Manifestaciones Clínicas y Tratamiento de los Trastornos Respiratorios Durante el Sueño

Curso de Especialistas en Medicina Interna

SMIBA 2027

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FAS
FUNDACIÓN ARGENTINA DEL SUEÑO

El sueño es una “amenaza” para la respiración

AMENAZA		**RESPUESTA**
⬇ Tono de músculos VAS	➡	Apneas obstructivas
⬇ Estímulo respiratorio	➡	Hipoventilación
⬇ Volúmenes pulmonares	➡	Hipoxemia
⬇ Relación V/Q	➡	AC y RP

Progresión del Trastorno Respiratorio Vincualdo al Sueño

Tiempo

Respirac. Normal — **Ronquido Posicional** — **Ronquido** — **UARS** — **AOS**

Alcohol
Benzodiazepinas

Peso Corporal
Obstrucción Nasal

Sobrepeso
COPD

ESD/Trast.Cogn.
HTA Sist
IC/Stroke
Hipercapnia
HTP
Cor pulmonale

Adaptado de Schwartz, J 2006

¿Qué es la Apnea Obstructiva del Sueño?

Definición

Trastorno respiratorio del sueño caracterizado por episodios repetitivos de obstrucción parcial (hipopnea) o completa (apnea) de la vía aérea superior durante el sueño, a pesar de los esfuerzos respiratorios continuos.

Apnea

Cese completo del flujo aéreo ≥ 10 segundos

Hipopnea

Reducción del flujo aéreo ≥ 30% asociado a desaturación o microdespertar

IAH

Índice Apnea-Hipopnea: número de eventos por hora de sueño o de registro

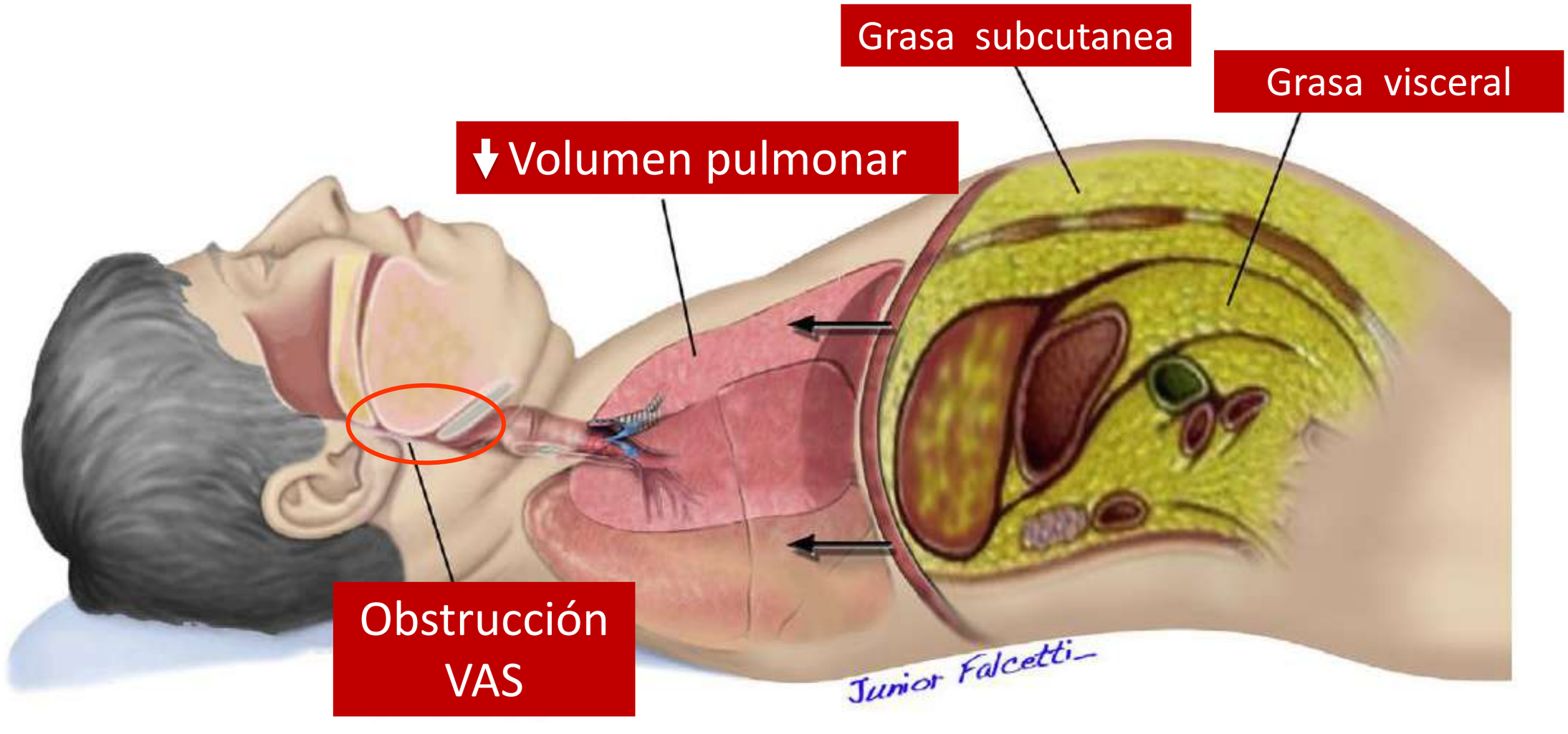
Fuente: AASM – American Academy of Sleep Medicine, 2023

STATE-OF-THE-ART PAPER

Obstructive Sleep Apnea

A Cardiometabolic Risk in Obesity and the Metabolic Syndrome

Luciano F. Drager, MD, PhD,* Sônia M. Togeiro, MD, PhD,† Vsevolod Y. Polotsky, MD, PhD,‡
Geraldo Lorenzi-Filho, MD, PhD*



Journal of the American College of Cardiology Vol. 62, No. 7, 2013

ALTERACIONES ANATÓMICAS 100%

APNEAS OBSTRUCTIVAS

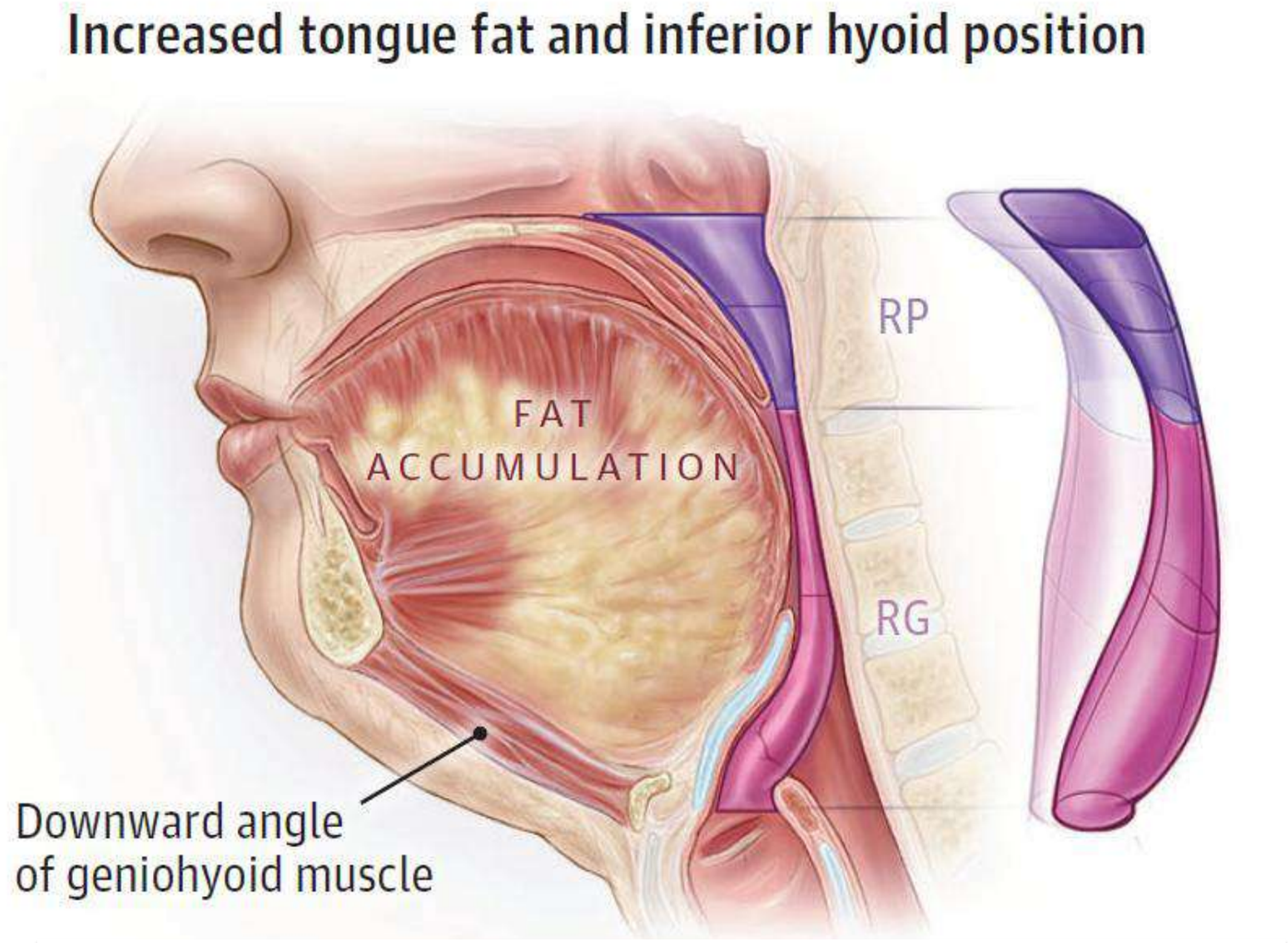
36%
FALLA EN LOS MUSCULOS DILATADORES

36%
INESTABILIDAD DEL CONTROL VENTILATORIO

37%
BAJO UMBRAL DEL DESPERTAR

Eckert DJ, Sleep Medicine Reviews. Dec 2016

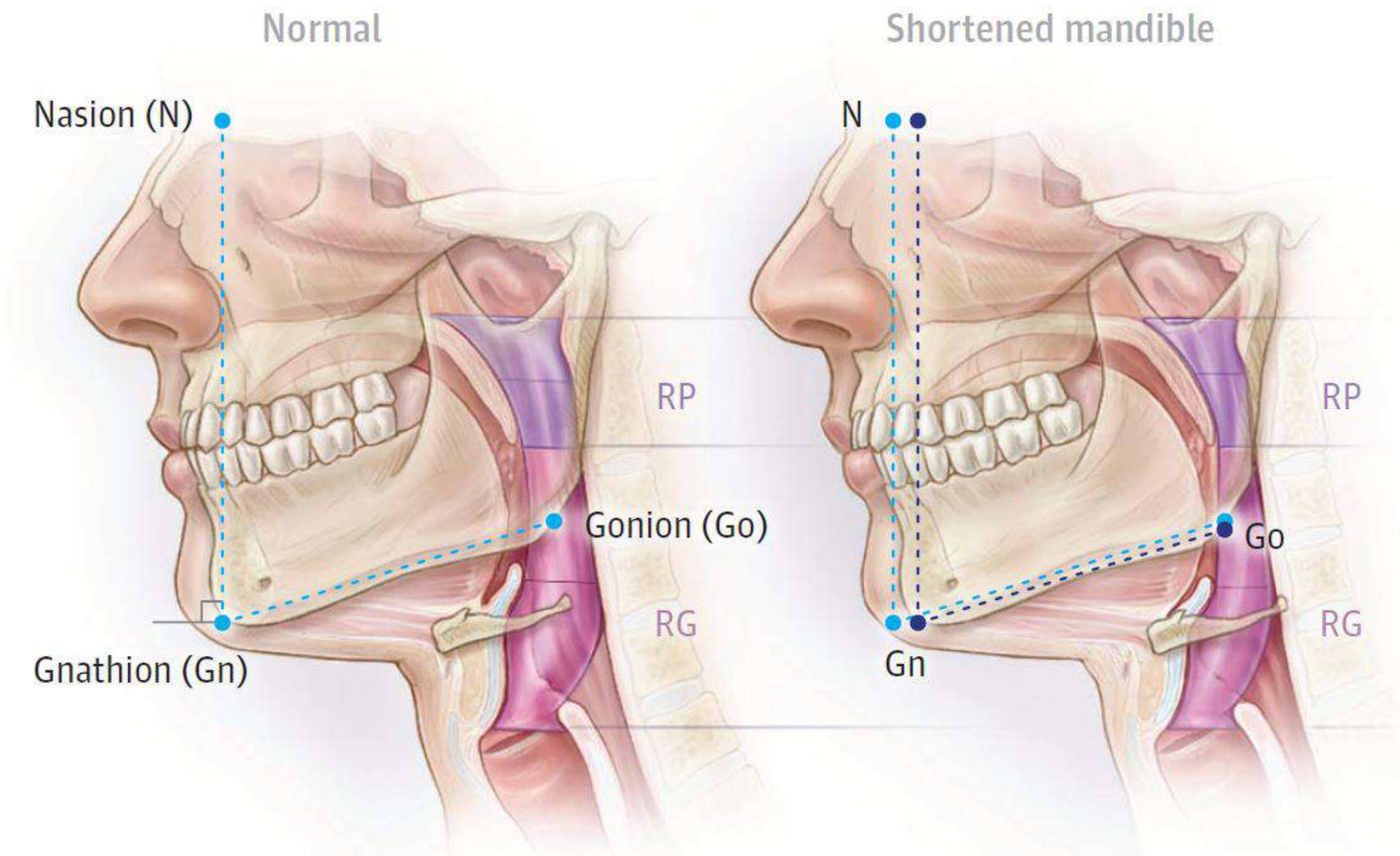
Figure 1. Anatomic Features Contributing to Obstructive Sleep Apnea (OSA)



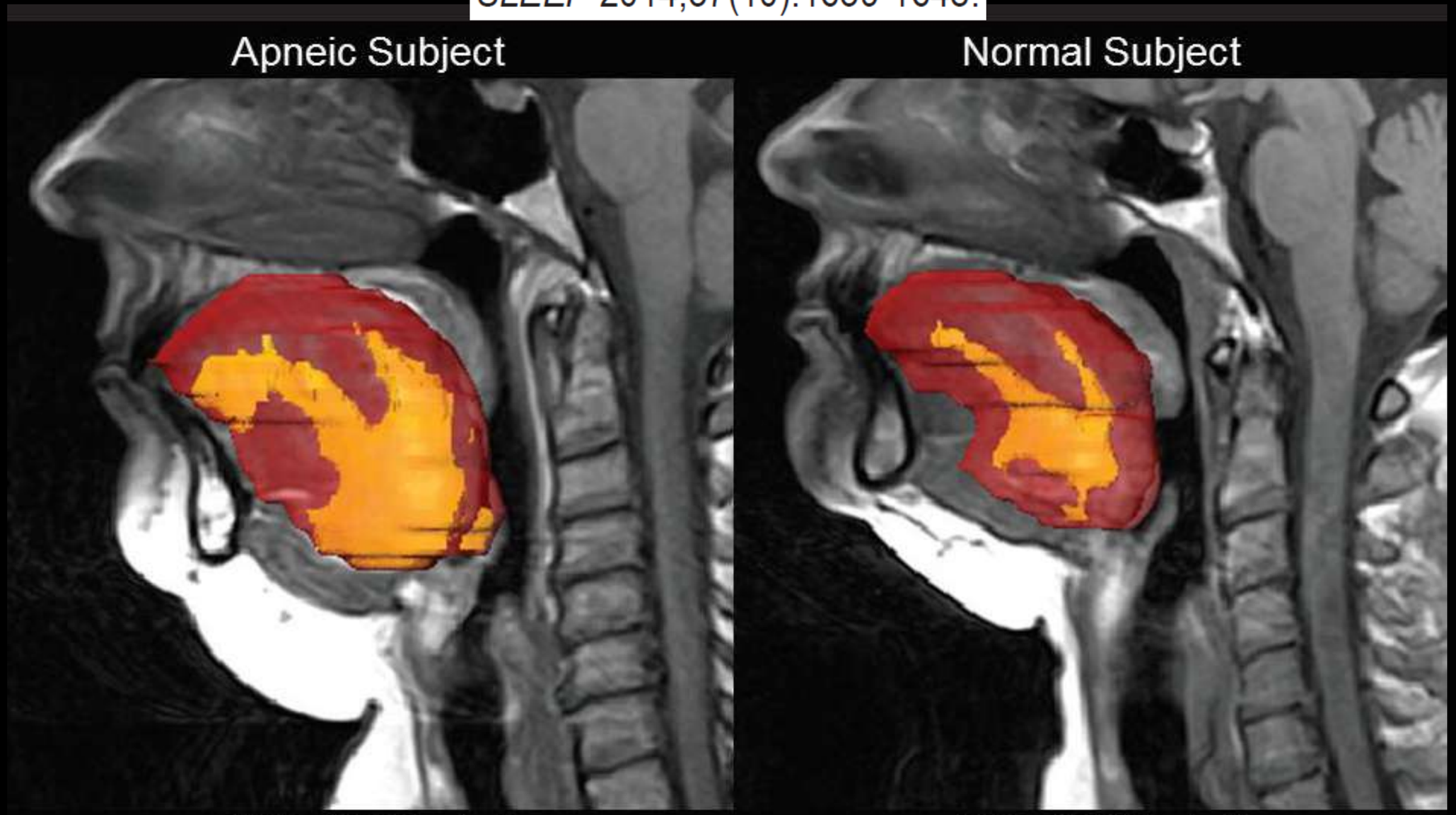
Narrowing of the upper airway is common in patients with OSA. This can result from a long soft palate, enlargement of the tongue and pharyngeal wall, and a more inferior and posterior position of the hyoid bone, commonly due to fat deposition, or from skeletal features including mandibular retrognathia and a shorter mandibular or maxillary length.

