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FOCUS OF THE MONTH
January 2015

Back to breathing :)
Breath
Breathing. We do it approx. 26,000 times each day. There are many ways to do it -- because if we can't . . .

When deep breathing is done you feel freshness, energetic, and lightness in both body and mind.

Since it is January and tis the season for losing holiday weight and getting your 2015 on track with health, food, and exercise . . . thought some new data on nose breathing and weight loss would be helpful.

Guess what the primary organ of fat removal is???? Are you ready for this . . . our **LUNGS**!

- A new study published in the *British Medical Journal* determined that the primary organ of fat removal in the body is the lungs. (1) In fact, according to the study, when 10kg of fat in the form of triglycerides is lost, 8.4kg of that fat is exhaled through the lungs.

Triglycerides are the fats stored on our body and carried in our blood. Triglycerides are made of carbon, hydrogen, and oxygen. When we burn fat the hydrogen and oxygen combine and form water (which we excrete through sweat, urine, and feces) and the remaining carbon is breathed out of the lungs as CO2 . .

- The carbon from the broken down fat is exchanged in tiny sacs in the lung tissue called *aveoli*, and breathed out of the body as CO2.

And interestingly over 80% of the fat is metabolized down to carbon dioxide and less the 20% is broken down to water . . .

This means over 80% of the fat we metabolize is excreted through our lungs!
This could also be why the ancient yogic texts say pranayama makes you light . . .

We all know that deep breathing includes deep exhalations in our yoga practice which removes the carbon dioxide which is in turn removing the unnecessary fat and toxins from our bodies . . . Remember toxins are stored in fat cells as you metabolize the fat toxins are burnt off as well.

- This is why I like the strong breathing in uth-pluthi at the end of our practice, not only are we burning off the toxins that the liver and kidneys could not get rid of — we are burning the fat that housed the toxins :)

When I was doing research on pranayama one of the benefits I came across is that deep breathing by combustion burns off the hardest to remove toxins from our body (which the liver and kidneys are challenged to remove).

Breathing deeply is important -- this is why in my classes I stress the importance of breathing deep enough that your rib cage moves -- breathing deep enough that you fill your entire thoracic cavity (ribs and chest) with air and you feel them expand on the inhale will access the rich blood in the lower lobes of the lungs where we can exhale more carbon dioxide.

- Think of a 3D expansion of your rib cage as you inhale — expanding top to bottom, side to side, and front to back. When you fill your entire thoracic cavity you will expand both your rib cage area and your chest.

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- It is ok when breathing deep to expand your chest too — as long as you are expanding your rib cage as well. Some people have heard that "chest breathing" is bad — this is referring to shallow breathing where ONLY your chest moves and not your rib cage. I would re-word this statement from chest breathing to shallow breathing. It is shallow breathing that is not as beneficial, not necessarily chest breathing.

Breathing deeply through your nose is important because the lungs are gravity fed:

- The lungs are mostly gravity fed (although other individual factors may play a role with blood distribution in the lungs). This means the blood pools in the lower lobes of the lungs — so most of the blood holding the CO2 to remove from our lungs sits in the base of the lower lobes — this blood is also the most oxygen rich. (2)
- And furthermore Nasal Breathing (vs. mouth breathing) turbinates the air we breathe spiraling it down deeper into the lower lobes of our lungs perhaps also helping us to access this rich blood in our lower lobes.

Studies have shown that there is a significant increase in CO2 released during nose breathing compared to mouth breathing. (3) Of course more studies to prove this would be nice to see.
These findings suggest that by breathing through the nose, both at rest and during exercise, more CO2 would be expelled (exhaled), and the removal of fat in the form of broken down triglycerides would be significantly increased. (3)

It would seem by breathing deeply and expanding our thorax as the ancient yogis taught us, we we would access the blood rich lung tissue in the base of the lungs and release CO2 more efficiently during exhalation. And I would recommend this style of breathing as your pattern for breathing all day long . . .NOT just on your yoga mat.

References:
1. http://www.bmj.com/content/349/bmj.g7257
2. http://bja.oxfordjournals.org/content/98/4/420.full
3. http://www.ncbi.nlm.nih.gov/pubmed/3141357
4. Body Mind and Sport. John Douillard. Harmony Books 2000

And remember . . . your weight also reflects your lifestyle choices — in fact diet and lifestyle play just as much a role . . . keep in mind the more sugar and carbs you eat the more triglycerides your body will make forcing the body to store far more triglycerides than we can breathe out in a 24 hour period! If you want to lose weight:

- Don't sit too long - every 15 minutes of uninterrupted sitting get up and move! Intermittent exercise all day long along with a reasonable (in time and intensity) exercise or yoga program seem to be the most effective
  - In fact if you do need to sit . . . sit on the floor instead of a chair . . . or when you do need to sit in a chair don't sit like a lady . . .
- You are what you eat . . . eats too . . . Be mindful of what you put into your body. I have much research in many other articles on my website about this (**www.befityoga.com**)
  - get rid of processed foods, eliminate sugars, be careful with carbs and grains until we understand better what is really healthy for our bodies.
  - focus on fresh vegetables, grass fed meats and fats, and eating more fat and cholesterol in general!

