



THE OXYARM™ AND OXYMASK™ FROM SOUTHMEDIC, INC.

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In this issue we're going to explore and discuss two oxygen therapy delivery devices from Southmedic (The Southmedic Corporation, Barrie, Ontario, Canada); the OxyArm™ and the OxyMask™

As most therapists are aware, the respiratory care profession has had to contend with numerous types of oxygen delivery devices over the years. We have had nasal catheters, nasal cannula, simple masks, venti-masks, partial re-breathing masks and non-rebreathing masks just to name a few. All these masks need to be stocked in the hospital (often in multiple locations) kept track of, and purchased as needed; a storage, purchasing and expense "hassle", to be sure. Wouldn't it be nice if just one mask could fit the bills of all the other masks? Wouldn't it be nice if one mask could replace all those others? Enter the Southmedic Corporation's OxyArm™ and OxyMask™ which may, at last, be the answer to those laments. Southmedic, a medical device manufacturer in Canada, seems to have invented just such a mask. Their oxygen delivery devices are unique in that they do not utilize the traditional methods of delivering oxygen to the patient's respiratory system, at least not in the way most therapists are accustomed to. Instead, their OxyArm™, which looks very much like a telephone operator's headset and microphone absent the earpiece,



Southmedic's OxyMask™

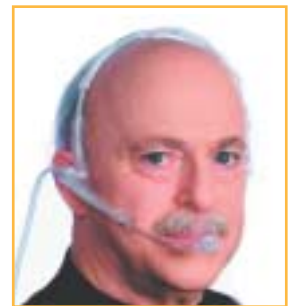
and their OxyMask™ which consists of a series of form-giving struts that together make for a framework of a very "open" mask, deliver oxygen in a whole new way with numerous additional ancillary benefits for the patient and the caregiver alike.

Let's discuss the structure and function of these devices in detail, for it is the details which make the difference in their function. Let's start with the OxyArm™, which the company promotes principally for the homecare market.

The first difference one notes is that there is no part of the device entering the nose or the mouth. Instead, where one would expect a microphone mouthpiece in a telephone headset, there is a small triangular cup-like object (the "diffuser") with its opening pointed toward the nose about 1/2 of an inch from the nares. Closer inspection reveals a mushroom shaped piece (the "pin") centered in the deepest and most central part of the diffuser. The diffuser is held in position by a strut (the "arm") which in turn is stabilized by

a headband which does not fully encircle the head. Rather, the headband fits snugly over the head and utilizes three soft foam disks positioned to provide both stability and comfort. One disk sits at mid skull and the others each sit at the pre-auricular portion of the temporal bones.

The oxygen supply tubing connects at the rear of the arm. The arm itself can be positioned on either the patient's right or left by reversing the head bands' orientation. This is a nice feature, especially for people who need to utilize oxygen 24 hours a day. Additionally, the arm can move both up and down and in and out as needed for a more personalized fit, another nice feature of this unit.



Southmedic's OxyArm™

A larger version, the OxyChin™ is available for oral delivery of O₂ using a similar application which substitutes a neck strap for the OxyArm™ assembly. A nasal cannula is also available with a straight, small, single limb cannulae.

Southmedic's OxyMask™ is open to atmosphere rather than being the "mini-tent" that completely covers ones mouth and nose, the type of mask therapists are used to using and the same type many patients abhor. Using a skeleton-like frame the mask focuses flow toward the mouth and nose. Again a system similar to the "pin" and "diffuser" assembly described above, provides O₂ enriched gas to the patient. This open framework also provides for an immediate exhaled CO₂ washout to atmosphere, thereby preventing any re-breathing of exhaled CO₂ while enhancing FIO₂ delivery. The open framework also allows for oral and nasal patient access which is of great assistance in facilitating both communication and oral hygiene both of which can be fully done without have to take off the mask – something impossible with conventional masks. We also liked that oral suctioning of secretions, visualization of NG tube placement and upper airway and pharyngeal inspection can take place without decreasing delivered O₂. Finally, the strut and space configuration being so "open" will likely be less anxiety producing to the claustrophobic and/or dyspneic patient as well.

By the way, children's versions are available in both open O₂ mask configurations and in an aerosol mask with connector that aims the aerosol at the mouth and nose, not upwards

towards the eyes. For obvious reasons the aerosol mask is a closed type of mask. All of the children's masks are also fitted with a penguin-like figure on the mask surface to make them more "kid friendly".

Pin and Diffuser – Here's the theory to back up the structure. As oxygen from the gas source flows into the pin it creates a negative pressure in the "mushroom-like" cap. This, then, creates a vortex which pulls the desired gas into the vortex. The vortex then travels to the diffuser carrying with it a high concentration of oxygen which spreads and spills out of the diffuser cup filling the mask's volume and simultaneously clearing exhaled gas from the mask. For a more technical explanation with numerous excellent graphics, visit SouthMedic's website at www.southmedic.com

Functional Analysis

We evaluated how the open design of the arm and mask would affect oxygen delivery. Several studies have compared the OxyArm™ with a nasal cannula and a Venti mask at the same oxygen flow rate to the pulse oximetry values in small patient groups 1-4. In our evaluation we measured the "tracheal" oxygen concentration delivered by an OxyArm™, adult OxyMask™, a standard cannula (Baxter) and a Venturi mask (Hudson RCI) to a Resusci-Annie head (Laerdal Medical) connected to a test lung (Michigan Instruments, Inc.) under constant simulated breathing conditions.

The drive test lung was ventilated by a PLV-100 (LifeCare) with a tidal volume of 600 mL, respiratory rate of 12, peak flow of 30 LPM and I:E ratio of 1:1.8 for all test conditions. Flow rates of 2, 4, 8 and 15 LPM were used with each device except with the Multi-Vent mask. The Multi-Vent was tested at 3 LPM on 28%, 9 LPM on 35% and 15 LPM on 50% oxygen settings simply to verify the functionality of a high flow delivery device on the Resusci-Annie head model. The high and low oxygen concentrations for each of five breaths were recorded when the oxygen percentages stabilized after settings or devices were changed. High and low concentrations were then averaged for each device on all flow rates. Confidence intervals (95%) for each condition were also calculated. Oxygen concentrations were analyzed with a TED 60 analyzer (Teledyne Analytical Instruments).

Our testing revealed that the delivered oxygen concentrations were not at all significantly different from the ranges reported on the Southmedic website all of which satisfy the claims being made by the manufacturer. It was our feeling then that the OxyMask™ might indeed be the delivery device that solves that age-old problem of having to stock numerous kinds of oxygen masks. Combine that with the numerous benefits we discussed pertaining to everything from total CO2 elimination, to ending that claustrophobic feeling, to allowing patients to talk more effectively, and one seems to have a pair of devices well worth looking at.

We agreed also, that the OxyArm™ device would indeed be an excellent alternative for homecare patients who often report chaffing and soreness around the ears with nasal cannulae - something that is completely avoided via the OxyArm™.

Southmedic is also a well-established company with an excellent track record. They can be contacted thru their website www.southmedic.com or via phone at (705) 726-9383.

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