, pp 3-10

## Long-Term Effects of Treatment with Nasal Continuous Positive Airway Pressure on Lung Function in Patients with Overlap Syndrome

Javier de Miguel M.D., Jorge Cabello M.D., José M. F. Sánchez-Alarcos M.D., Rudolfo Álvarez-Sala M.D., Domingo Espinós M.D., Ph.D., José L. Álvarez-Sala M.D., Ph.D.

**55 unselected patients (48 men, mean age of  $58.5 \pm 10.5$  years) with a concurrent diagnosis of chronic obstructive pulmonary disease (COPD) and obstructive sleep apnea-hypopnea syndrome (OSAHS)**

**Response of overlap syndrome patients to CPAP therapy was superior in the hypercapnic group, particularly in relation to improvement of arterial blood gases. However, statistically significant differences in all parameters for the comparison between 6 and 18 months were not recorded.**