Accuracy of Two Pulse Oximetry Devices with Motion Artifact Reduction Technology on Very Small Birth Weight Infants in an Intensive Care Nursery.
Slogic S. *Anesth Analg* 2002; 94(1S) S108.

Objective
To evaluate the accuracy of Masimo Radical and the Nellcor N-395 pulse oximeters ton Very Small Birth Weight infants (VSBW). Both machines employ motion artifact technology. Motion artifact interferes with accurate SpO2 values, particularly in conditions of low peripheral blood flow when "… the motion-added signal tens to predominate over the pulse signal so that the (Red/Infrared) ratio transmitted to the photoreceptor produces a false SpO2 value". [1] Motion and conditions of low perfusion are common in premature infants and are a continuous source of inaccurate SpO2 measurement. Motion artifact reduction technology uses filers to separate non-arterial noise from the arterial signal and thus improve the accuracy of SpO2 readings.

Methods
Blood gas values from critically ill VSBW infants were compared with simultaneous SpO2 readings. Infants were entered into the evaluation if they were critically ill with functioning arterial lines in place. Simultaneous SpO2 was measured on post-ductal limbs to avoid potential pre-ductal admixture. Arterial blood gases (ABG) were drawn as ordered by the physician for clinical reasons; no ABGs were ordered for the sole purpose of comparing machine accuracy to ABGs. ABGs were measured in a Bayer 855 Blood Gas, Electrolyte and CO-Oximeter analyzer. Functional oxyhemoglobin saturation (SaO2) was computed by the following equation: SaO2 = Fo2Hb / 1 – (FCOHb = FmetHb) x 100. Two hundred and thirty eight paired test values were obtained. The difference between the SpO2 and measured SaO2 of the ABG were calculated for each pair and the mean difference (bias) and standard deviation (precision) was calculated. A paired t-test was performed on the means to determine if there was a statistically significant difference between the two instruments.

Results
Two hundred thirty eight values were collected on 9 patients.

Conclusions:
The Nellcor device was statistically more accurate than the Masimo device when compared to measured functional saturation on critically ill VSBW infants. The Masimo device consistently read lower SpO2 values when compared with measured functional saturation.

	Masimo Radical	Nellcor N-395
Mean difference from ABG (bias)	-2.614*	-0.484*
Median difference from ABG	-2.55*	-0.4*
Standard deviation of the differences (precision)	2.197	2.101
Paired t test value	7.2362 (* = P<0.001)	