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- Periods of intermittent fasting will help your body burn more fat as fuel instead of blood sugars.
- Get rid of toxins in your environment — toxins in our environment interfere with many of the processes in the body and in many cases confuse our immune system leading to auto-immune diseases. Some of the first places to look for toxins? Cosmetics, toothpaste, hairspray, shampoo, conditioner, lotions, pills, household cleaning supplies, furniture (especially new furniture that off gases), etc,

Douillard reporting on it:
http://www.lifespa.com/can-nose-breathing-boost-weight-loss/

Mercola reporting on it:
http://fitness.mercola.com/sites/fitness/archive/2015/01/09/fat-burning.aspx?e_cid=20150109Z1_PRNL_art_1&utm_source=prmrnl&utm_medium=email&utm_content=art1&utm_campaign=20150109Z1&et_cid=DM64311&et_rid=797140043

Nose Breathing is an important part of our health! Here is some research on the benefits of nose breathing and why you want to breathe through your nose.

Deep breathing stimulates cellular breathing -- taking in O2 and giving off CO2 in every cell of our body. This improves the health of each cell in our body. Disease starts when a cell is not healthy -- and as more and more cells become unhealthy disease takes a stronger hold on our body. Keeping your cells healthy is the root of disease prevention. Deep breathing is one of the easiest ways to improve cellular health.

A typical office worker, sitting 8 hours per day in a building with fake air does not activate cellular breathing. Further complicated by this person then sitting in their car with their windows up, going home to their homes that are sealed "efficient" and enclosed from the fresh air -- leaves the body deprived of oxygen and vitality. Deep breathing especially when we have access to fresh outside air gives our body vitality.

Deep breathing increases absorption and improves distribution of oxygen in our systems.

Learning a yogic style of breathing as a way of breathing all day long; on a scientific level, helps our body better "digest" the air we breathe. Many of us do not pay much attention to our breath, resulting in shallow breathing. Shallow breathing does not oxygenate our tissues enough -- depriving us of oxygen and leaving us feeling drained of energy. Shallow and erratic breathing also disrupt the mind.

Filling your body with O2 and getting more O2 to your cells and tissues is preventative medicine at a CELLULAR level. Preventing disease before it sets in to our tissues.

Cellular Health depends up 2 processes -- getting nutrients into a cell and toxins out.

- Oxygen plays a vital role in every metabolic process in our body. **Health depends on how efficiently nutrients can be absorbed and utilized at a cellular level**. (Oxygen is what

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breaks down food in the cell turning sugar into energy, remember the Krebs cycle? I love how we are one with the universe :) Photosynthesis and Respiration are the same in reverse . . . Photosynthesis is a plant turning the Suns energy into Sugar, Respiration is the process of turning that sugar back into energy :)

- Healthy cells are aerobic -- meaning they have adequate levels of O2. When cells are deprived of O2 decay sets in and cells can mutate or die.
    - **The primary cause of cancer is directly related to cells deprived of O2. Cancer cells are anaerobic and thrive in an oxygen-deficient environment.**

And the other side of breathing - the release of Carbon Dioxide (C02). Health is also dependent on how effectively toxins and waste can be removed from the body.

Cellular waste is removed from the body in several ways:

- Some is dissolved in water and transported to the kidneys or to the liver where it can be excreted in our urine or bowels.
- **Some of the most toxic poisons in the body can only be "burnt up" and neutralized through oxidation — deep breathing — exhaling the carbon/fat/toxins from our lungs as explained on pages 1 & 2.** Have a good breathing session and "POOF" toxins gone ;)

Breathe deep and Oxygenate your cells while you burn up toxins :)

Our breath rate can be automatic or controlled. We can not at will give orders to our liver, spleen or stomach, but it is possible to control our breathing. When our breath is left to subconscious control it is easily influenced by our thoughts and emotions and what is happening around us; this sets off a chain reaction of stress responses in the body that are not favorable like a racing heart and/or shallow breathing, the body slows down the digestive tract and diverts blood flow and body energy from our organs to stimulating the fight or flight response. The fight or flight response stimulates the release of adrenaline and cortisone in our bodies. (If you run or fight you use up those hormones, if you do not they stay in the blood stream where they build up and are associated with stress and heart disease.)