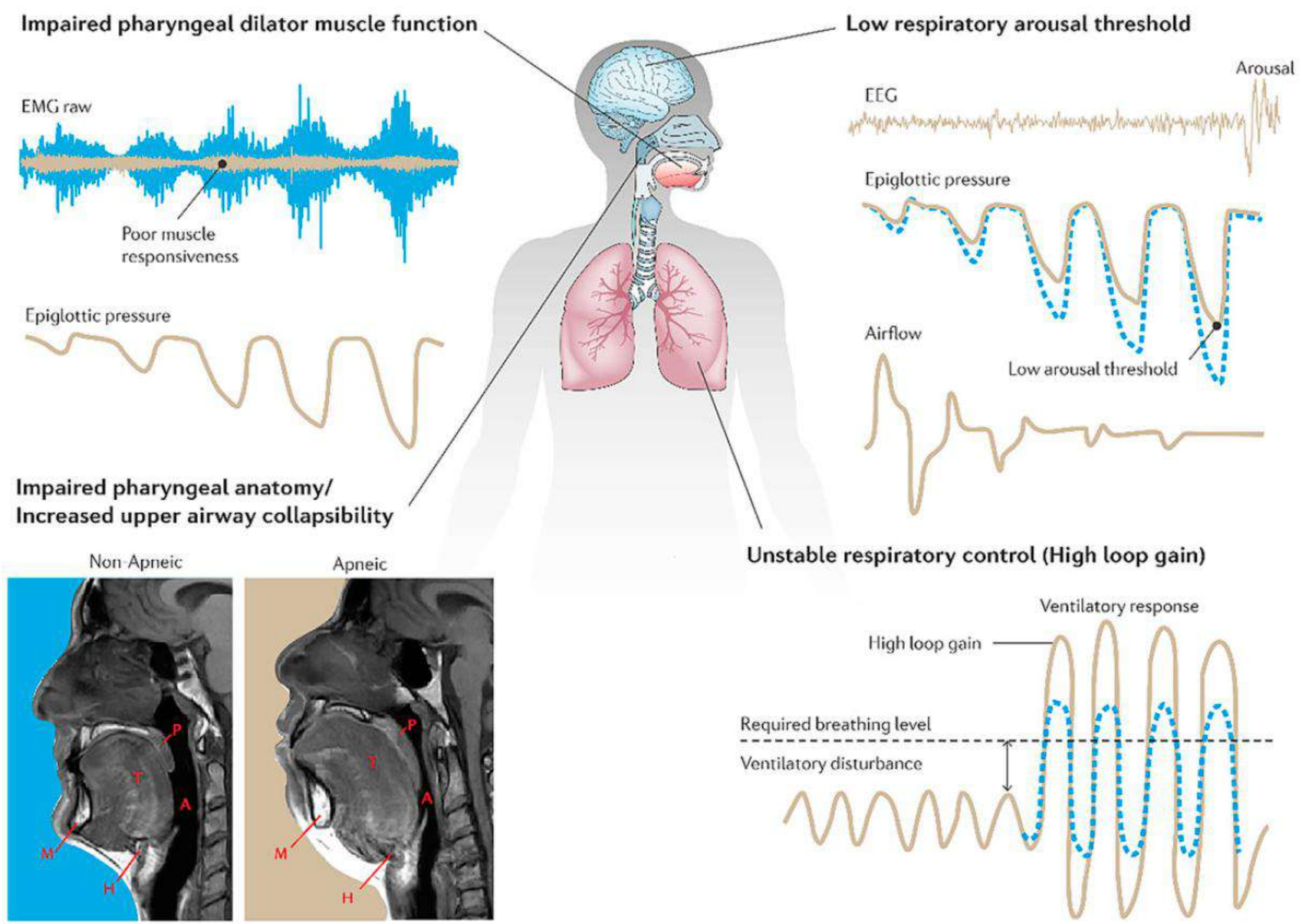
ALTERACIONES ANATÓMICAS 100%

Shortened mandible length



SLEEP 2014;37(10):1639-1648.




Impaired pharyngeal dilator muscle function
EMG raw
Poor muscle responsiveness
Epiglottic pressure
Impaired pharyngeal anatomy/
Increased upper airway collapsibility
Non-Apneic
Apneic
P
T
A
M
H
Low respiratory arousal threshold
Arousal
EEG
Epiglottic pressure
Airflow
Low arousal threshold
Unstable respiratory control (High loop gain)
Ventilatory response
High loop gain
Required breathing level
Ventilatory disturbance

Endotipos en Apnea del Sueño

Endotipo: mecanismo fisiopatológico subyacente que explica el colapso repetido de la vía aérea superior durante el sueño, es medible y tiene implicancia clínica.

¿Por qué importa?

- ✓ La AOS es heterogénea: misma severidad (AHI), distintos mecanismos.
- ✓ Tasa de fracaso de tratamientos actuales ~50%.
- ✓ El endotipo permite dirigir la terapia al mecanismo específico de cada paciente.
- ✓ Concepto clave: Transición de 'one-size-fits-all' a medicina de precisión en apnea del sueño.

Anatomía faríngea Colapso por aumento de tejidos	**Umbral del despertar** Despertar precoz ante carga ventilatoria
Loop Gain (Control ventilatorio) Inestabilidad del control respiratorio	**Respuesta muscular VAS** Función del GG, TP

Tolbert et al. · Am J Respir Crit Care Med 211(9):1562–1583, 2025

Fenotipos Clínicos de la AOS

Los fenotipos clínicos son independientes del IAH — los clusters presentan IAH similar entre sí pero difieren en síntomas, comorbilidades y pronóstico.

A Somnolencia Excesiva

Varón joven, obeso, AOS grave. Síntomas clásicos. Buena respuesta a CPAP. Mayor riesgo CV.

B Mínimamente Sintomático

Varón mayor, obeso, AOS grave, comorbilidades frecuentes. Menor respuesta a CPAP. Fenotipo no-dipping

C Insomnio Predominante

Mujer de edad media, levemente obesa, AOS moderada-grave. Mayor riesgo CV. Respuesta mixta a CPAP.

D Síntomas de Vía Aérea Superior

Varón joven, no obeso, AOS grave. Menor hipoxemia y comorbilidad. Menor éxito con CPAP.

Basado en: Zinchuk & Yaggi, Chest 2020 | Ye et al., ERJ 2014 | Keenan et al., Sleep 2018

Epidemiología y Criterios Diagnósticos

EPIDEMIOLOGÍA

- Afecta al 9–38% de la población adulta, según criterios diagnósticos
- Mayor prevalencia en hombres (2:1 vs mujeres), hasta la menopausia
- Incremento significativo con la edad y con la obesidad
- Alta tasa de subdiagnóstico: ~80%
- Segunda causa más frecuente de hipersomnia diurna

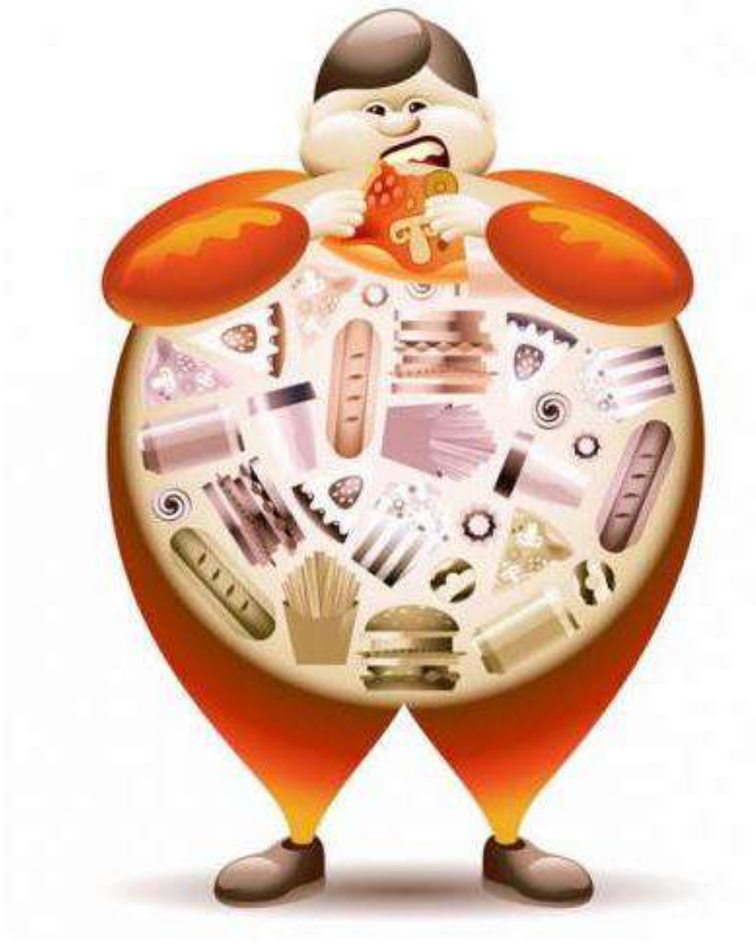
CLASIFICACIÓN POR IAH

Leve
5–14 eventos/hora

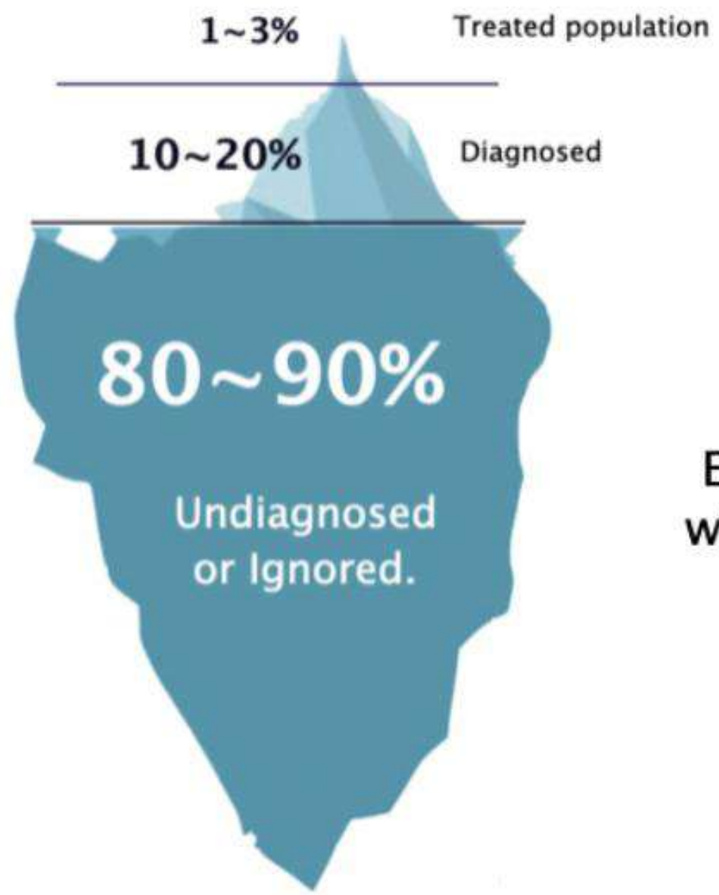
Moderada
15–29 eventos/hora

Grave
≥ 30 eventos/hora

Diagnóstico definitivo: Polisomnografía o Poligrafía Respiratoria







936 Million

Estimated number of people worldwide with Sleep Apnea including undiagnosed

Estimation of the global prevalence and burden of obstructive sleep apnea: A literature-based analysis. Lancet Respir. Med. 2019, 7, 687–698

Sleep and Breathing (2025) 29:89
https://doi.org/10.1007/s11325-025-03253-y

SLEEP BREATHING PHYSIOLOGY AND DISORDERS • ORIGINAL ARTICLE

Sleep apnea screening through a news portal using the STOP-bang questionnaire

Daniel Solomons[1,2] · Daniel Schonfeld[3] · Sergio Arias[4] · Daniel E. Vigo[5] · Mikel Azpiazu[6] · Daniel Pérez-Chada[7]

Received: 13 June 2024 / Revised: 2 January 2025 / Accepted: 15 January 2025
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STOP-Bang Questionnaire

- **S**: snoring
- **T**: tiredness
- **O**: observed apnea
- **P**: high BP
- **B**: BMI
- **a**: age
- **n**: neck circumference
- **g**: male gender

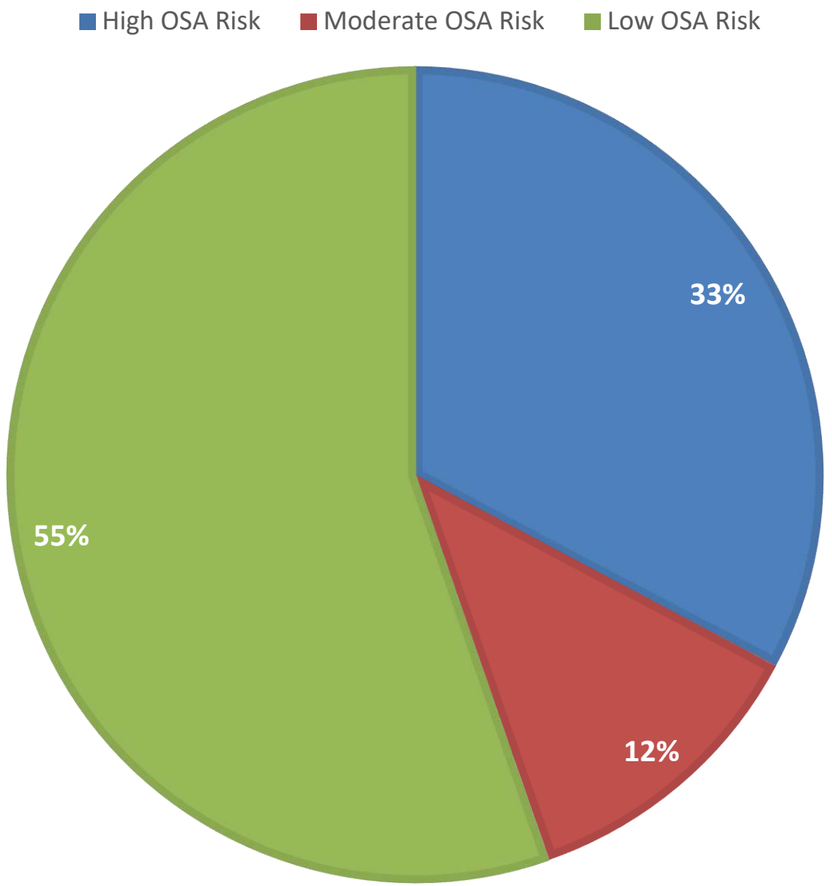


Anesthesiology, 2008; Br J Anaesth 2012; 108:768–75; CHEST 2016; 149(3):631-638

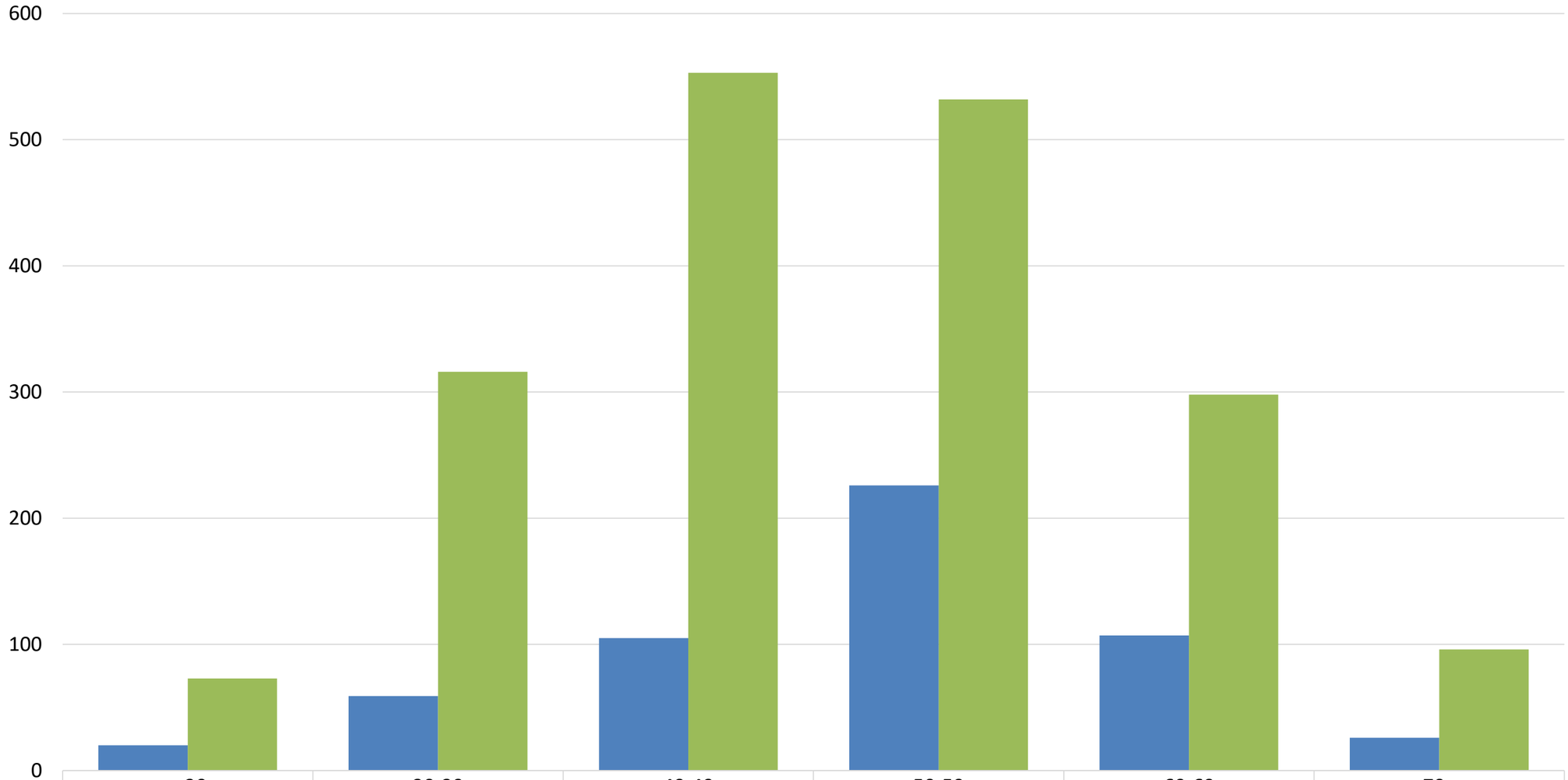
Results (I)

