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|  | **BIOLOGICAL RESPIRATORY RESEARCH PROJECT**  **INTRODUCTION:**  The research I have recently conducted was a series of tests based on a product that is out on the market. This product, called the, '' Breathe Right Nasal Strip", is advertised to enhance respiratory functions in men and woman. This product is to be placed just above the bridge of the nose. Its composition consists of two thin metal rods engulfed in an elastic Band-Aid. As the elastic band aid is placed around the nose, it exerts force on the metal rods bending them accordingly to the nose's shape. These metal rods, having the elastic force being exerted on them, pushes around the user's nasal cavity increasing its diameter. According to this product's advertisement, when the nasal cavity's diameter is increased, the user will experience an increase in their tidal volume. Tidal Volume is defined as the amount of air inspired and expired in one single breath. My first objective in my research is to test the user's tidal volume at a relaxed state, with and without the strip, to find the degree of effectiveness in this product. My current research on the human respiratory system sprung up several other questions. If the user's tidal volume is increased, than several other variables may also correlate accordingly. One of these variables is the respiratory rate, or the number of breaths taken over a period of time. Another variable which may show correlation towards tidal volume is the respiratory minute volume. This is the tidal volume multiplied by the respiratory rate to measure the air in take in the lung over a period of time. Heart rate is the amount of beats the heart makes over a certain length of time. A person's heart rate is increased during times when body cells need essentials in order to survive. One of these essentials is oxygen. When a person is in time of activity, his or her cells are using a greater amount of energy, and therefore, are in need of more oxygen. All these variables may have a variation if the nasal strip advertisement holds to be true.  In interpreting the data obtained, first you have to look at the subject�s tidal volume rates before and after using the strip. If the tidal volume didn't sufficiently increase than the strip was proven ineffective. However, if the tidal volume did in fact show an increase, than the heart rate and respiratory rate can be statistically analyzed to uncover their relationship with tidal volume. If these statistics are found significantly lower, than the subjects body will be at a more relaxed state. The respiratory minute volume will be looked at independently. This measurement, with respect to the experiment, is interesting because it will show if more or less air was respired after the strip has been applied. If the tidal volume was found significantly greater, this measurement will show if the body will act accordingly.  According to Claudia Kenicer of the University of Massachusetts, MS in Organic Chemistry, during a period of rest, every breath is not identical in mass to the previous one. In order to receive an accurate sample, the breaths being analyzed must be randomly selected. Deciding which breaths are to be analyzed can be accomplished with a random number generator. A preference of mine would be to record at least one breath per minute. According to George B. Johnson, Ph.D., of the University of Washington, the respiratory rate of a human at a relaxed state is usually between ten and fifteen breathes per minute. Therefore, by using a program found on the standard "TI" calculator, I will randomly draw a number between ten and fifteen. The breaths I analyze will be the multiples of this number. This process will give me a random sample size which will give the data I will obtain more significance.  These variables being measured have multiple significance in the way the respiratory system will function. According to Tony Babb, Ph.D. of the University of Texas Southwestern, the average tidal volume will usually remain constant during extensive periods of rest. If this holds true, the body will receive a constant flow of oxygen. If the tidal volume is increased, other metabolic rates of the body may correlate accordingly. One of these variables is respiratory rate. If an increase in tidal volume is introduced, the respiratory rate, may or may not change. At a time of relaxation, the body will work to maintain a constant oxygen level in order to maintain healthy cell function. If the body can achieve this in fewer but more efficient breaths, than the advertisement will hold true. The user's body will be at a more relaxed state. Heart rate and respiratory rate correlate with a high percentage. This will hold true in every circumstance because the heart is responsible for the supply of blood to the lungs to carry out oxygen diffusion. If the heart remains at a more relaxed state than the body may have an according response. The respiratory minute volume may also have a correlation with a breath enhancer. It is of curiosity to me to find out how much oxygen is entered through the body over a period of time. This is perhaps the most interesting part of my experiment because it will show how the body responses to all these variables. According to Stephen Seile, Ph.D., of the University of Arkansas, the more oxygen that is introduced into the system, than the chance of someone to maintain cellular health increases.  