**Team Breathe Easy – Halare – New Product Development**

In the United States alone, 40 million people suffer from either asthma or sleep apnea. Hundreds of millions more suffer from both disorders worldwide. Billions of others are simply unaware how to breathe properly, thus leading to poor breathing habits. The main objective of the Halare device is to train people how to breathe properly, improving the quality of life of victims suffering various breathing disorders, athletes, and the average person. The device provides an audibly delivered breathing program that takes a user through the Buteyko breathing technique, a step by step proven method of safely alleviating asthma and sleep apnea symptoms while relieving the need for rescue medication.

The technical manufacturing objective is to develop a feasible, cost effective design for a device that measures both heart rate and air flow, and interfaces with a computer program. The device simultaneously analyzes the user’s performance and gives a diagnostic report on their progress. The design is also ergonomically and aesthetically pleasing, so that the user will feel comfortable using the device at any time during any day for a period of 40 minutes.

SolidWorks was used to model the Halare device and used in the development of multiple generations of rapid prototypes. The device is modeled as a battery-powered headset which cradles the right ear. The apparatus encompasses a heart rate earlobe clip sensor, an air flow sensor, a speaker that provides instructions to the user, and an LED low battery indicator. Additionally, the device includes volume control and a DAQ (data acquisition) device that will interface with the computer. A cannula is housed in an adjustable compartment that fits around the patient's cheek; it includes a bi-nare tip to improve sanitation.

The device provides real time instructions to the user regarding their training regimen. The heart rate data collected from the user will ensure that the user is keeping a low BPM (beats per minute) throughout the exercises. The air flow data is used to determine the user's breathing pattern, such as paused breath, length of each breath, and excessive breath intake. The data is then analyzed using a computer software program (LabVIEW) and user friendly results are provided.

The Halare device will change the way people breathe. Routine use of the device will train patients to become efficient with their breathing, therefore dramatically lessening breathing symptoms and improving the quality of life.