



UPDATE

OSA: A CAUSE OF TYPE 2 DIABETES MELLITUS

A number of studies have linked obstructive sleep apnea and snoring with impaired glucose tolerance and insulin resistance. However, these studies generally have drawn on selective populations, such as overweight or hypertensive subjects. Furthermore, sleep apnea and metabolic dysfunction are known to share common etiologic factors including central obesity and increasing age. As a result, numerous confounds have impeded understanding of the relationship between O S A and metabolic dysfunction.

A very recent large-scale study based on participants in the multi-center Sleep Heart Health Study has provided strong support for an independent association between OSA and altered glucose metabolism.¹ Unique aspects of this study include a large community-based sample (n=2,656), full polysomnographic assessment of OSA, inclusion of numerous confounding covariates (age, gender, ethnicity, BMI, fat distribution, smoking status and usual sleep duration) and objective measures of metabolic function (fasting and 2-hour glucose levels and fasting insulin levels).

After adjusting for the covariates, the finds were...

1. **Glucose intolerance:** Increasing Apnea/Hypopnea Index was associated with increased prevalence of impaired (110-125 mg/dl) and diabetic (≥ 126 mg/dl) fasting glucose levels and impaired (>140 mg/dl - 199 mg/dl) and diabetic (> 200 mg/dl) 2-hour glucose levels. Increasing hypoxemia during sleep was also associated with glucose intolerance.
2. **Insulin resistance:** The degree of insulin resistance, based on the homeostasis model assessment (HOMA) index, was associated with both the Apnea/Hypopnea Index and the degree of sleep-related hypoxemia and to a lesser extent with arousal frequency.

This study demonstrates that OSA is independently associated with glucose intolerance and insulin resistance. Further studies are needed to clarify whether apnea-related hypoxemia or arousals (or other specific physiological effects of apnea) might mediate the effects of OSA on metabolic function and whether metabolic function normalizes when the apnea is treated.

If you would like a copy of this article, contact the Sleep Disorders Center at (714) 771-8950.

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¹Punjabi et al. Sleep-disordered breathing, glucose intolerance, and insulin resistance. The Sleep Heart Health study. Am. J. Epidemiol. 2004; 160: 521-530.