Another variable which was incorporated in my experiment was the subjects mass. According to Peter H. Raven, Ph.D. of the University of Washington, the larger a human is in mass, the more air will need to be inspired. A body with a heavier mass will respond to change differently than a lighter body. A subject with a larger body mass may have different respiratory patterns than those subjects with a more moderate body mass. Therefore, body mass is a lurking variable which needs to be eliminated. By dividing my subjects into a moderate weight group and heavy weight group, the data will offer a clearer statement towards the "Breathe Right " nasal strip. Also, it may show a degree of effectiveness regarding weight. A significantly higher percentage of effectiveness may be associated with a weight class.  In professional sports today, many athletes have successfully experimented with breathing enhancers in order to gain an advantage over their competitors. Other people, besides athletes, regularly use nasal strips in their sleep in order to obtain a more efficient night rest. Today, according to the Food and Drug Administration, twenty-four billion American dollars are spent each year on over the counter drugs. Many of these drugs contain the following statement on their label," This product's effects have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, or cure, or prevent any disease.". The effects of these drugs vary from person to person. Nevertheless, billions of dollars will be annually spent on questionable drugs. In my research, the question of effectiveness of the "Breathe Right Nasal Strip" will be answered.  A similar breathing enhancer is out and being regularly used by athletes. This strip differs slightly in shape but servers the same purpose. Scientists J.J. Fasnacht, S mortier, A. Wipshaar Medizinische, and Kantonsspital Schaffhausen of the Institute of Sports Medicine conducted a similar experiment to mine. Their main goal was to study the "theoretical ability of an athlete to postpone exhaustion during exercise". In other words, they studied aerobic and heart rate performances with and without the nasal strip. Their subjects were cyclists, perhaps the most aerobic conditioned athletes in the world. To test their subjects� recovery time, they conducted a simple but practical experiment. They had their subject do strenuous activity to increase their heart rate. After this was done, the scientists measured the time it took their subject bodies to return to a normal state. The subjects did this with and without the nasal strip. Both sets of recovery times were then compared. After conducting tests on both men and women, they found an 80% correlation with men and a 90% correlation in women in favor on the nasal strip. This data enabled the scientists to conclude that the athletic nasal strip, "may enhance aerobic performance and heart rate recovery times".  Understanding the mechanics of the human respiratory system is knowledge which would help clarify the results obtained. Physically the lung is supported in the body by an air tube called the bronchus. The trachea is another air tube which receives the air exhaled, passes it down through the voice box, or larynx, and down to the bronchus. As the air passes through the nasal cavity, cilia hair around the lining of the nose filter out any dust particles which could do harm to the lungs. By doing so, moisture is prevent from being lost in the lung Once the air is in the bronchus it then enters the avioli of the lung. At this point the air is taken into the body. The lungs are part of the thoracic cavity. The theoretic cavity is bounded onto the ribs and is separated from the abdominal cavity by the diaphragm. A fluid called the intrapleural fluid engulfs each lung. This fluid has many essential purposes. Its main physical job is to support the lung's weight in the body.  During inhalation, the walls of the chest cavity expand as the ribs move upward and outward. The extra space in the chest causes the fluid pressure surrounding the lung to decrease to a point that is less than the pressure within the lung. As result, the walls of the lung push outwards. As the lung expands, the internal pressure within the lung decreases. This process allows the air inhaled to enter the lung. The amount of air that enters the lung can be regulated by smooth muscles within the bronchus. Reacting with chemical sent by the body, these muscles can open and close air passages regulating the airflow into the lung. During exhalation, the ribs and the diaphragm move back to their original position. These motions exert a pressure on the fluid surrounding the lung. This pressure is forced on uniformly along the surface of the lung forcing air outwards.  