5968 subjects responded the questionnaire.
54.6% were males.
Median age: 44.9 yo (CI: 44.58-45.21).
Median BMI: 27.42 kg/m² (CI: 27.28-27.56).
Healthy BMI (18.5-24.9) = 35.3% of the sample.
Overweight (25-29.9) = 35.8%.
Obese (≥30) = 24.6%
Morbid obesity (>35)= 2.7%

Results (II)



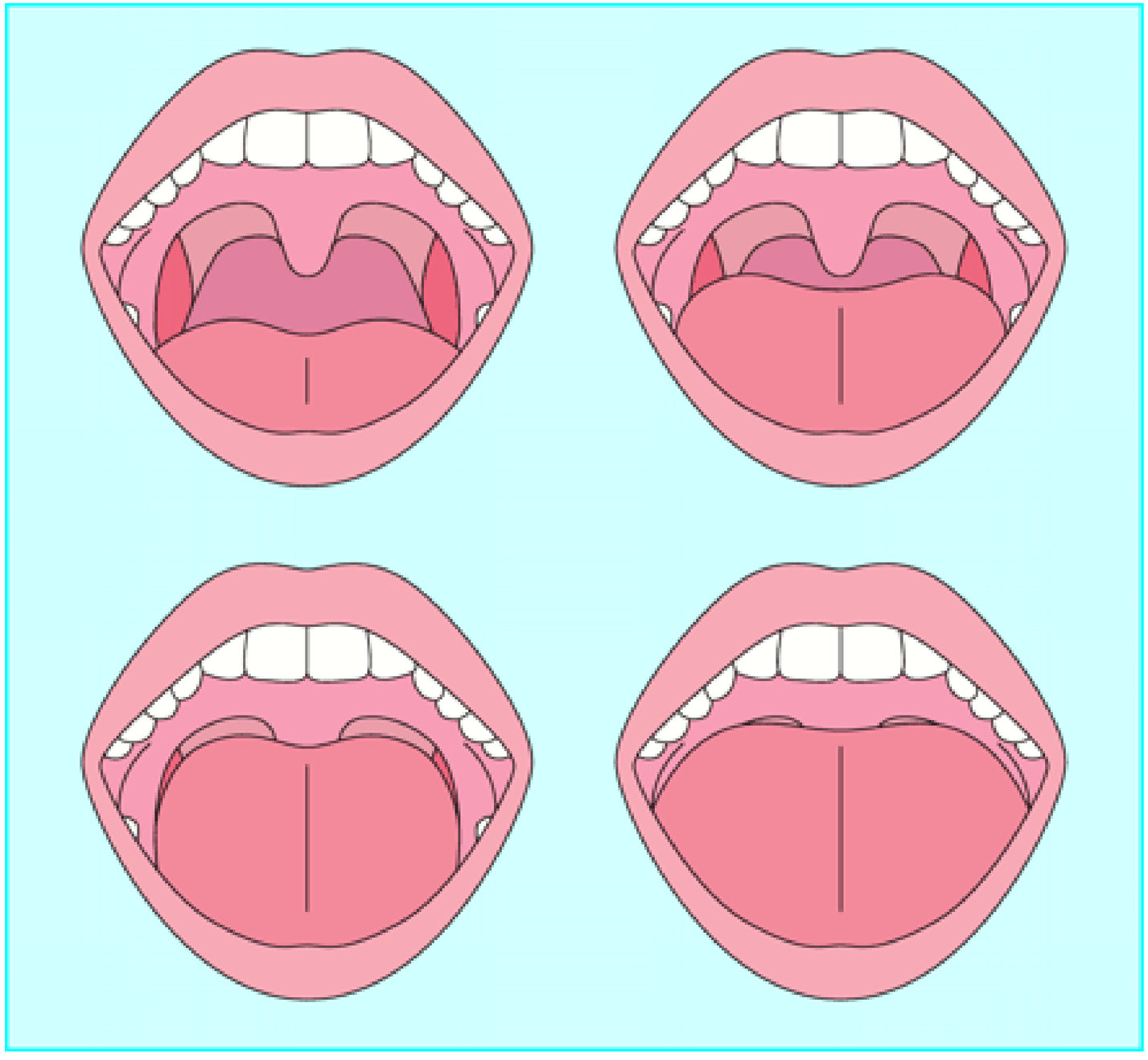
Moderate to high OSA risk according to STOPBang questionnare
Distribution between women and men according to age group

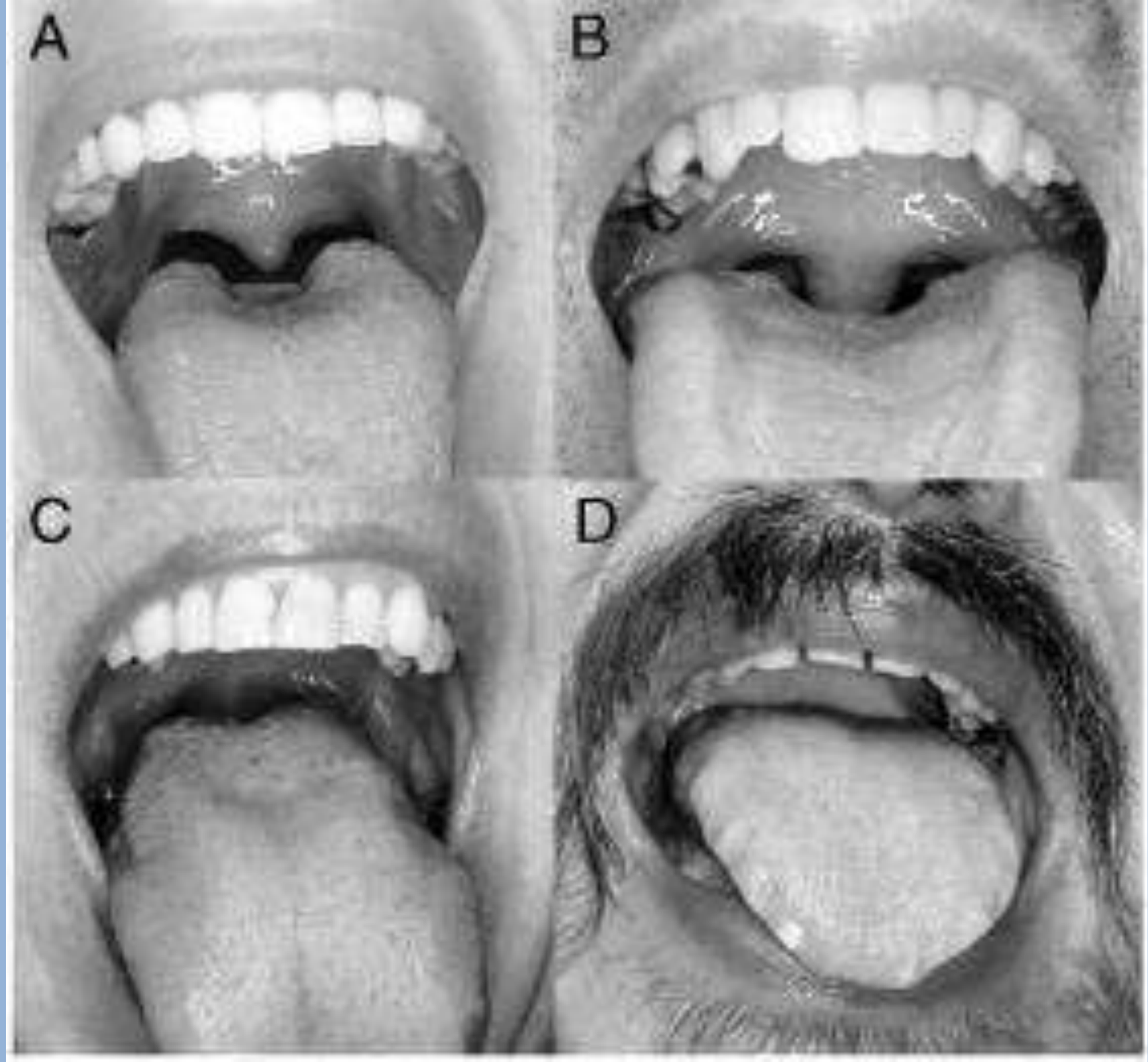


	< 30	30-39	40-49	50-59	60-69	70+
Female	20	59	105	226	107	26
Male	73	316	553	532	298	96

Female Male

Score de Mallampati




A
B
C
D



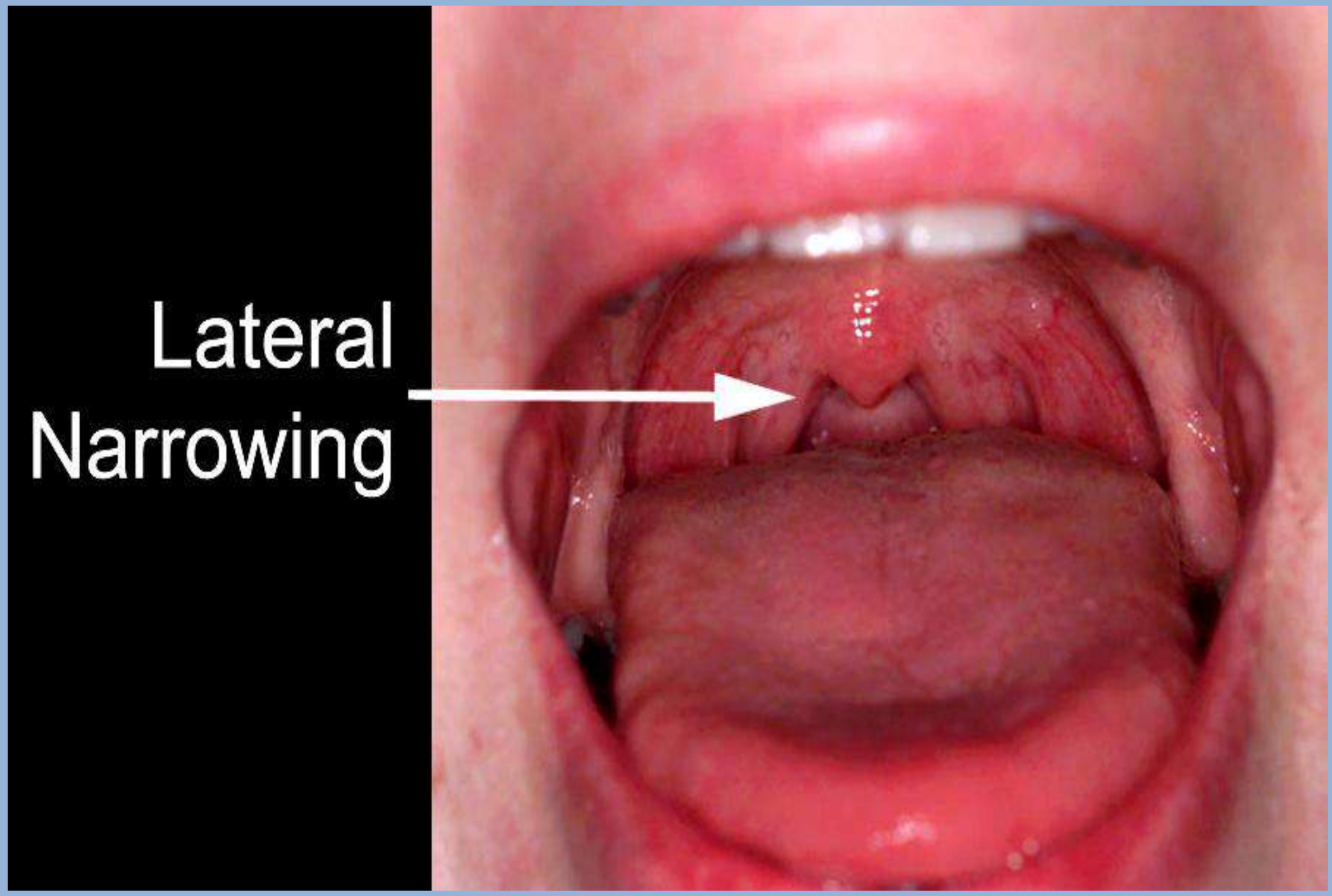
Vía aérea superior normal
(Schellenberg et al, AJRCCM 162;740-748, 2000)

Amígdalas hipertróficas



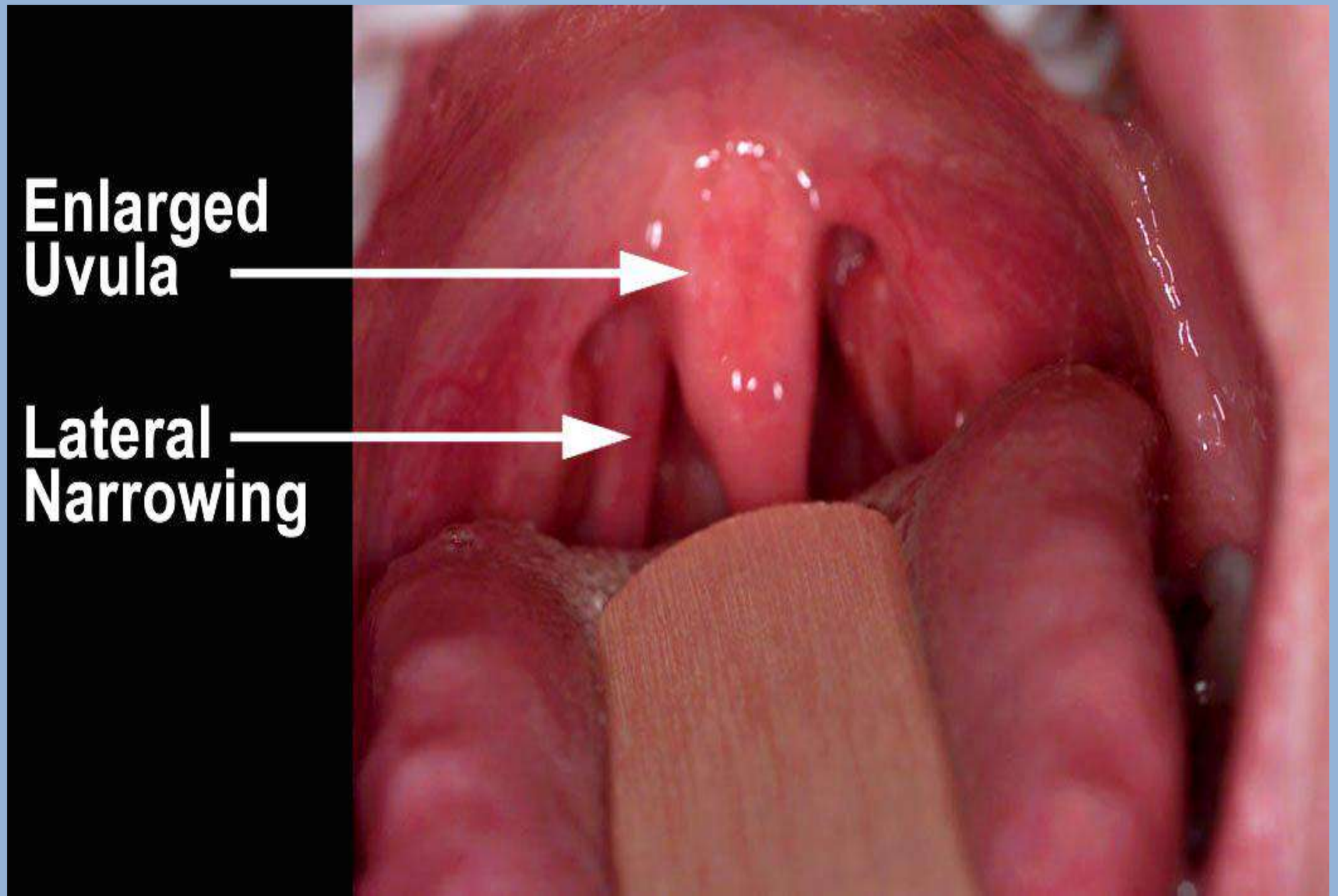
Examen físico y apnea de sueño

(Schellenberg et al, AJRCCM 162;740-748, 2000)



