

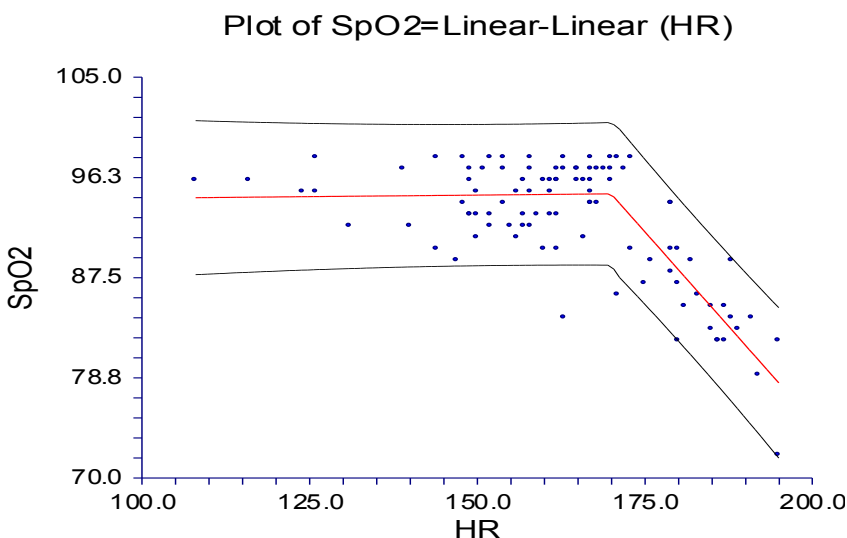
OXYGEN SATURATION AND HEART RATE DURING EXERCISE PERFORMANCE

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Background: Anaerobic threshold is not completely understood in exercise performance. We believe that the use of pulse oximetry and heart rate may provide a method to target anaerobic threshold and further develop training tools for high performance athletes and that may relate to aerobic exercise in the chronic stable patient. We tested three category 3 and one category 2 (USA Cycling classification) cyclists to determine if there would be a stratification or clustering of SpO₂ % and HR as workload increased. Method: Four cyclists completed a 10 mile flat course time trial using a Computrainer. Wattage increased throughout the 10 mile measured course. Heart rate and oxygen saturation via pulse oximetry were recorded. Data was statistically analyzed by cluster analysis and a regression analysis completing a Piecewise polynomial analysis using a Linear-Linear model. Results: The four cyclists completed the 10 mile course with a mean time of 21 minutes with a workload range of 350 – 850 watts during which time 98 sample sets were recorded. Verbal coaching and encouragement were provided throughout the test trial. There were two distinct cluster means discovered:

Variables	Cluster 1	Cluster 2
SpO ₂ %	95 (s.d. 2.4)	84 (s.d. 4)
Heart Rate	156 (s.d. 14)	183 (s.d. 7)
Count	72	26

Graphical representation reveals desaturation as heart max is reached and workload continues to increase:



Discussion: Heart rate measure as a method to track physical work does not incorporate pulmonary status. HR is a single measure and may be less sensitive to maximal performance effort in the trained athlete – although heart rate is a good measure of

exercise stress it should be modified to the specific athlete's ability. Interestingly, these tested subjects achieved HR max while maintaining an ability to increase work load in the face of oxygen desaturation. Conclusion: SpO₂% desaturations during maximal performance levels with power bursts into the clusters as revealed in this test could lead to measures of intense interval training providing an important augmentation to sports conditioning. The same measures may be equally important in the chronic stable COPD or CHF patient however with maintained aerobic activity throughout the duration of a set work load. Further evaluation is needed to determine exercise zones or clustering of the variables.