

## OXYGEN THERAPY

### **Assessment of the Salter Labs Demand Nasal Cannula Model #4807 and #4804 in Regards to Human Anatomy and Oxygenation**

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The Salter Demand Cannula was designed to separate the delivery of oxygen from the act of sensing respiratory effort. This design represents an advance over other cannulas with similar function for several reasons. Most importantly by separating the sensor side of the cannula from the delivery side, the sensor side becomes far more sensitive and effective in its function. Since oxygen delivery does not mingle with sensor function response time for demand oxygen delivery is much faster. It is well known that effective demand oxygen delivery is dependent on the timing of the delivery of the oxygen bolus. Sensors, which fail to provide this oxygen bolus in the first third of the inspiratory effort, may not properly oxygenate the patient.

Questions have been raised about the effectiveness of oxygen delivery utilizing only one naris and one oxygen delivery prong. This important concept was thoroughly analyzed by JV Roth et al in an article published in the journal of Anesthesiology V75 #3A Sept. 1991 entitled: A NEW CO<sub>2</sub> SAMPLING NASAL CANNULA: OXYGENATION AND CAPNOGRAPHY in which the author states that "oxygen...via one prong was as effective at delivering the same flow of O<sub>2</sub> via 2 prongs." In a study comparing the Nelcor Puritan Bennett Dual Lumen Cannula #778058-00 with the Salter Demand Cannula #4804 it was found that the Salter Cannula was as effective in oxygen delivery, even with partial occlusion, and more responsive to sensing and triggering than the NPB unit.

The reason oxygen delivery is effective when provided to only one naris is explained by the anatomy and physiology of the upper respiratory system. We will briefly describe this system and how the function of the cannula can be maintained even when the side of the nose, to which oxygen is delivered is partially occluded.

The upper respiratory tract is composed of the nose, nasal turbinates and the posterior pharynx. The structures of the nose are divided into two fosse (cavities) by a central septum. These cavities contain the turbinates who's primary job is to warm and humidify the air we breathe. These turbinates are covered with a delicate mucus membrane. To protect the membrane from drying and subsequently sloughing off, these membranes alternately swell and occlude one side of the nose. To assure that airflow is maintained the body has two defense mechanisms. The first is that this occlusion is rarely complete and, as such, oxygen flowing at one to two liters per minute from the opening of a nasal prong easily passes beyond the obstruction. The second structural feature that supports oxygen delivery to only one side of the nose and compensates for the natural occlusion of the naris is a foramen (aperture) through the middle nasal septum. This communication between the fosse of the nose through the septum varies from one individual to another and may be very large of non-existent.

In conclusion, the Salter demand cannula has a proven clinical record of safety and effectiveness in the delivery of oxygen via demand oxygen delivery devices and remains an industry standard for patient comfort and satisfaction.