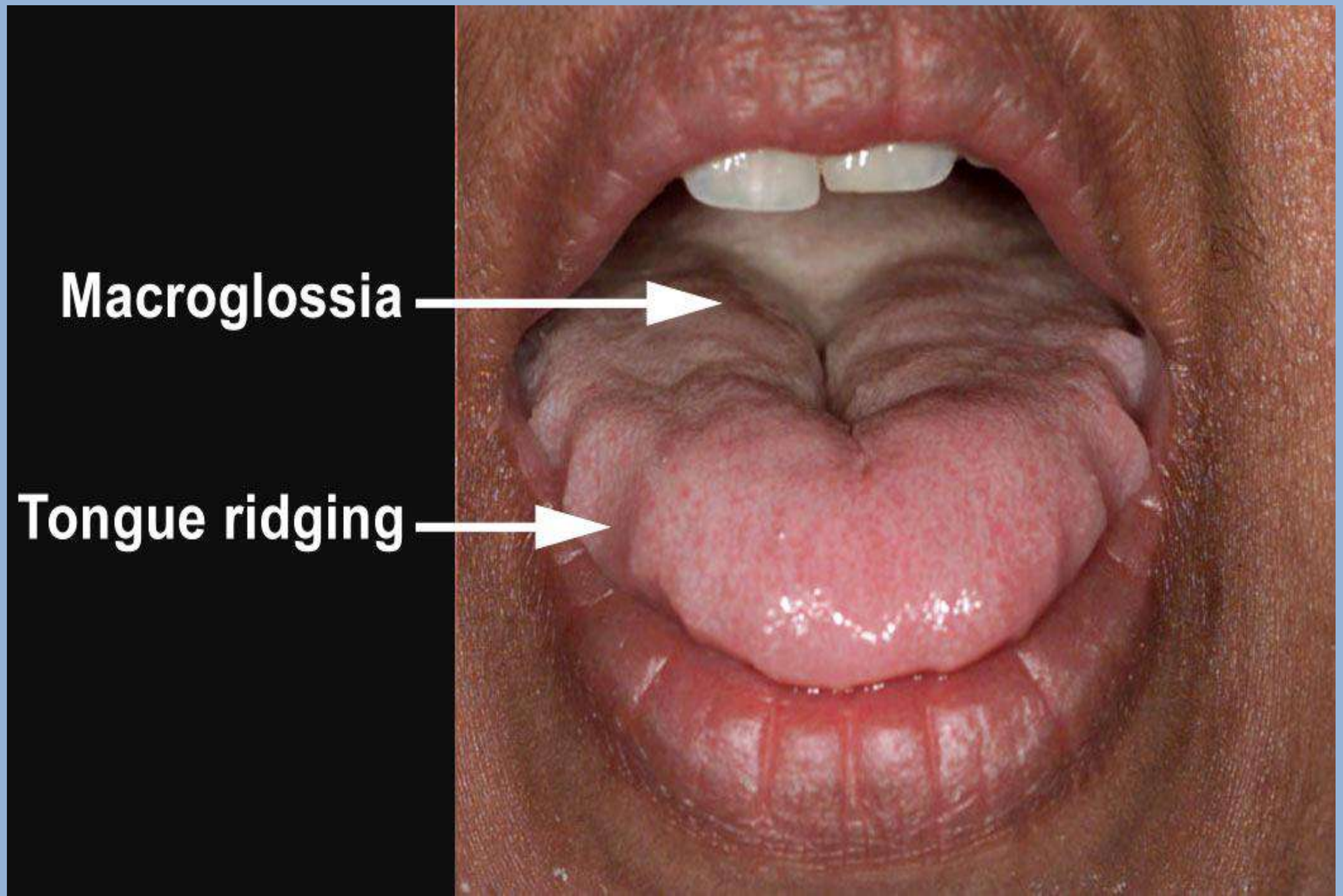
Examen físico y apnea de sueño

(Schellenberg et al, AJRCCM 162;740-748, 2000)



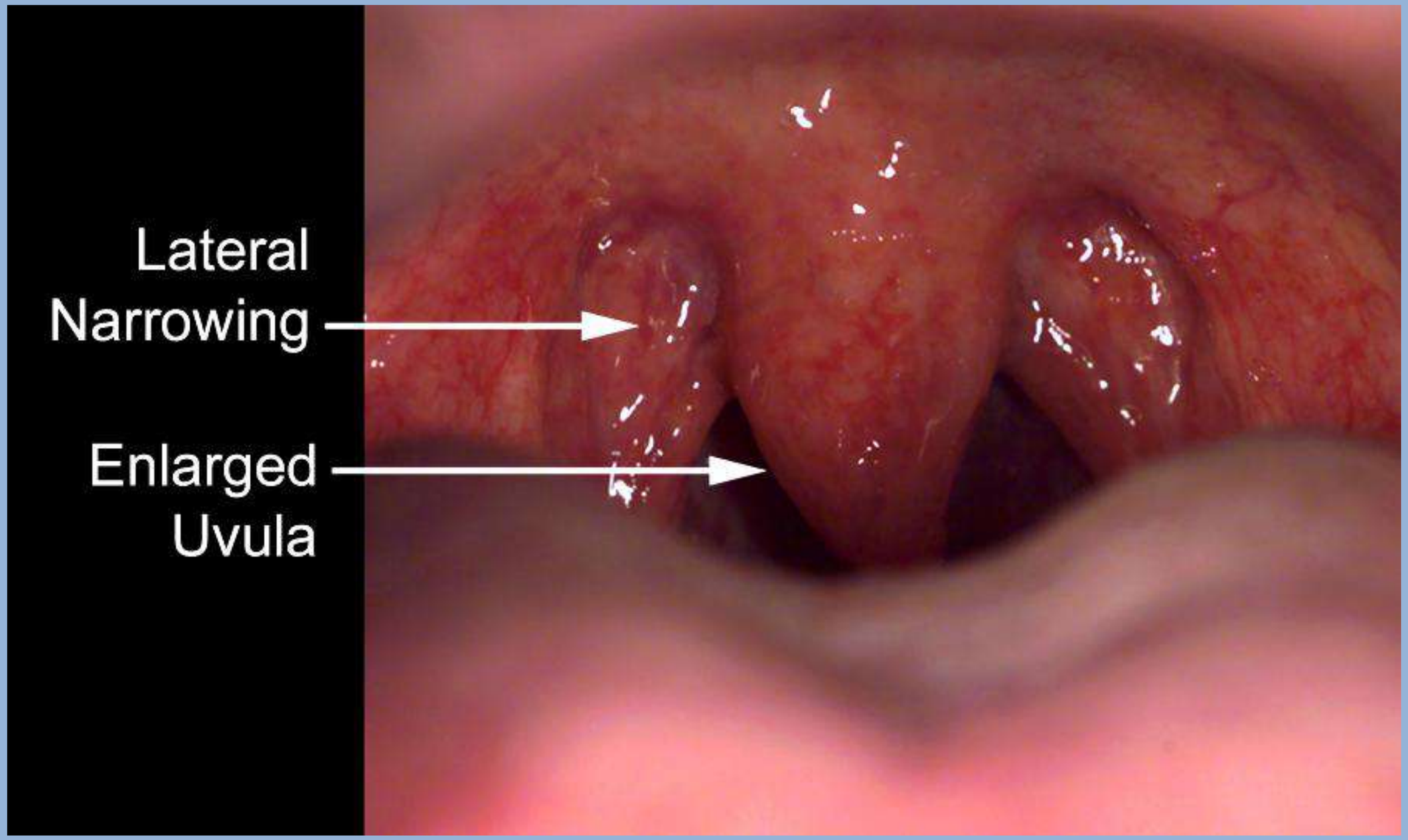
Examen físico y apnea de sueño

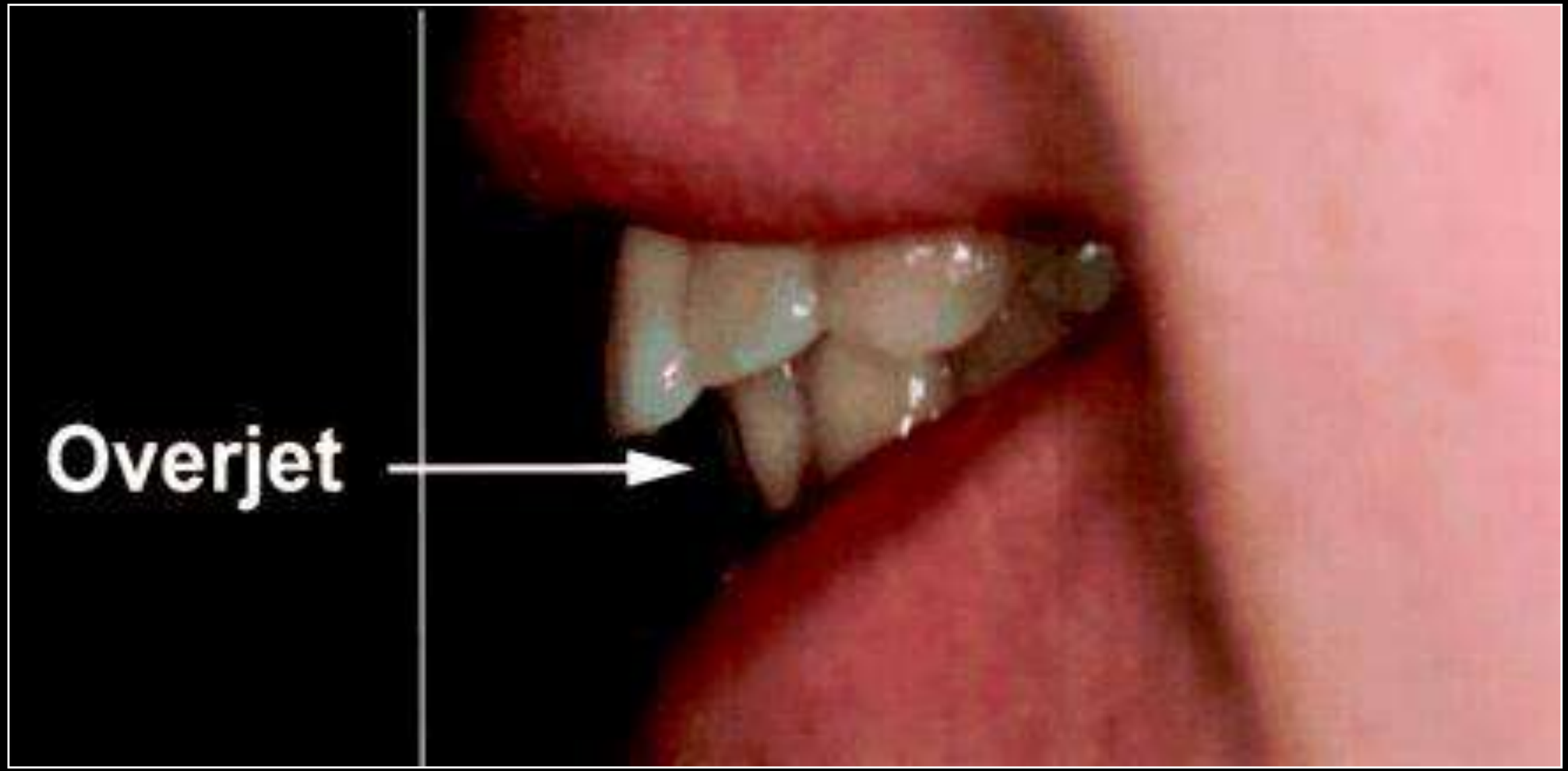
(Schellenberg et al, AJRCCM 162;740-748, 2000)



Examen físico y apnea de sueño

(Schellenberg et al, AJRCCM 162;740-748, 2000)





Examen físico y apnea de sueño
(Schellenberg et al, AJRCCM 162;740-748, 2000)



IAH: 65 ev/h

IMC: 29



IAH=60ev/h
IMC=27

IAH= 50ev/h

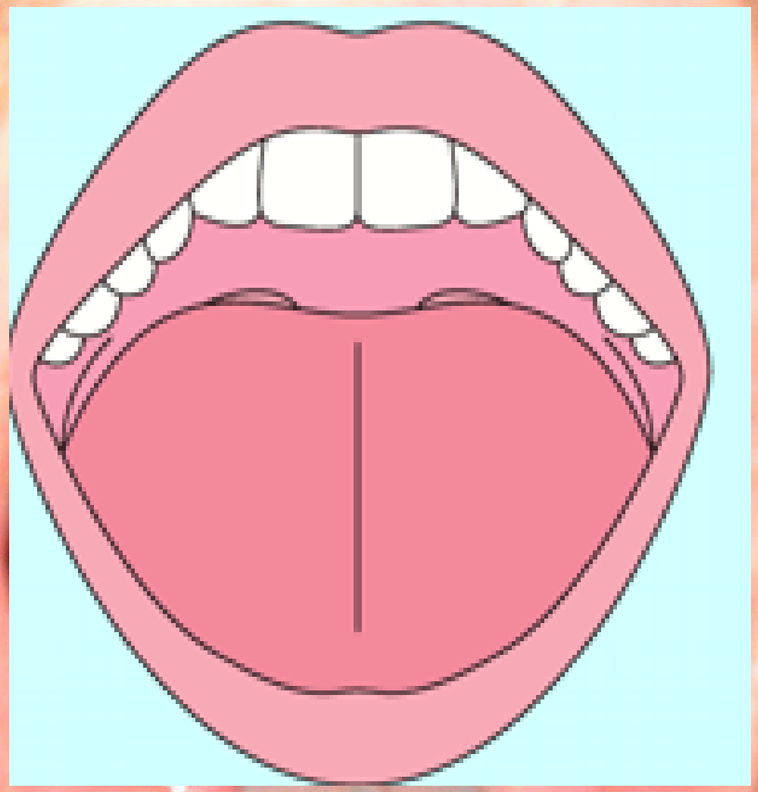
IMC= 30 ;Rinitis crónica; ESE= 20



IAH=60ev/h

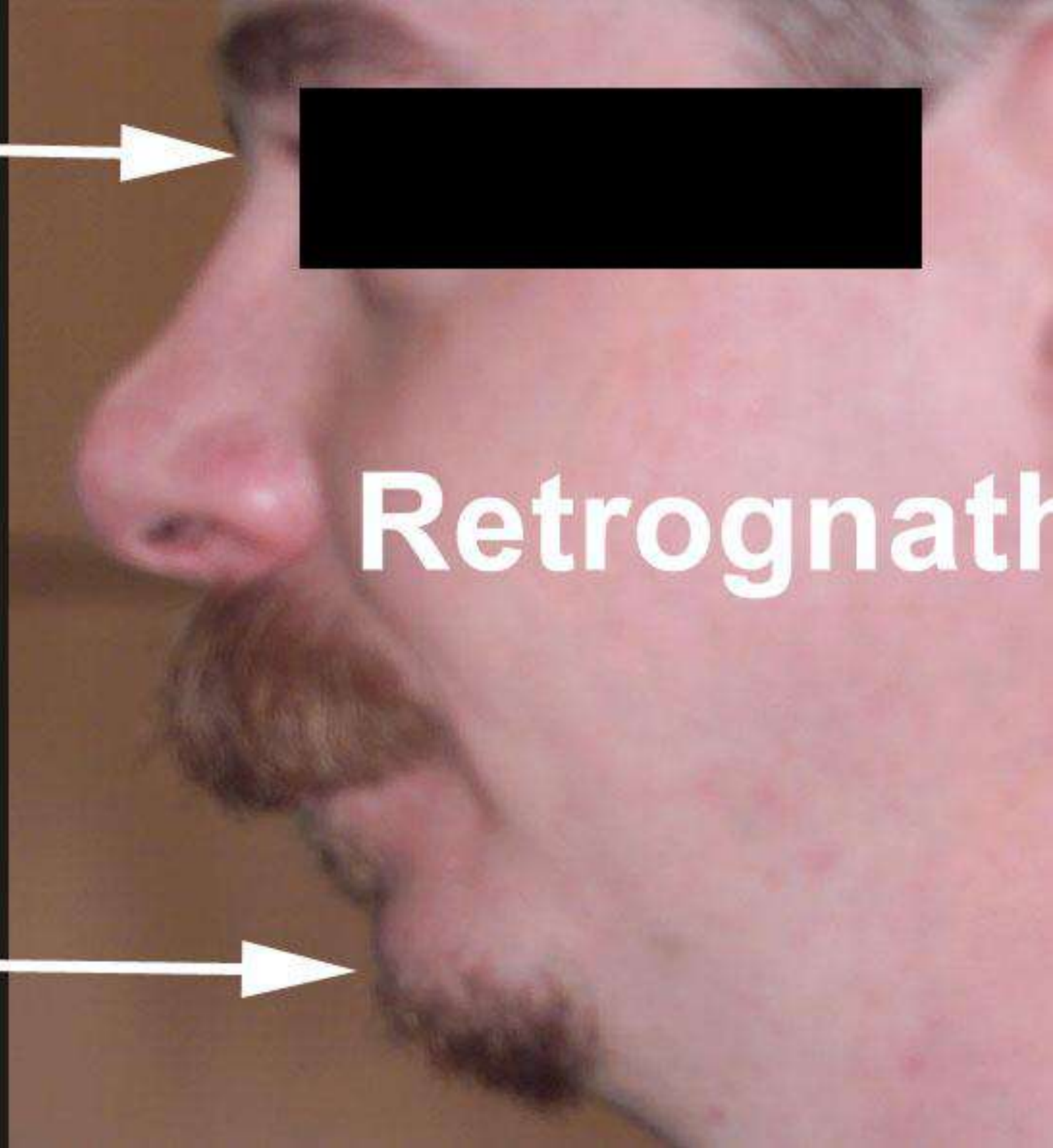


IAH= 50ev/h



IMC: 27.0
IAH: 61.3

Examen físico y apnea de sueño (Schellenberg et al, AJRCCM 162;740-748, 2000)



Factores de Riesgo y Características Clínicas de los Pacientes con AOS

Table 1. Risk Factors and Clinical Features of Obstructive Sleep Apnea

Characteristic	Measure[a]
Risk factors	**Odds ratio**
Weight	
Overweight vs normal weight	2.3-3.4
Obese vs normal weight	4.0-10.5
Male sex (vs female)	1.7-3.0
Age (per 10-y increment)	1.4-3.2
Postmenopausal state in women	2.8-4.3
Enlarged upper airway soft tissues (eg, tonsils, adenoids, tongue)	Unknown
Craniofacial abnormalities (eg, retrognathia, micrognathia)	Unknown
Clinical symptoms and signs	**Prevalence, %**
Excessive sleepiness, fatigue, or unrefreshing sleep	73-90
Snoring most nights	50-60
Witnessed breathing pauses, choking, or gasping during sleep	10-15
Nocturia (2 or more times per night)	30
Nocturnal gastroesophageal reflux	50-75
Morning headache	12-18

[a] Odds ratios reflect the range of values reported from population-based cohort studies, excluding extreme values. Prevalence estimates are from population- or clinic-based patient samples referenced in the text.

