

# Comparison of the New Masimo SET V3 Technology with a Conventional Pulse Oximeter during Polysomnography

Whitman RA, Garrison ME. *Sleep* 2001;24:A412 (730.R)

## Introduction


Measuring arterial oxygen saturation with pulse oximetry is an integral component of the Sleep Laboratory evaluation for Sleep-Disordered Breathing. Indeed, in a recent Position Paper, the American Academy of Sleep Medicine (AASM) proposed new criteria for the diagnosis of hypopnea in adult patients. Critical to this definition is a drop in oxygen saturation of at least 4%. AASM concluded that mild elevations of the apnea-hypopnea index (AHI) of > 5% are associated with an increased risk of cardiovascular disease.<sup>1</sup> Due to these new guidelines, and an increased awareness of variations in pulse oximeters response time,<sup>2</sup> this group of researchers compared the fidelity of a pulse oximeter with Masimo SET to a standard conventional pulse oximeter in the measurement of small rapid changes in oxygen saturation.

## Methods

Thirteen patients being evaluated for sleep-disordered breathing were instrumented with three pulse oximeters for concurrent measurement. A Quartz Medical Q-400 with Masimo SET V3 was placed in 2 second SpO<sub>2</sub> averaging. Two Nellcor N-200s were used: one in mode 1 (5 to 7 seconds SpO<sub>2</sub> average) and one in mode 2 (2 to 3 second SpO<sub>2</sub> average). The Nellcor N-200 placed in mode 1 was always positioned on the index finger of one hand. The Q-400 and the N-200 (mode 2) were randomly placed on the index and ring fingers of the opposite hand. All three pulse oximeters were turned on at the start of the study and were turned off at termination of the study. The trend data from all three pulse oximeters were downloaded into PROFOX pulse oximetry analysis software for comparison.

## Results

For all thirteen patients, the mean SpO<sub>2</sub> was similar for the three instruments (see table). In addition, for any given patient, the mean SpO<sub>2</sub> values of the three pulse oximeters were ≤ 1%. However, when evaluating significant desaturations there was a 50% increase in the number found by the Masimo pulse oximeter compared to the Nellcor pulse oximeter (in either mode1 or mode 2).

Pulse Oximeter	SpO <sub>2</sub> (mean ± sd)	Desaturations > 4%
 Masimo SET	95.8 ± 1.5%	78±120
Nellcor N-200 mode 2	96.2 ± 1.4%	51 ± 93
Nellcor N-200 mode 1	96.4 ± 1.6%	51 ± 92

## Authors' Discussion and Conclusion

The data shows that Masimo SET V3 in a 2 second SpO<sub>2</sub> average identified a greater number of significant desaturations than the Nellcor N-200 in either mode 1 or mode 2 even though the mean saturations were the same. The authors conclude **“this finding suggests that Masimo SET V3 technology has higher fidelity relative to actual physiologic changes in saturation than conventional pulse oximetry technology, which should lead to improved diagnostic capabilities.”**

1. American Academy of Sleep Medicine. Position Paper: Hypopnea in Sleep-Disordered breathing in Adults. *Sleep* 2001; 24(4); 469-470  
 2. Davila DG, Richards KC, Marshall HL, Gregory TG, Hernandez VJ, Rice SI. Oximeter's Acquisition Settings Influence the Profile of the Respiratory Disturbance Index. *Sleep* 2000; 23 Abstract Supplement #2; A8