Diverting blood flow from our organs leaves them not able to operate fully, while this may be ok for short periods of time (for example, dodging a car that almost hit you), remaining in this state for long periods of time (stressing out all day at work . . .) leaves your organs not fully functioning and our body more susceptible to disease.

By consciously controlling our breath and keeping it deep we set off a chain reaction which calms our heart and slows our pulses, relaxes our minds, and helps the organs of the body operate efficiently.

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Yogic breathing techniques improve our breathing and breath awareness 24 hours per day, you breathe deeply not just when practicing yoga, but all day long, establishing regular breathing patterns.

Deep breathing:

- Gets more oxygen to our cells
- Increases lung capacity
- Removes toxins, the deeper breath allows more time for CO2 to be expelled
- Induces a meditative state
    - Mental activity correlates with our breathing pattern, more thoughts = more breaths and erratic breaths. **By reducing the number of breaths we take in a given period it makes concentration and meditation easier**
    - Deep breathing is a tool for living in a meditative state where ease of life, and happiness comes easier.
- Increases our Life Span? Some people have laughed at this fact . . but the yogis give it merit:
    - The sages observed animals and noticed that animals with a slow breath rate such as elephants, tortoises, and pythons have a longer life span than animals with shallow breaths such as rabbits, birds, and dogs. From this observation they realized the importance of slow breathing for increasing our life span. Our respiration and heart are directly related, a slow breathing rate keeps our heart beat slower and stronger, our heart beats more efficiently all day long moving blood in the body with stronger pumps but less of them . . . promoting longevity.

Ideal breath rate for our normal day is about 6 breaths per minute -- this is a 5 second inhale and 5 second exhale. Not difficult to do …. but will require some attention until it becomes habit. This breath rate gives more time for each cell in our body to expel CO2 and take in O2.

- Reciting mantra or prayers also slows down breath rate to about 6 breaths per minute.

NASAL BREATHING – TAKE IN THE AIR!

Nasal Breathing . . . Next time you go to the store, or just out and about, look around. Pay attention to people, notice who is breathing through their nose and who is breathing through their mouth . . . I don't want to offend anyone so will keep my observations to myself, take notice what you observe. Nasal breathing pulls more O2 across the brain among many other benefits . . .

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Each nostril functions independently and synergistically in filtering, warming, moisturizing, dehumidifying, and smelling the air.

Nose breathing imposes approximately 50% more resistance to the air stream in normal individuals than does mouth breathing, resulting in 10-20% more O2 uptake. (Cottle, 1972:Rohrer, 1915) There must be adequate nasal resistance to maintain adequate elasticity of the lungs. (Cottle 1980).
What this study is saying is **breathing through your nose improves oxygen uptake — it requires a slower exhale than breathing through your mouth which allows more time for O2 extraction and CO2 expulsion in our lungs, also exhaling especially through your nose puts a back pressure on the O2 in the lungs helping to drive the O2 deeper into the tissues** (our lungs extract O2 from the air on our exhale)**.**

Maintaining a keen sense of smell is also very important for enjoying life, and for safety and social acceptance. Think of all the beautiful smells we enjoy with our nose. Smell influences our behavior, our memories, and many autonomic nervous system functions which are below the level of conscious awareness. This is because the receptors in the nose, known as olfactory bulbs, are direct extensions of a part of the brain known as the hypothalamus. The hypothalamus, also known as the Brain's brain, is responsible for many functions in our bodies, particularly those that we consider automatic: heartbeat, blood pressure, thirst, appetite, and of course, the cycles of sleeping and waking. The hypothalamus is also responsible for generating chemicals that influence memory and emotion. Breathing through your nose regulates and balances the functions of the hypothalamus.

Realize . . . breathing through your nose instead of your mouth positively effects your heart rate, blood pressure, thirst, appetite, and mood among many other functions.

<u>Inhaling and exhaling through your nostrils instead of your mouth:</u>

- Filters and humidifies the air you breathe.
    - Your nose is the only organ able to properly prepare the air you breathe; mouth breathing leads to over-breathing, chronic hyperventilation, depleted carbon dioxide levels, reduced blood circulation, and narrowing of the airways.
- Breathing through your nose turbinates the air you breathe taking it down deeper into lungs -- the capillaries in the lower lobes of the lungs have more O2 in them so you get more O2 in your blood with each breath.
    - The lungs are a primary source of our energy level. They extract oxygen from the air we breathe primarily on the exhale. Because the nostrils are smaller then the mouth, air exhaled through the nose creates back pressure when one exhales. It slows the air escape so the lungs have more time to extract oxygen from them and that back pressure helps to drive the O2 into our cells. When there is proper oxygen-carbon

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dioxide exchange, the blood will maintain a balanced pH. If carbon dioxide is lost too quickly, as in mouth breathing, oxygen absorption is decreased.