Principales Síntomas Clínicos de SAHOS

Síntomas Referidos

Ronquidos	100%
Apneas	50%
Movim. Corporal	40%
Cambios Personal	26%

Síntomas Sufridos

Somnolencia	15-50%
Ahogos Noct.	53%
Cefalea Matinal	38%
Deter. Intelect.	27%
Nocturia	37%

Síndrome de Apneas Obstructivas Durante el Sueño

Manifestaciones Diurnas

Excesiva somnolencia diurna

Sueño poco reparador

Pérdida de memoria

Trastornos de ideación

↓ Atención y alerta

↑ Riesgo de accidentes

↓ Calidad de vida

Consecuencias clínicas

Enfermedad cardiovascular

Hipertensión Arterial

Arritmias cardíacas (FA)

Enfermedad coronaria

Hipertensión pulmonar

Insuficiencia cardíaca

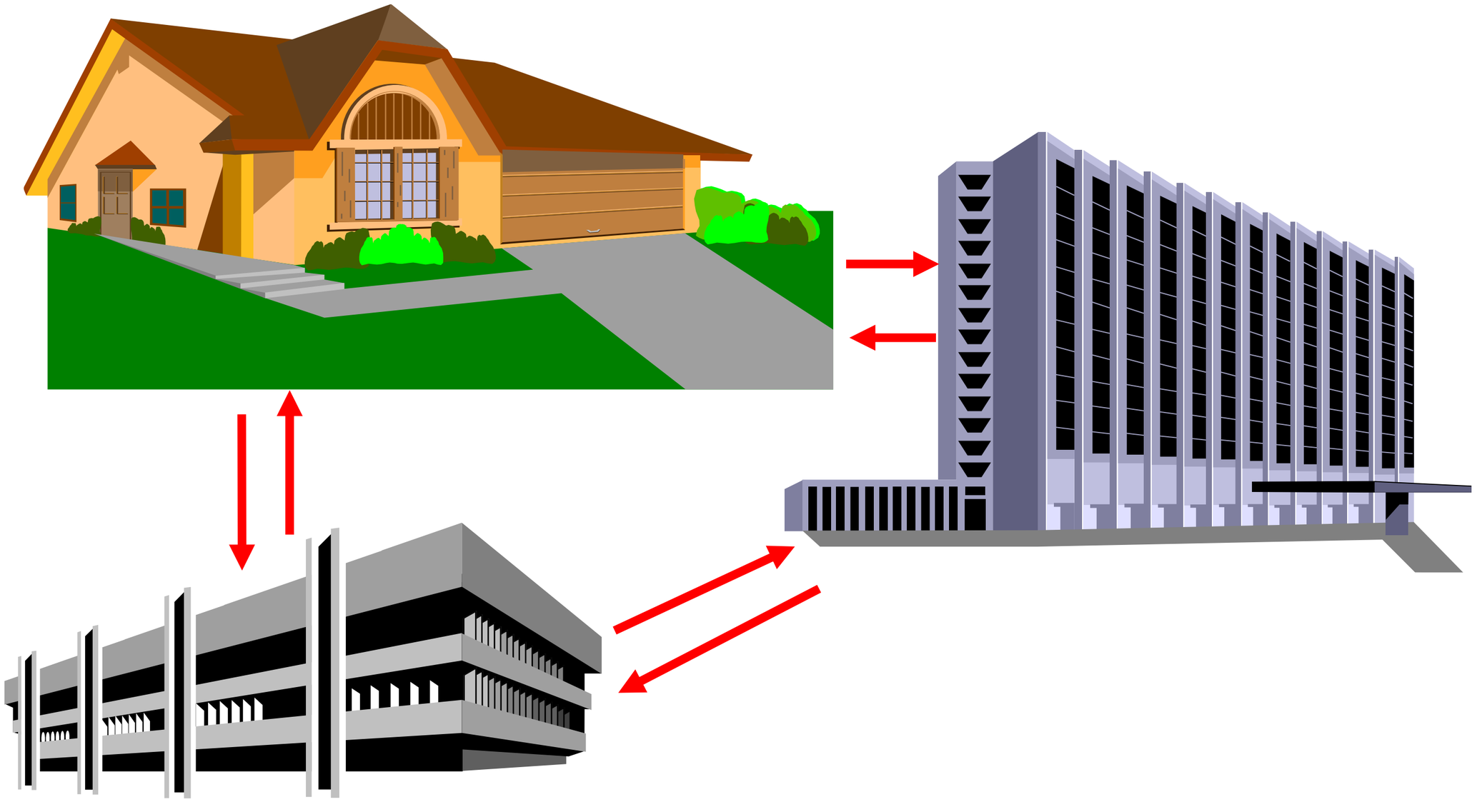
Accidente cerebrovascular

Evaluación subjetiva de la somnolencia

Table 2. Methods to Identify Obstructive Sleep Apnea (OSA)

Metric	Description	Additional information	Sensitivity, %[a]	Specificity, %[a]
Questionnaire				
Berlin Questionnaire	Eleven items grouped in 3 domains: snoring/apneas, fatigue/sleepiness, and obesity/hypertension. Range, 0-3; 0 indicates the lowest risk and 2-3 indicate high risk of OSA.	Developed for assessing sleep apnea risk in the primary care setting.	77 (73-81)	44 (38-51)
STOP-Bang questionnaire	Eight items assess snoring, sleepiness, apneas, hypertension, obesity, neck girth, age, and sex. Range 0-8; 0 indicates the lowest risk of OSA.	Developed for sleep apnea screening in the preoperative setting.	90 (86-93)	36 (29-44)
Epworth Sleepiness Scale	Self-administered assessment of sleep tendency in 8 common situations. Range 0-24; 0 indicates the least sleepy and greater than 10 indicates excessive sleepiness.	Widely used for assessing sleepiness and response of sleepiness to therapy; not useful in screening for OSA.	47 (35-59)	62 (56-68)

COMO DOCUMENTO LAS APNEAS DURANTE EL SUEÑO



Sleep Testing			Sensitivity, %[a]	Specificity, %[a]
Polysomnography	Monitors electroencephalogram, eye movements, and chin muscle tone to assess sleep-wake state and thoracic and abdominal excursion, oronasal airflow, and pulse oximetry to identify apneas and hypopneas. Measures number of apneas plus hypopneas per hour of sleep.	Criterion standard for diagnosis of OSA; permits diagnosis of sleep disorders other than sleep apnea; cost is high relative to HSAT.		
Home sleep apnea testing (HSAT)	Multiple available devices; most include monitoring of airflow, respiratory effort, and oximetry; some use nonstandard measures, such as peripheral arterial tonometry. Measures number of apneas plus hypopneas per hour of recording.	Lower cost and greater convenience compared with polysomnography; false-negative results possible; unable to diagnose disorders other than sleep apnea.	79 (71-86)	79 (63-89)
Oximetry	Overnight recording of blood oxygen saturation. Measures number of 3% or 4% desaturation events	Inexpensive and convenient; false-negative results possible; cannot distinguish OSA from central sleep apnea; can document resolution of	7-100	15-100

[redacted]

File View Report Options Video Window Help

F2 F11 F3 F12 F4 F5 F6 F7 F8 F9

C3A2
C4A1
O1A2
O2A1
LEOG
REOG
Chin
ECG
RR
LEMG
ABD
THO
MICRO
NAF
PAW
SAO2
BODY
LITE
STAGE

Apneas Obstructivas

96 97 95 92 88 85 83 82 81 80 80 94 96 94 90 85 81 80 79 78 80 93 96 93

30" 60" 90" 120"

09/02/2006 02:49:49 a.m.

File View Report Options Window Help

F2 F11 F3 F12 F4 F5 F6 F7 F8 F9

Trend and Raw data (F12)

C3A2
C4A1
O1A2
O2A1
LEOG
REOG
Chin
ECG
RR
LEMG
ABD
THO
MICRO
NAF
PAW
SAO2
Sat2
Sat3
BODY
LITE
STAGE

Apneas Centrales

93 93 92 93 94 95 98 99 98 97 96 96 97 98 98 98 98 97 94 94 94 94 94 94
(+) (+)

30" 60" 90" 120"

1-hour trend and Raw data

F4 File View Report Options Video Window Help

F2 F11 F3 F12 F4 F5 F6 F7 F8 F9

C3A2
C4A1
O1A2
O2A1
LEOG
REOG
Chin
ECG
RR
LEMG
ABD
THO
MICRO
NAF
PAW
SAO2
Sat2
BODY
LITE
STAGE

Apneas Mixtas

SAO2: 90 83 80 77 77 76 81 95 97 95 93 87 82 78 77 76 76 75 80 94 94 89 84 81

Sat2: 50 50 50 50 50 50 50 50 50 50 50 50 50 50 50 50 50 50 50 50 50 50 50 50

BODY: S S S S S S S S S S S S S S S S S S S S S S S S S S S S S S S S S S S S

LITE: 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3

STAGE: S2 S2 S2 S2 S2 S2 S2 S2 S2 S2 S2 S2 S2 S2 S2 S2 S2 S2 S2 S2 S2 S2 S2 S2

30" 60" 90" 120"

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F4 File View Report Options Multimedia Scoring Window Help

F2 F11 F3 F12 F4 F5 F6 F7 F8 F9 WK MVT REM S1 S2 S3 S4

C3A2
C4A1
O1A2
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Chin
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SAO2 90
BODY
LITE
STAGE

Hipoapneas

92 92 92 92 93 93 93 92 92 91 90 90 91 93 94 94 93 92 91 92 93 94 94 94

S S S S S S S S S S S S S S S S S S S S S S S S S S S S S S S S S S S S

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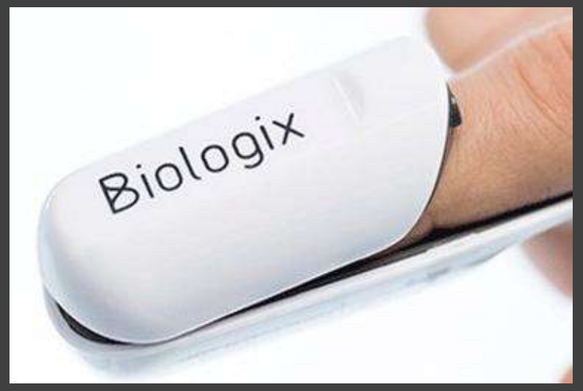
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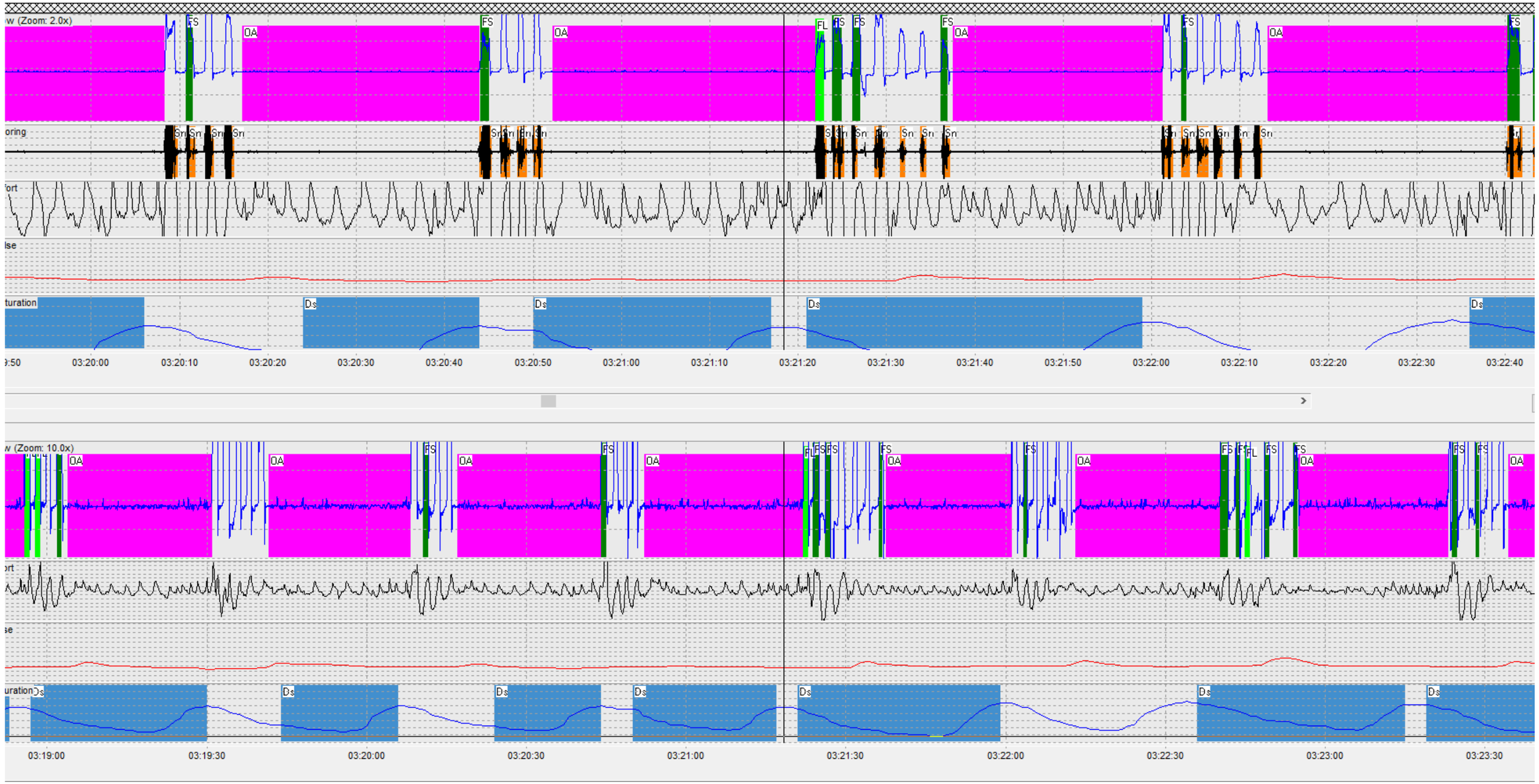

Alice NightOne
PHILIPS
RESPIRONICS

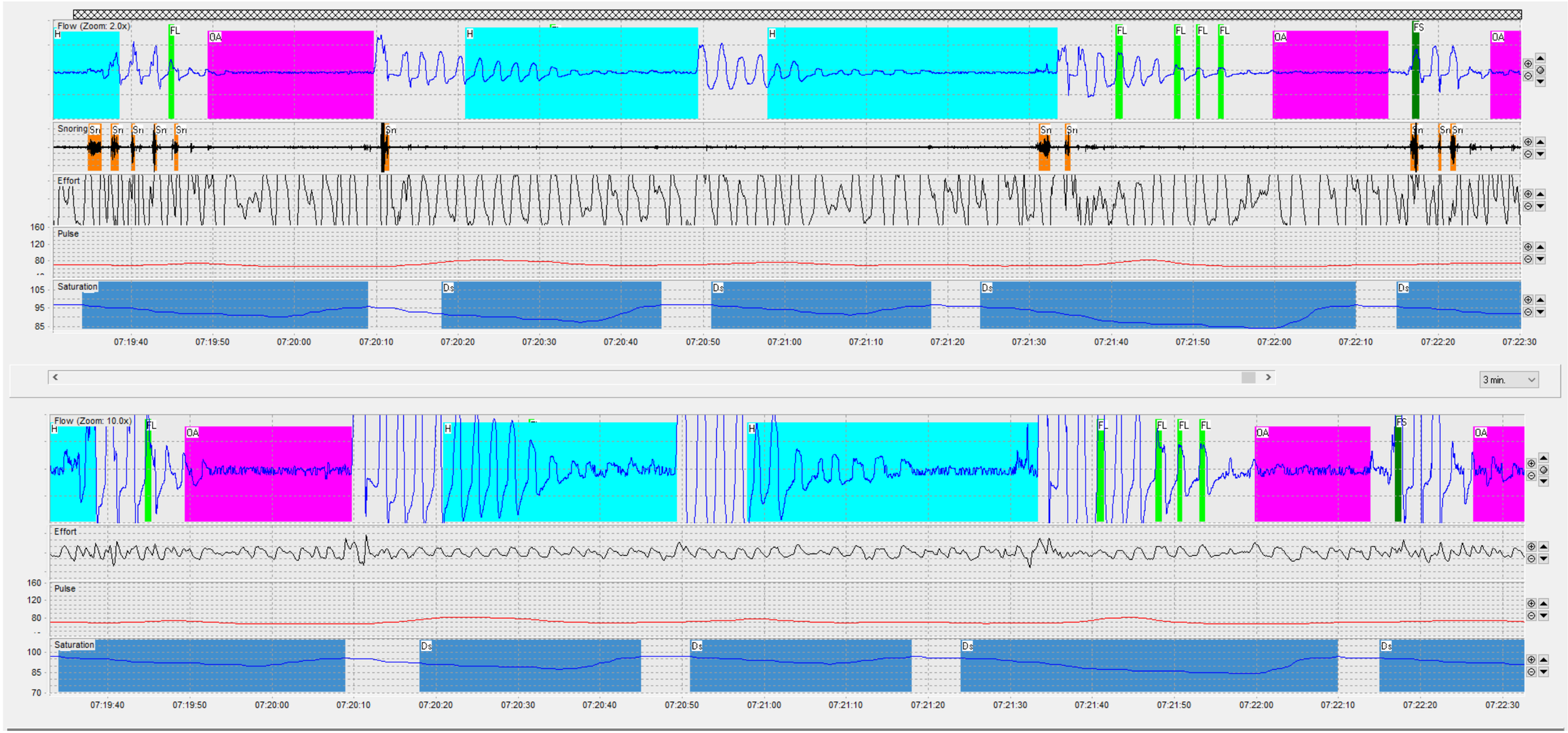





Biologix


ResMed
ResMed
AirSense 10 AutoSet


w (Zoom: 2.0x)
FS
OA
FL
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Sn
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03:20:10
03:20:20
03:20:30
03:20:40
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03:21:30
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03:22:10
03:22:20
03:22:30
03:22:40
w (Zoom: 10.0x)
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03:20:00
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03:21:00
03:21:30
03:22:00
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03:23:00
03:23:30


Flow (Zoom: 2.0x)
H
FL
OA
FS
Snoring
Sn
Effort
160
120
80
Pulse
105
95
85
Saturation
Ds
07:19:40
07:19:50
07:20:00
07:20:10
07:20:20
07:20:30
07:20:40
07:20:50
07:21:00
07:21:10
07:21:20
07:21:30
07:21:40
07:21:50
07:22:00
07:22:10
07:22:20
07:22:30
3 min.
Flow (Zoom: 10.0x)
100
85
70


Flow (Zoom: 2.0x)
FL
Snoring
Effort
160
120
80
Pulse
105
95
85
Saturation
04:16:25
04:16:30
04:16:35
04:16:40
04:16:45
04:16:50
04:16:55
04:17:00
04:17:05
04:17:10
04:17:15
04:17:20
1 min.
Flow (Zoom: 2.0x)
Effort
160
120
80
Pulse
100
85
70
Saturation
04:15:40
04:15:50
04:16:00
04:16:10
04:16:20
04:16:30
04:16:40
04:16:50
04:17:00
04:17:10
04:17:20
04:17:30
04:17:40
04:17:50
04:18:00
04:18:10
04:18:20
04:18:30
Apneas
3 min.