Inside the lung, an exchange has to take place to get the air inside of the body. This exchange occurs within the alveoli of the lung. Physically, the alveoli appear to be a large mass of grapes. There are over 300 million alveoli in each lung. Each alveolus is engulfed within masses of thin wall capillaries. The distance between the alveoli and the thin wall capillaries is between 0.5 and 1.5 microns (micron is equal to a millionth of a meter). The masses of capillaries create a surface area for gas exchange ranging from sixty to eighty square meters. There are approximately one hundred capillaries for every one aviolus.  Each lung has its own capabilities in productivity. Scientists and researches have established certain units of measurements to determine the lungs' efficiency. These measurements can be used to determine the health of the lung. Tidal Volume is the amount of air inspired and expired by the lung in a single breath. The average Tidal Volume is 500 milliliters at a relaxed state. The Functional Residual Capacity (FRC) is the measurement of air which remains in your lungs after exhaling. This ranges from forty to one hundred milliliters depending on lifestyle variables. The FRC correlates with the Inspinatory Volume Reserve (IVR), which is the amount of air above the FRC the lung can hold. The amount of air being capable of exhaling out of the lung is known as the Exspinatory Reserve Volume (ERV). Vital Capacity is the sum of the FRC, IVR, and ERV. If all these variables are assembled together, the Vital Capacity turns out to be the maximum amount of air capable of being moved in and out of the lung through muscular effort. The average Vital Capacity in men is 4.6 liters while the average drops to 3.1 liters in women. Depending on activity, the Respiratory Rate, or the number of breaths taken over a period of time, will vary. The Respiratory Minute Volume (RMV) is a product of Tidal Volume and Respiratory Rate. This measurement will give you the total amount of air inspired and expired over a period of time. RMV can range from five liters per minute to up to 130 liters per minute during periods of vigorous exercise. All these variables can be slightly altered by the lungs Dead Space. A Dead Space is a portion of the lung in which air does not contact blood. Problems can occur if the Dead Space escalates to a certain percentage.  Once oxygen has entered the lung it moves through the circulatory system through a series of proteins which bind dissolved molecules of oxygen. This binding occurs in the capillaries surrounding the avoli. Once the oxygen is bounded together, proteins distribute it throughout the body. The carrier protein in mammals which distributes oxygen is called hemoglobin. Hemoglobin consists of four peptide units containing an iron ion to form bonds with oxygen. Hemoglobin can be found anywhere on the body circulating with the red blood cells. Ninety-five percent of the body�s oxygen is bound onto hemoglobin. The higher the oxygen concentration is in the blood, the more hemoglobin will be assembled. In cell tissue, carbon dioxide molecules are present. Carbon dioxide causes hemoglobin to change shape making it easily available to give up oxygen. Other chemicals bind with hemoglobin, for example (DPG), which make it give up oxygen at a greater rate. Carbon Monoxide reacts with hemoglobin in lethal way when talking about the person it belongs to. This holds true because carbon monoxide forms a strong bond with hemoglobin disabling its ability to bind with oxygen, a life necessity for humans.  The Breathe Right Nasal Strip is advertised to enhance the breathing process and its efficiency. The company has produced several different models of strips in order to associated better with the users' demands. The athletic strip, the one most commonly known, is larger than the strips used for relaxation. Instead of using two rods in the center, the athletic strip uses three. If one were to try on both strips, a difference could obviously be felt. The elastic Band-Aid covers more of the nose area in both the men and women models of the athletic strip. The strip designed for men is significantly larger than the strip designed for women for both designs. This is a practical modification because the average surface area of a man's nose is greater than the average surface of a woman's nose. More adhesives are placed on the athletic strip to ensure the strip will not fall off during competition. The nasal strip designed to enhance a relaxation period is much smaller compared to the users nose. This modification was made