



## Question: Can the Bimini NanoJet System Cause Oxygen Toxicity?

The Bimini NanoJet® Oxygen Perfusion System is a technological breakthrough for perfusion of oxygen into the body's soft cell tissue using Ultra Fine Nanobubbles. These bubbles are so small (.1 microns) they can penetrate the skin through pores allowing for exceptionally deep treatment. Bimini saturates a water source up to 28PPM with 95 % Ultra Fine Oxygen Bubbles.

The utilization of both the Moxy device, recording muscle oxygen saturation, and the Nonin device, recording regional oxygen saturation over the femoral vessels, increased our accuracy and made regional oxygen saturation measurements possible. We found both the rSO<sub>2</sub> and SMO<sub>2</sub> to increase in healthy athletes. SMO<sub>2</sub> increased 86% on average and rSO<sub>2</sub> increased 4.5% during an unpublished preliminary trial. Eight individuals were tested using the Bimini NanoJet® to provide hyperoxygenation to bilateral lower extremities with or without Bimini NanoJet® oxygenation. Results below represent timing and data from the Bimini NanoJet® exposure of 8 individual SMO<sub>2</sub> trials, a mean non-linear regression fit line, and results from our single rSO<sub>2</sub> trial (Figure 9).

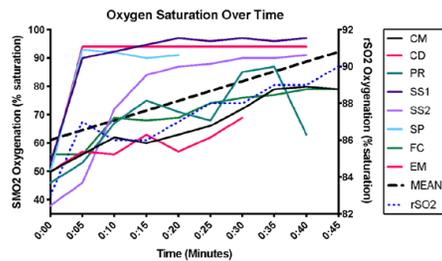


Figure 9. Real time oxygenation values of the right rectus femoris utilizing an SMO<sub>2</sub> sensor. Real time oxygenation values of the bath water used for treatment during the time of Bimini NanoJet® UFB infusion. N=8.

### Study on OXYGEN TOXICITY

Pulmonary toxic effect of oxygen can arise after prolonged exposure to oxygen > 0.5 ATA. Symptoms appear after a latent period whose duration decreases with increase in PO<sub>2</sub>. In normal humans the first signs of toxicity appear after about 10 hours of oxygen at 1ATA. Clinical features can be divided into three phases (a) Tracheobronchitis, (b) ARDS, (c) Pulmonary Interstitial fibrosis. Absorption atelectasis due to washout of N<sub>2</sub> can lead to collapse of the lung in the event of air trapping.

**In Humans, 100% oxygen can be tolerated at sea level for about 24–48 hours without any serious tissue damage.** Longer exposures produce definite tissue injury. Oxygen at 2 ATA produces characteristic pulmonary signs and symptoms beginning with mild carinal irritation on deep inspiration 3–6 hours into the continuous exposure, intense carinal irritation an uncontrolled cough after about 10 hours and finally chest pain and dyspnea. Symptoms subside 4 hours after cessation of exposure in majority of patients.

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### Conclusion

A Bimini NanoJet treatment consist of 1-hour treatments or less in water saturated at 28PPM with 95% Ultra Fine Oxygen Bubbles. Based on data from the many studies on Oxygen Toxicity, a Bimini Treatment is a safe treatment with little or no risk.

“At Rice University we have treated over 100 athletes for the past 6 months using the Bimini NanoJet Oxygen Perfusion System and have not had any adverse effects on any our athletes”.

*Dean Miller – Associate Athletic Direct – Sports Medicine – Rice University*