ResMed

ApneaLink - Informe de 27/3/2021 08:24

Médico responsable del tratamiento

Remitir a

Datos del paciente

Nombre: [redacted]
Nombre:
Calle:
Código postal, ciudad:
Teléfono:

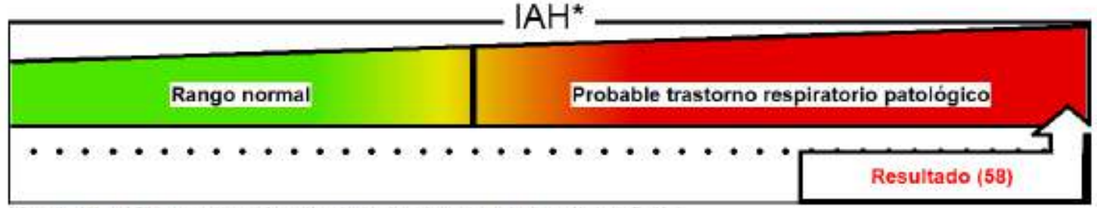
ID paciente: 19521
Fecha de nac.: 25/8/1961
Altura: 180 cm
Peso: 100 kg.
IMC: 30,9 kg./m²

Registrando

Fecha: 26/3/2021
Inicio: 00:45 .
Fin: 07:28 .
Duración: 6 h 43 min.

Evaluación

Inicio: 00:55 .
Fin: 07:26 .
Duración: 5 h 19 min.



* Consulte el Manual Clínico para obtener información sobre las abreviaturas y los parámetros estándar de ResMed

IAH:58.0 ev/h

IDO:58.5 ev/h

Análisis (Periodo de evaluación de flujo: 5 h 19 min. / Periodo de evaluación de SpO2: 5 h 20 min.)

Índices		Normal
IAH*:	58	< 5 / h
IR*:	58,5	< 5
Índice de apneas:	42,3	< 5 / h
IAI:	0,4	
IAO:	41,1	
IAC:	0,6	
IAM:	0,2	
Índice de hipopnea:	15,8	< 5 / h
% lim. Flujo Res sin Ron (Lf):	5	< Aprox. 60
% lim. Flujo Res con Ron (LR):	0	< Aprox. 40
IDO Índice de Desaturación de Oxígeno*:	58,5	< 5 / h
Saturación promedio:	91	94% - 98%
Desaturación menor:	75	-
Saturación más baja:	75	90% - 98%
Saturación basal:	96	%
Frecuencia de pulso mínima:	50	> 40 bpm
Frecuencia de pulso máxima:	98	< 90 bpm
Frecuencia de pulso promedio:	65	bpm

Resultado	
Promedio de respiraciones por minuto [rpm]:	5,70
Respiraciones:	1820
Apneas:	225
Apneas indeterminadas:	2 (1%)
Apneas obstructivas:	219 (97%)
Apneas centrales:	3 (1%)
Apneas mixtas:	1 (0%)
Hipopneas:	84
Lim. Flujo Res sin Ron (Lf):	95
Lim. flujo Res con Ron (LR):	2
Eventos de ronquidos:	446
N.° de desaturaciones:	312
Saturación <= 90% :	136 min. (35%)
Saturación <= 85% :	32 min. (8%)
Saturación <= 80% :	7 min. (2%)

CT 90: 35%

Estado del análisis: Editado manualmente

Parámetros de análisis utilizados (Definido por el usuario)

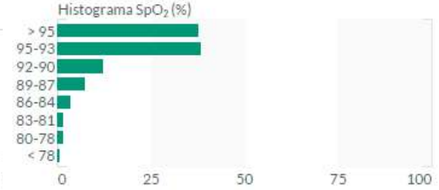
Apnea [20%; 10s; 80s; 1,0s; 20%; 60%; 8%]; Hipopnea [70%; 10s; 100s; 1,0s]; Ronquido [6,0%; 0,3s; 3,5s; 0,5s]; Desaturación [3,0%];


Biologix

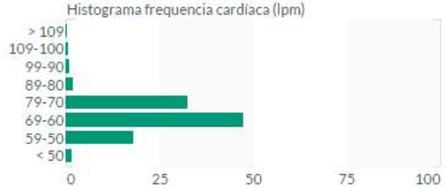

Biologix


Biologix

Histograma SpO_2 (%)



Histograma frequencia cardíaca (lpm)



SpO_2 mínima	73%
SpO_2 media	94%
SpO_2 máxima	100%
Tiempo con SpO_2 < 90%	58,3 min (14%)
Número de desaturaciones[1]	386
Índice de desaturaciones de oxígeno (IDO)[1,2]	56,8 /hora
Índice de desat. de oxígeno sueño (IDOs)	61,5 /hora
Número de eventos de hipoxemia[3]	0
Duración total de hipoxemia[3]	0,0 min (0%)

Mínima	43 bpm
Media	66 bpm
Máxima	114 bpm

Sueño estimado

Tiempo total de sueño	364,5 min
Tiempo para dormir	9,0 min
Tiempo despierto después del sueño	47,0 min
Eficiencia del sueño	86%

Carga hipóxica - *Hypoxic burden*

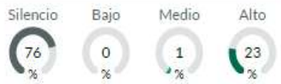
Carga hipóxica[4]	202,1 %.min /hora

Riesgo cardiovascular

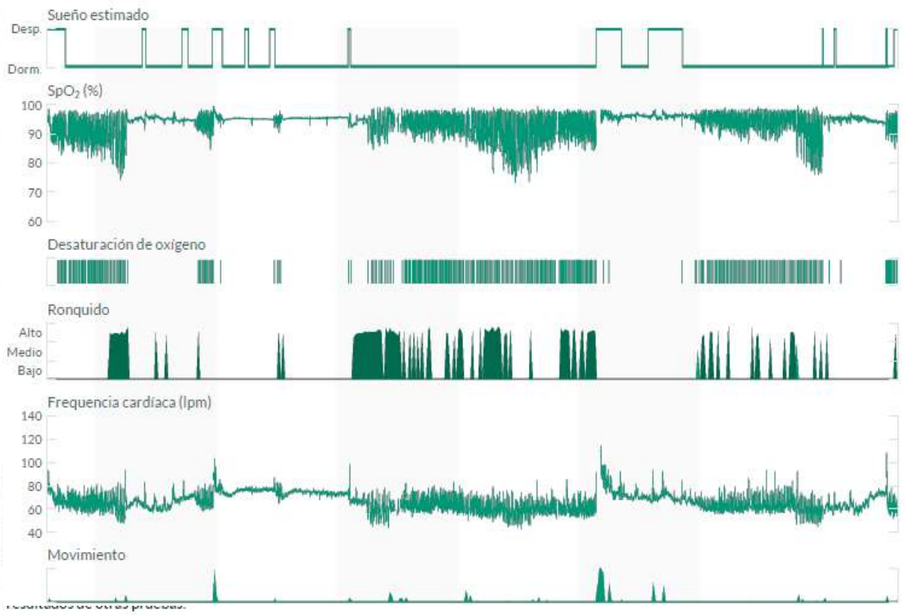


Análisis de ronquido

Tiempo de grabación	423,0 min
Tiempo con ronquido	101,5 min (24%)



Polisomnogramas



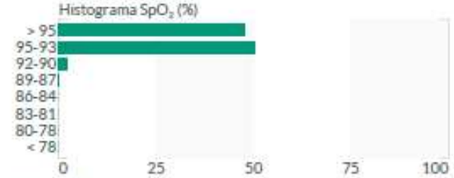
Conclusión

Estudio del sueño (incluye polisomnogramas)

Examen del Sueño Biologix®

Oximetría (SpO_2)

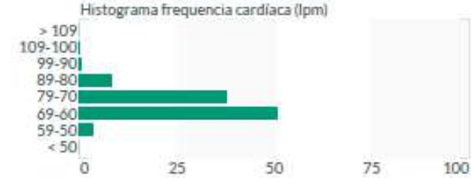
Histograma SpO_2 (%)



SpO_2 mínima	89%
SpO_2 media	95%
SpO_2 máxima	100%
Tiempo con SpO_2 < 90%	0,0 min (0%)
Número de desaturaciones[1]	16
Índice de desaturaciones de oxígeno (IDO)[1,2]	2,5 /hora
Índice de desat. de oxígeno sueño (IDOs)	2,2 /hora
Número de eventos de hipoxemia[3]	0
Duración total de hipoxemia[3]	0,0 min (0%)

Frecuencia cardíaca

Histograma frequencia cardíaca (lpm)



Mínima	52 bpm
Media	69 bpm
Máxima	108 bpm

Sueño estimado

Tiempo total de sueño	372,0 min
Tiempo para dormir	30,0 min
Tiempo despierto después del sueño	2,5 min
Eficiencia del sueño	92%

Carga hipóxica - *Hypoxic burden*

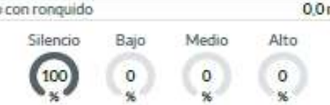
Carga hipóxica[4]	14,6 % min /hora

Riesgo cardiovascular

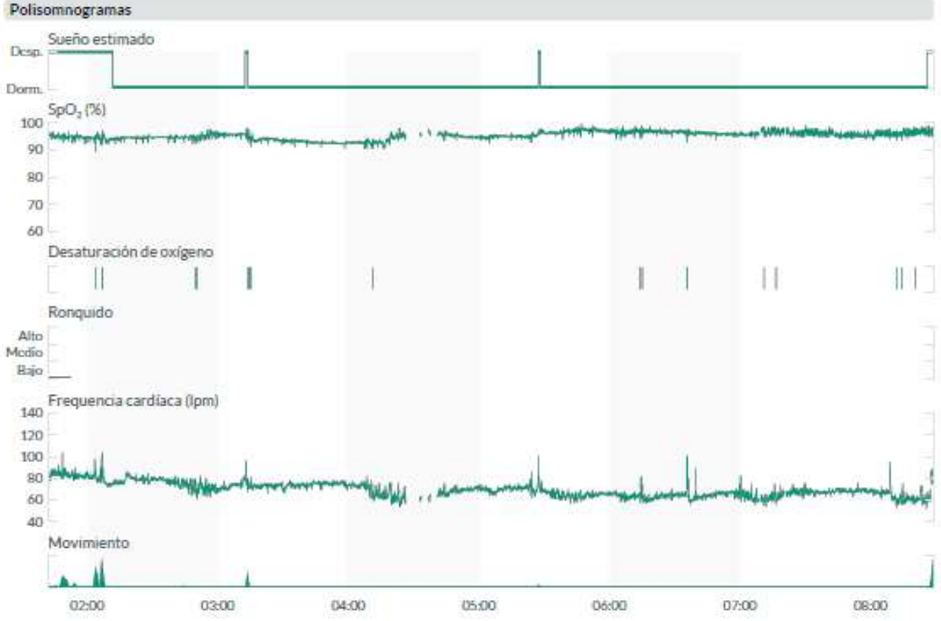


Análisis de ronquido

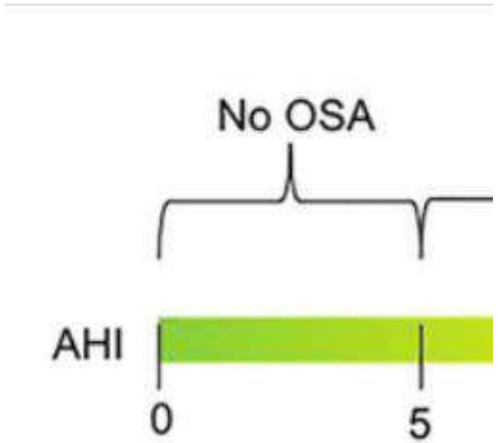
Tiempo de grabación	11,0 min
Tiempo con ronquido	0,0 min (0%)



Polisomnogramas



Criterios de Severidad en AOS según el IAH





T90: SpO2< 90%

CH: Frecuencia, duración y profundidad de la desaturación en cada apnea o hipopnea

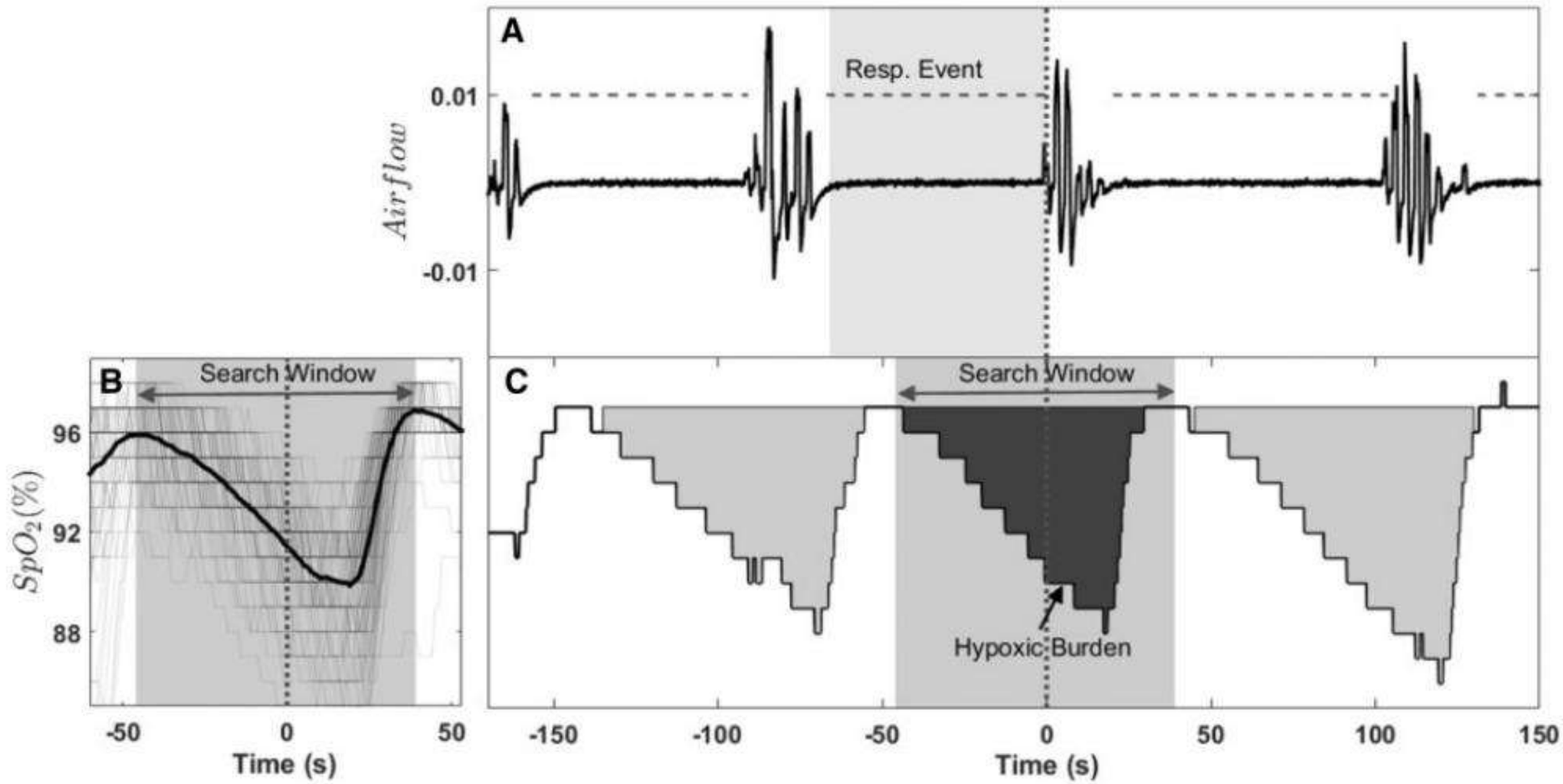


Figure 1 Example of hypoxic burden calculation for an individual respiratory event. (*A*) The nasal cannula airflow and annotated respiratory events is shown. (*B*) The overlaid oxygen saturation signals (SpO_2) associated with all respiratory events for one individual is shown. These signals were synchronized at the termination of respiratory events (time zero) and averaged to calculate the search window (the time between two peaks). The search window was used to calculate the hypoxic burden for individual events. That is, the area under saturation curve within the search window (*C*). The total hypoxic burden was defined as the sum of individual burdens divided by total sleep time. Resp. Event, respiratory event.