with regards to comfort. With respect to gender, the differences in the sizes between the men and women strips are greater in the athletic strip. The men's athletic strip is 5.35 square centimeters while the women�s athletic strip is 4.95 square centimeters giving a .4 square centimeter yield in size. The non- athletic strip designed for men is 4.68 square centimeters while the strip designed for women is 4.49 square centimeters giving a .19 square centimeter yield in size. The yield difference is not explained in their Internet advertisement. However, I've recently received an e-mail from a local medical center answering this question. Their explanation was that during a time of strenuous aerobic exercise, men tend to push their bodies farther than women. Not matter how strong one's determination is in athletics, the body will reach a limit in the amount of work it can do. Men's bodies tend to have a farther limit than women's and therefore are in need of a larger strip. Touching the two strips you might be able to notice that the elastic in the athletic strip is more flexible. In any contact sport the nose may be struck or pushed in an unnatural position. The flexibililty is to compensate for these instances. Economically speaking, the athletic strip runs in stores for $4.32 for a pack of twelve ($.36 per strip), and the relaxation strip runs for $3.88 for a pack of twelve ($.32 per strip). The price difference is mainly because the athletic strips contain more material. Because my subjects were at a relaxed state during data analysis, I used chose to use the "Breathe Easy Relaxation Strip". Both strips showed support from its users. Here are several exerts taken from professional athletic who have successful used nasal strips:  "*I feel more prepared to hit the ice when wearing a strip. It opens my nasal passages to help me breathe easier, which gives me more energy for when I need it most." �*  *Peter Bondra NHL Allstar*  *"Breathe Right® strips open my nose so I can breathe easier on the field. I can actually feel them working, which makes me feel better when I'm playing."*  *Mike Duhaney, New York/New Jersey Metro Stars*  *"I feel I can get a cleaner, deeper breath of air through my nose with a Breathe Right® strip. It's an added piece of equipment that is very simple, and does a great job." � Anne Marie Lauck Professional Cross Country Runner*  *"It's something that at first caught me off guard, because I couldn't believe that something so small could be so significant with my play. The strips really elevated my game. Before, I would be congested at times, but after I put the strip on, I went out there and I was breathing well. I was recuperating faster. Around the fourth quarter when you've got a lot of players tired, I�m just getting my second wind." � Jerry Rice*  Those using the "Breathe Right Relaxation Strip" said the following:  *"It was something incredible. Not only did I fall asleep easier but I woke up feeling more refreshed."*  *Linda Johnson, St.Petersburg, Florida*  *" I highly recommend experimenting with the Breathe Right Nasal Strips if you are having problems with your sleep. I too, suffered from sleepless nights until I used the Breathe Right. After a couple nights of use, I could fall asleep immediately. And I still use them today." Michael -Salt Lake City, Utah-*  *"During my daily naps, I like to use the Breath Right Strips. I feel more refreshed when I wake up. Like I've been sleeping the whole winter. -Joan- Jacksonville, Florida-*  The Breath Right Company first marketed their product as an athletic enhancer. It was seen on the finest athletes during primetime events. Later on, when more research was done, Breathe Right produced a second strip, to enhance a night rest. Before this product came out, many people suffered from restlessness nights and lacking an efficient night rest. A good percentage of this people, according to Breathe Right, looked for a substance to deal with their problems. Although sleeping pills have been proven effective, some people, according to the University of Arizona Scientific Research Center of Biology, will experience lethargicness, dizziness, and or headaches. It was recommended by the advertisers of this product to try nasal strips as an alternative. Breathe Right even offered free samples to some. Many people have successful experimented with nasal strips in order to achieve a good night sleep. From personal aspects, nasal strips have been proven affective. (The fact that the company is still in business proves this). However, from a personal statement, nobody can be positive if the product really works. The effects could simple be mental or coincidental. The research I've done was a series of scientific tests administered to subjects using the "Breathe Right Relaxation Strip". This research is set out to answer anybody's questions regarding this product. | |
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