European Heart Journal (2019) 40, 1149–1157

< 20th percentile (reference)

20th–40th percentile

40th– 60th percentile

60th–80th percentile

>80th percentile.

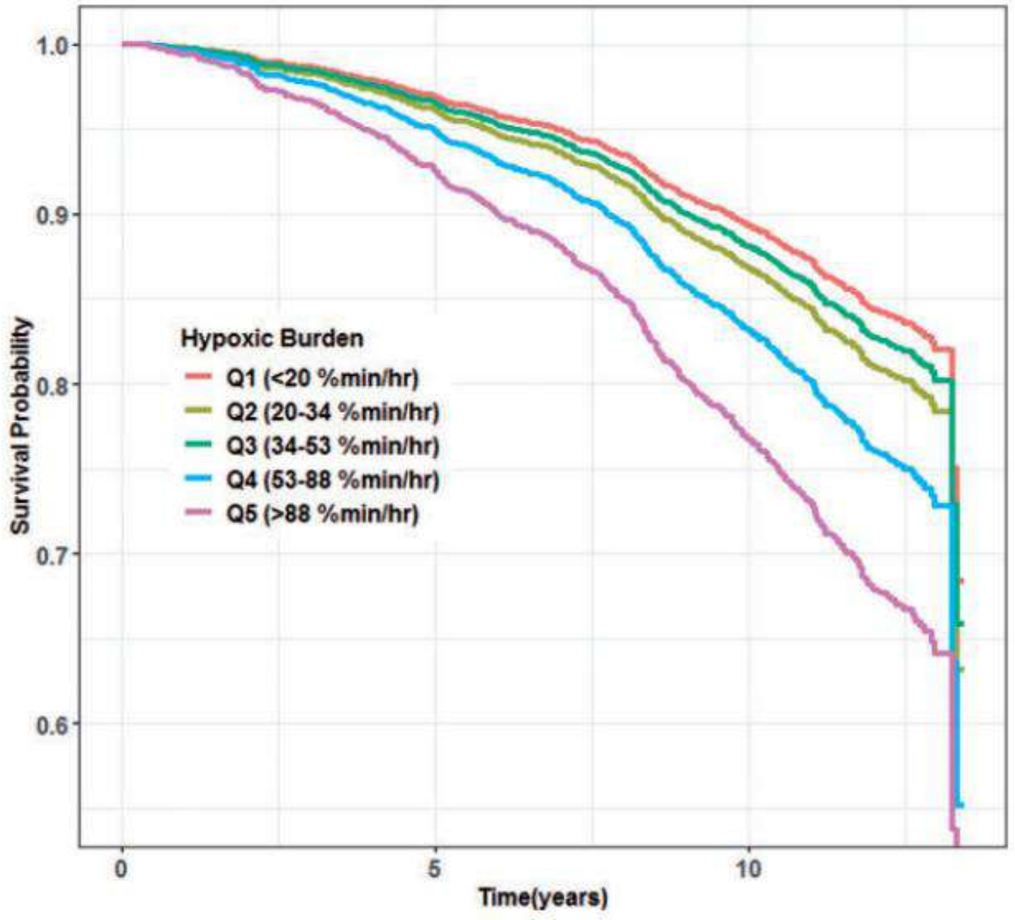


Figure 2 Adjusted survival curves for cardiovascular mortality across categories of the hypoxic burden in MrOS. These curves were obtained from Model 4. The adjusted survival curves were obtained by averaging the predicted survival curves for every observation in MrOS study.

Association between hypoxic burden and conventional OSA metrics in a nested cohort of rail workers in Argentina

Authors: Daniel Perez-Chada, MD [1], Sergio Arias, PhD [2], Daniel Schonfeld, MD [3], Bernardo M Etchegoren, MD [1], Gustavo Armando, PhD [2], Alan R. Schwartz, MD [4], Ali Azarbarzin, PhD [5], Gonzalo Labarca Trucios, MD [6]

[1] Universidad Austral, Hospital Universitario Austral, Pilar, Argentina, [2] Instituto Nacional de Enfermedades Respiratorias "Emilio Coni", Santa Fe, Argentina, [3] Centro de Diagnóstico San Jorge, Puerto Madryn, Argentina, [4] University of Pennsylvania Perelman School of Medicine, [5] Division of Sleep Medicine, Brigham and Women's Hospital, and Harvard Medical School. USA, [6] Departamento de Enfermedades Respiratorias, Pontificia Universidad Católica de Chile.

Purpose:

Obstructive sleep apnea (OSA) is characterized by frequent upper airway obstructions (apnea/hypopnea events), causing intermittent hypoxemia and sleep fragmentation. In OSA, intermittent hypoxemia can be quantified by the Sleep Apnea-Specific Hypoxic Burden (SASHB), a metric that captures the area under the desaturation curve associated with a respiratory event (Apnea or Hypopnea). This study aims to explore the association between SASHB and baseline hypertension in a nested cohort of rail workers in Argentina.

Methods:

We executed a cross-sectional, prospective observational study. SASHB was measured from the SpO2 signal from baseline sleep studies using a type III home sleep test (Apnea Link Air, Australia). Baseline characteristics were represented as percentages and medians [Interquartile Range, IQR]. We determined the differences in SASHB between participants with hypertension and assessed the strength of the association between SASHB and hypertension at baseline. Multiple logistic regression analyses were used to obtain the adjusted odds ratio per 1 standard deviation (SD) increase in SASHB, after adjusting for Gender, Body Mass Index (Model 1), and AHI (Model 2).

Results:

This study included a total of 90 participants with complete data. The median age was 40 years [IQR: 34 - 51], 91% were male, and 23% had hypertension. The median AHI was 8.5 events/h [IQR: 3.2 – 20.5], and the median score on the Epworth sleepiness scale was 5.5 points [IQR: 3.0 – 8.0]. We found a significant association between SASHB and hypertension, both before and after adjusting for AHI (Model 1 odds ratio per 1 SD: 2.33; [95% CI: 1.24 to 4.38], p =0.03).

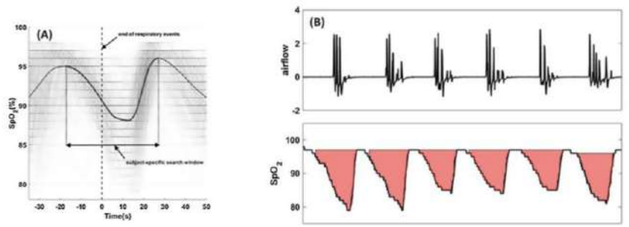


Fig. 1. Hypoxic burden is determined by creating a subject-specific search window (panel (A)) from all respiratory events regardless of desaturation or arousals. Overlaid oxygen saturation signals (SpOz) associated with all respiratory events are synchronized at the termination of events (time zero). Synchronized SpOz signals are averaged to quantify the subject-specific desaturation curve (solid black line). The search window is the time between the two peaks. The search window will be used to determine the area under individual desaturation curves (panel (B)). Total hypoxic burden (HB) is the sum of all individuals areas normalized by sleep time. (Archivos de Bronconeumología 59 (2023) 36–43)

Conclusion:

In a nested cohort of young rail workers in Argentina, a higher SASHB is associated with an increased risk of hypertension at baseline, before and after adjusting for AHI. Quantifying nocturnal hypoxemia using SASHB may offer additional value for cardiovascular risk stratification in sleep apnea.

Clinical implications:

OSA was a frequent finding in this sample of young rail workers. A significant association was observed between SASHB and hypertension, both before and after adjusting for gender, BMI and AHI.

Grant Identification: ResMed Foundation IIR 223 provided the devices to perform the home sleep tests

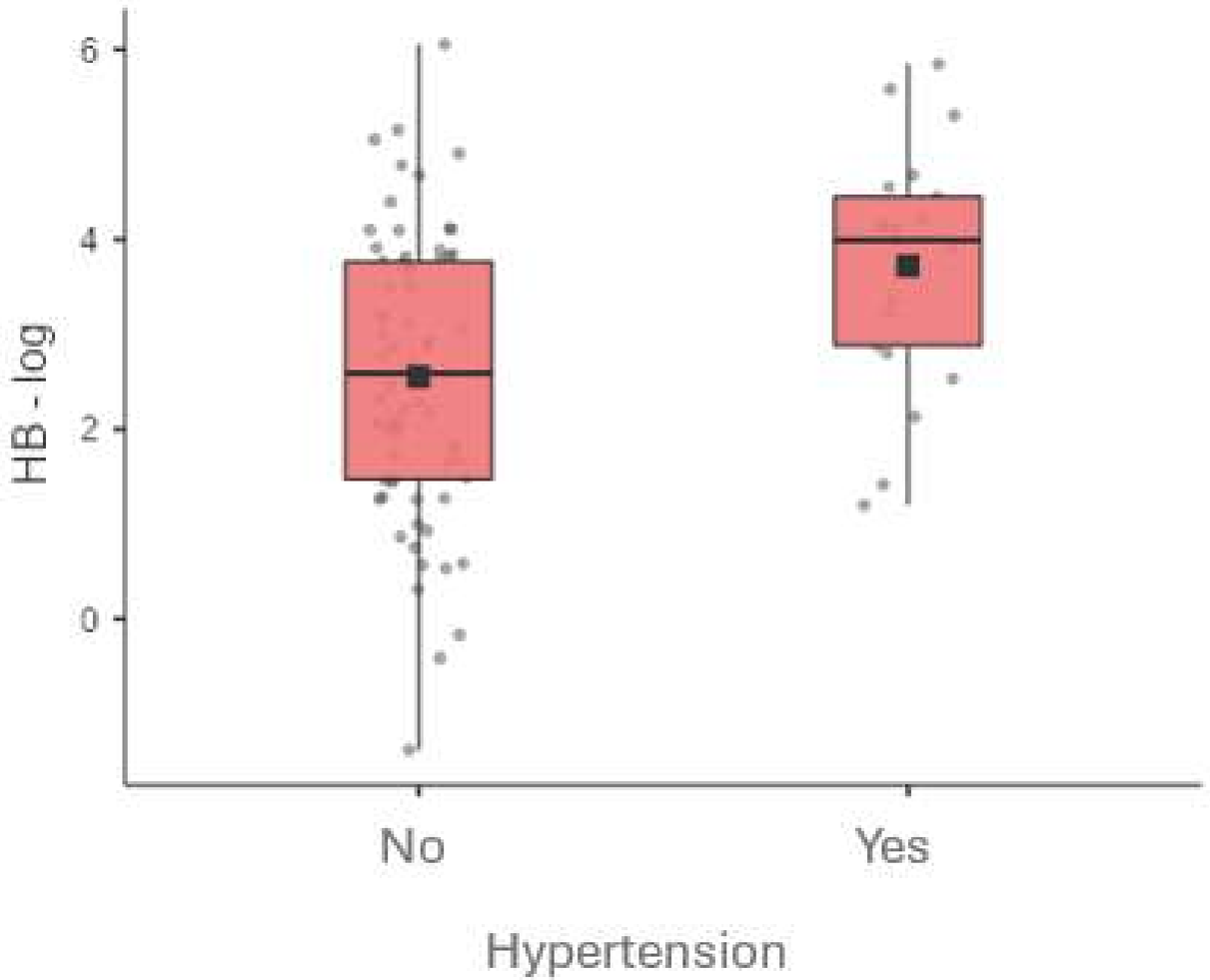


Figure 2. Hypoxic burden distribution by hypertension status, illustrating the comparative differences in hypoxic burden between these two groups, highlighting whether hypertension is associated with increased hypoxic burden.

CONCLUSIONES

El IAH es una métrica ampliamente utilizada para el diagnóstico de la AOS y para evaluar la respuesta al tratamiento.

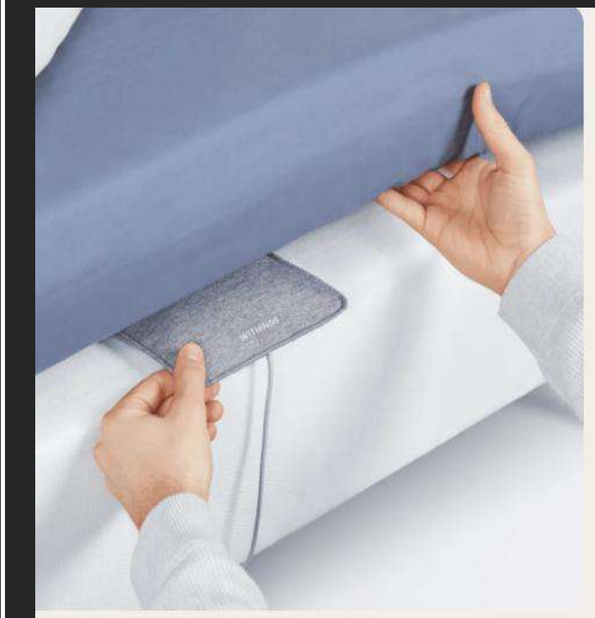
La relación del IAH con las consecuencias CV de la AOS y su utilidad en la evaluación de la respuesta al tratamiento ha sido deficiente.

La medición de la Carga Hipóxica evalúa con mayor precisión la severidad de la AOS en relación con la enfermedad cardiovascular.

La medición de la Carga Ventilatoria, es un mejor predictor que el IAH de la mortalidad por enfermedades cardiovasculares asociadas a las AOS.

Estas mediciones caracterizan mejor que el IAH el riesgo de mortalidad por enfermedad CV

European Heart Journal (2019) 40, 1149–1157
American Journal of Respiratory and Critical Care Medicine Volume 208 Number 11 | December 1 2023





JCSM | Journal of Clinical Sleep Medicine

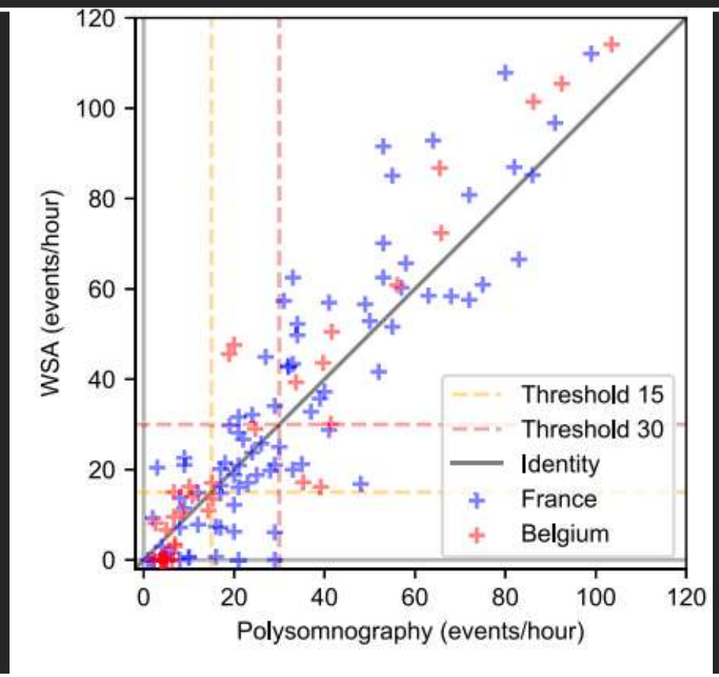
SCIENTIFIC INVESTIGATIONS

Validation of the Withings Sleep Analyzer, an under-the-mattress device for the detection of moderate-severe sleep apnea syndrome

Paul Edouard, MS[1]; David Campo, PhD[1]; Pierre Bartet, PhD[1]; Rui-Yi Yang, PhD[1]; Marie Bruyneel, MD, PhD[2]; Gabriel Roisman, MD, PhD[3]; Pierre Escourrou, MD, PhD[4]

[1]Withings, Issy-les-Moulineaux, France; [2]Chest Service, Saint-Pierre University Hospital, Brussels, Belgium; [3]AP-HP, Sleep Medicine Department, Antoine-Béclère Hospital, Clamart, France; [4]CIS, Paris, France

J Clin Sleep Med. 2021;17(6):1217–1227





Withings Sleep Analyzer/Sleep Rx; WSA







TRATAMIENTO





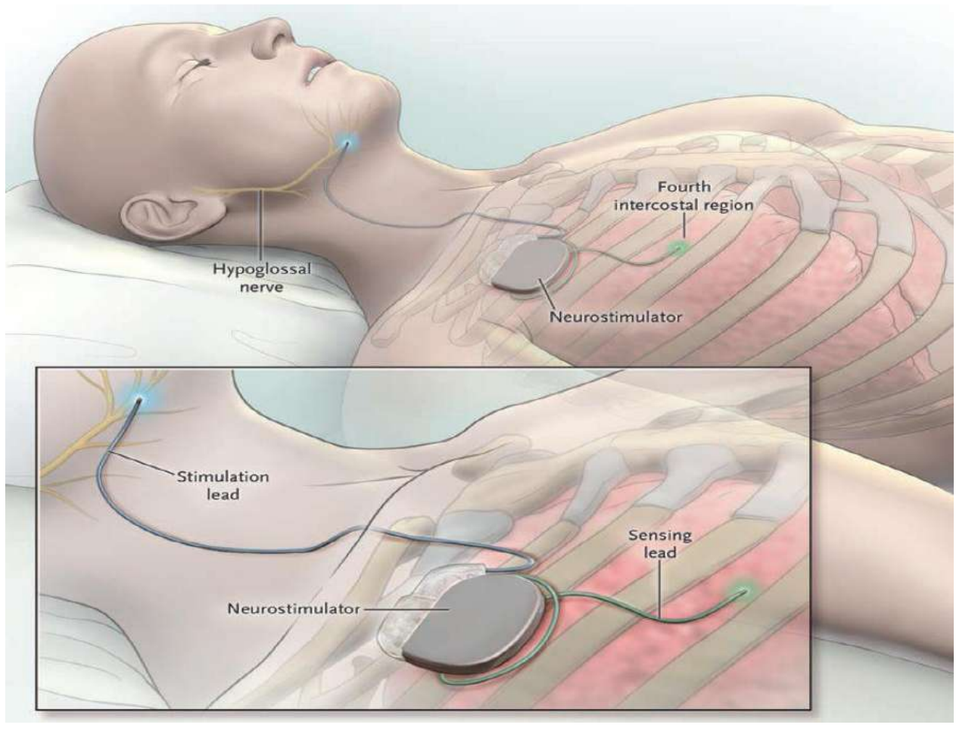


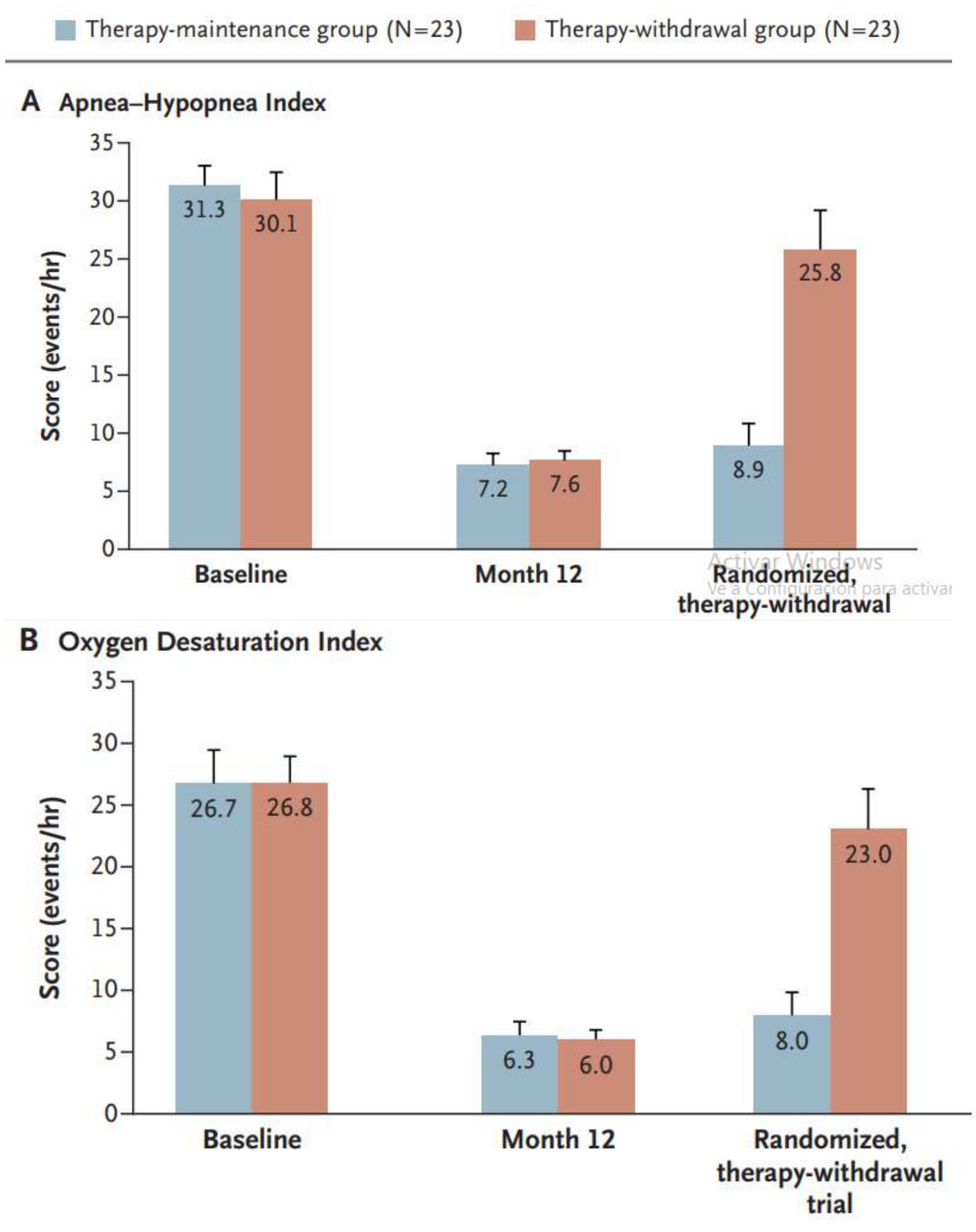
The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Upper-Airway Stimulation for Obstructive Sleep Apnea

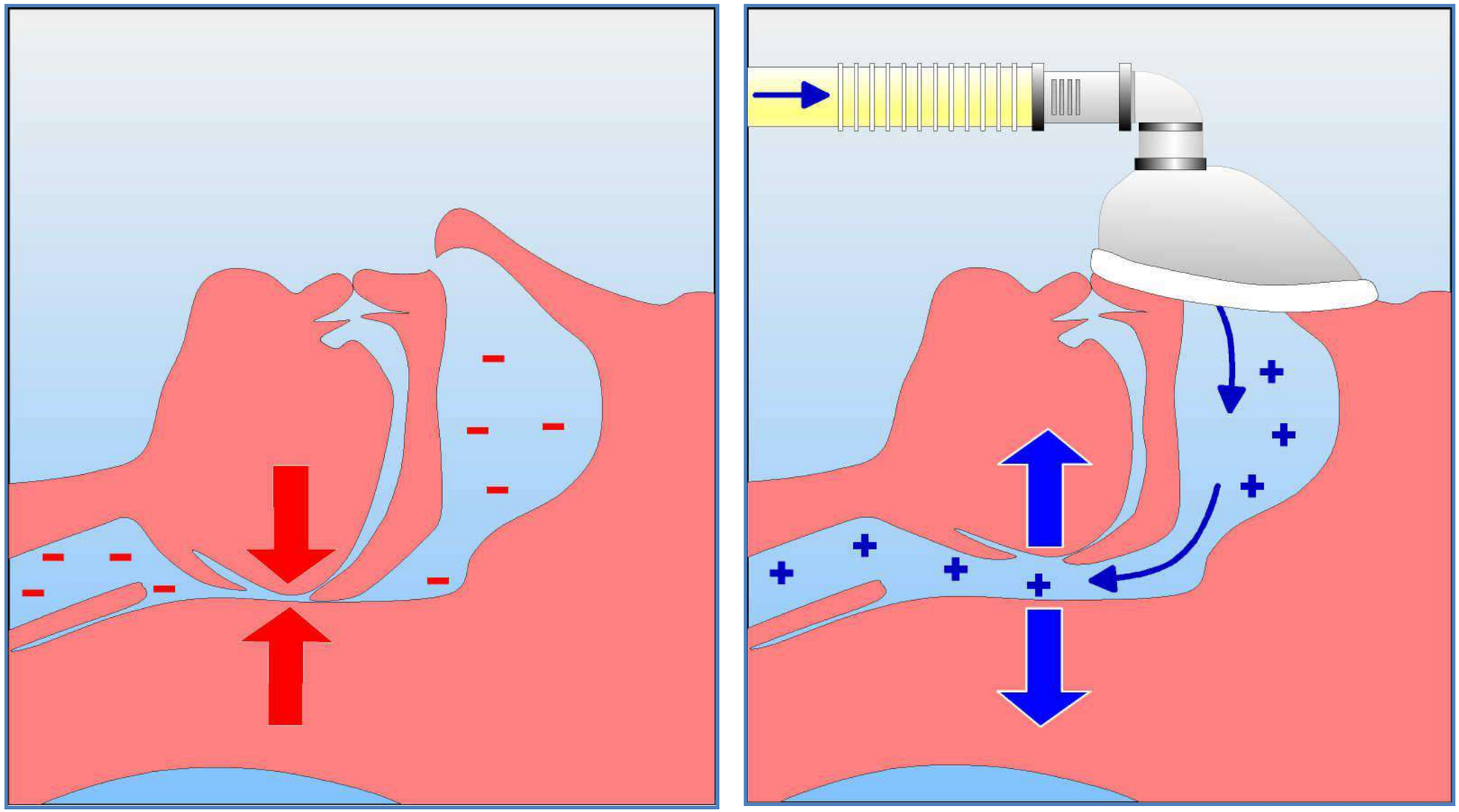
Patrick J. Strollo, Jr., M.D., Ryan J. Soose, M.D., Joachim T. Maurer, M.D., Nico de Vries, M.D., Jason Cornelius, M.D., Oleg Froymovich, M.D., Ronald D. Hanson, M.D., Tapan A. Padhya, M.D., David L. Steward, M.D., M. Boyd Gillespie, M.D., B. Tucker Woodson, M.D., Paul H. Van de Heyning, M.D., Ph.D., Mark G. Goetting, M.D., Olivier 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*





Activar Windows
Ve a Configuración para activar

Tratamiento con CPAP
Efectos de la presión positiva sobre la VAS




0.0
0.0
Device Hours


PHILIPS
10.0


AirMini™
Thursday, March 6
90
ResMed


ResMed
Home
My Options
Sleep Report
AirSense 10
MAX

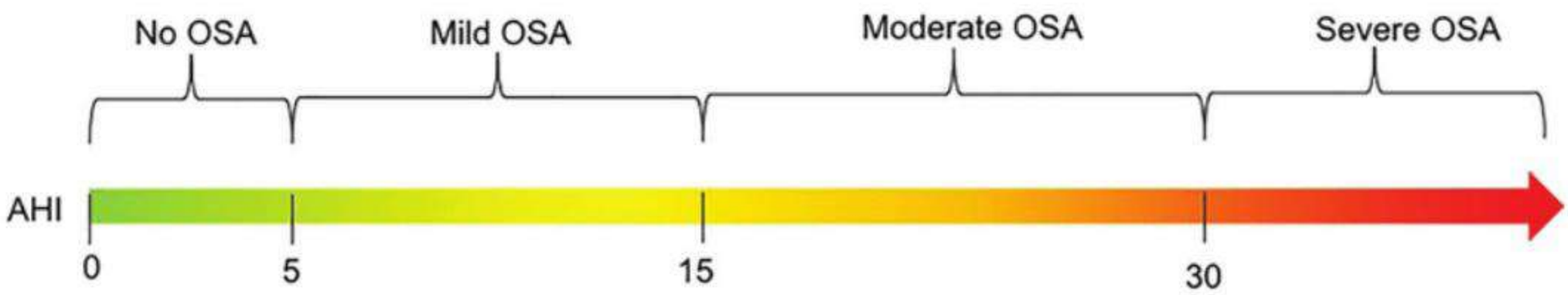








Criterios de Severidad en AOS según el IAH



AHI: apnea/hypopnea index
OSA: obstructive sleep apnea



Contents lists available at ScienceDirect

Sleep Medicine

journal homepage: www.elsevier.com/locate/sleep

DHECA score: A decision-making score to identify the need for CPAP treatment beyond the apnea-hypopnea index

D. Schönfeld [a,*], S. Arias [b], D. Pérez-Chada [c], O. Mediano [d,e], S. Romero Peralta [d], E. Dibur [f], M. Menéndez [f], D. Solomons [g], F. Barbe [h], D. Gozal [i], DHECA Study Group [1]

[a] Centro Diagnóstico San Jorge, Medicina Pulmonar, Puerto Madryn, Argentina
[b] Instituto Nacional de Enfermedades Respiratorias "Dr. Emilio Coni", ANLIS e Instituto de Salud, Dr. "Carlos Malbrán", Epidemiología, Santa Fe, Argentina
[c] Universidad Austral, Departamento de Medicina, Hospital Universitario Austral, Pilar, Argentina
[d] Sleep Unit, Pneumology Department, Hospital Universitario de Guadalajara, CIBER de Enfermedades Respiratorias, Instituto de Salud Carlos III, Madrid, Spain
[e] Instituto de Investigación Sanitaria de Castilla la Mancha (IDISCAM), Universidad de Alcalá, Madrid, Spain
[f] Hospital Alemán, Medicina Pulmonar, Buenos Aires, Argentina
[g] Institute for Biological and Medical Engineering, Schools of Engineering, Medicine and Biological Sciences, Pontificia Universidad Católica de Chile, Santiago, Chile
[h] Hospital Universitari Arnau de Vilanova y Santa María Lleida, CIBERES, Medicina Pulmonar, Lleida, Spain
[i] Marshall University, Joan C Edwards School of Medicine, Huntington, WV, USA

Score DHECA

Disturbances - AHI
Mild – 2
Moderate – 5
Severe - 10

Hypoxemia – T90
<10% - 0
>10% - 5

Epworth
Less than or equal to 10 – 0
11 or more - 8

Cardiovascular Comorbidities
HTN dipper – 2
Arrhythmia, Heart failure, Heart attack, Stroke - 5
HTN Non dipper or resistant - 8

Accidents (work or road)
Yes – 8
No – 0

Sum of scores for each factor

Total Score

Less than 10: No CPAP indication

10 or more: CPAP Indication

Among 1906 evaluated patients there was agreement between the therapeutic decision made at the clinicians and the recommendation suggested by the DHECA score representing an overall concordance of 78.7 %

Sleep Medicine 5 April 2025

Comité de Expertos

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Ana Musetti, Uruguay

Candela Caballero Eraso, España

Carlos Egea Santaolalla, España

Carlos Franceschini, Argentina

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Carmen Monasterio, España

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Sleep Medicine 5 April 2025

Muchas Gracias!

FUNDACIÓN ARGENTINA DEL SUEÑO

HOSPITAL UNIVERSITARIO AUSTRAL

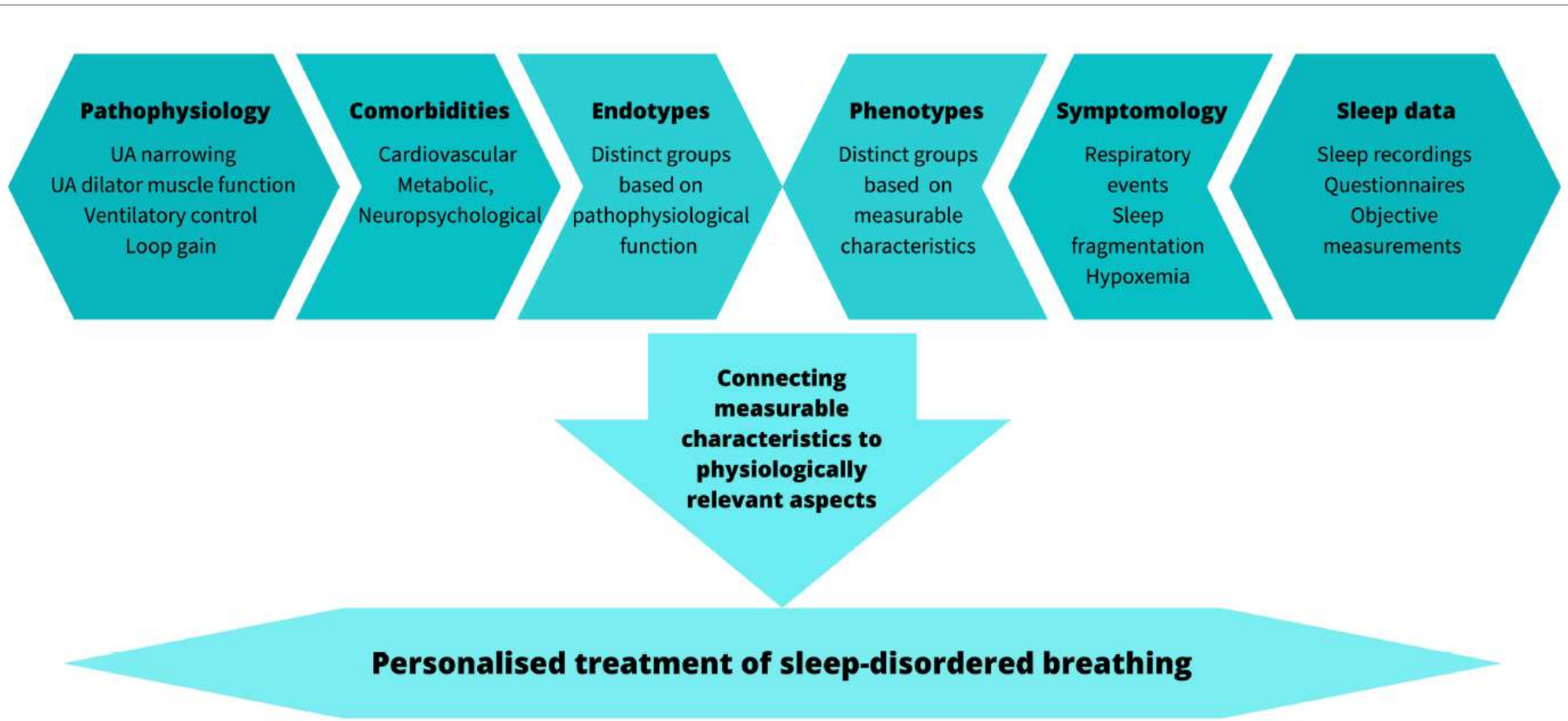


FIGURE 2
Factors to consider when translating pathophysiology and phenotypes to personalized treatment.