- The receptors for the Parasympathetic Nervous Systems are in the lower lungs, nasal breathing stimulates this part of your nervous system which is another reason why **deep breathing slows down your heart rate and reduces blood pressure**.
    - Breathing through your mouth keeps your breath shallow, in the upper lobes of the lungs, where the receptors to the sympathetic nervous system are located. Shallow breathing stimulates this part of your nervous system preparing you to fight or flight; releasing cortisol and adrenaline into your blood stream. If we run or fight and use up these hormones -- no damage done. If we do not these hormones they stay in our blood stream causing stress symptoms.
- Nose breathing during exercise reported 50% less fight or flight stress and 50% more calm parasympathetic nervous system activation when compared to mouth breathing.
    - Nose breathing exercise **increased alpha brain wave activity** compared to mouth breathing exercise. Alpha brain waves are produced during relaxation or meditative states. Mouth breathing exercise produces a significant amount of beta brain waves that are associated with a stress response.
        - Nose breathing exercise **increased brain wave coherence** compared to mouth breathing exercise. Brain wave coherence is associated with calm and organized brain function.
    - Nose breathing exercise was perceived as **less exertion (it was easier)** as compared to mouth breathing exercise, according to the Borg Scale of Perceived Exertion. (1)
    - Nose breathing exercise demonstrated **shorter recovery times and better endurance** than mouth breathing exercise.

References

Douillard, J. Body Mind and Sport. Three Rivers Press. New York. 2000

Mouth breathing and resultant over-breathing elevates your blood pressure and heart rate, worsens asthma, allergies, rhinitis, sleep apnea, and deprives your heart, brain and other organs of optimal oxygenation.

Nasal Breathing while sleeping is also important!

- What you do during waking hours carries over into sleep. Any opportunity for mouth breathing inhaling or exhaling will increase the chances of mouth breathing during sleep. Hospital studies have established that nocturnal mouth breathing is a primary cause of loud snoring. Snoring is a precursor to sleep apnea and apnea a precursor to heart attacks and dying in one's sleep.

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- Each nostril is innervated by five cranial nerves from a different side of the brain. Afferent stimuli from the nerves that regulate breathing are in the nasal passages. The inhaled air passing through the nasal mucosa carries the stimuli to the reflex nerves that control breathing. Mouth breathing bypasses the nasal mucosa and makes regular breathing difficult.

And more reasons to breathe through your nose:

Nasal Breathing & Nitric Oxide (NO) (and some of the latest research):

NITRIC OXIDE (NO) : NO is an important cellular signaling molecule involved in many physiological and pathological processes. It is best known as a powerful vasodilator.

- **Why Care About Nitric Oxide?** Nitric oxide is such an important compound that it was dubbed "Molecule of the Year" by Science magazine in 1992, followed by the 1998 Nobel Prize in Medicine for its discovery as a signaling molecule in the cardiovascular system. Your blood vessels require the amino acid L-arginine for the synthesis of nitric oxide, since L-arginine is its precursor in your body.

- Nitric Oxide also functions as a signaling molecule for your brain and immune system.

Your sinuses produce Nitric Oxide during nasal breathing, breath retention, and humming. (One of the reasons yogis chant "ommmmm;" the buzzing om in your face is shaking nitric oxide into your bloodstream.) Similar to, but NOT laughing gas, nitric oxide is remarkable. It's a relaxant that causes blood vessels to dilate, improving the absorption and release of gases in the lungs. It regulates the production of hair and erections (due to blood flow improvements) . . . It's in health products; it's in semiconductors. Lightning produces nitric oxide, and so do your sinuses.

- Nitric oxide is a "vasodilater" meaning it relaxes your blood vessels so they dilate which is important in regulating blood pressure.
    - By helping to regulate your blood pressure, nitric oxide enhances blood flow. Nitric oxide signals the smooth muscle cells in your blood vessels to relax so that your vessels dilate and your blood flows more freely, which helps your arteries stay free of plaque. When you have inadequate nitric oxide, your risk for coronary artery disease increases.
    - nitric oxide production in important in protecting organs such as the liver from ischemic damage.

- If your blood is flowing freely, then nearly every physiological process will function better. If your blood is sluggish, then blood carrying important nutrients can't reach the areas that need them.

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- Nitric oxide from the sinuses helps to explain why we feel so good after deep breathing through a yoga session, and why breathing exercises are so refreshing. It may even explain why it is so invigorating to breathe through the nose during aerobic exercise. These activities all stimulate the production of nitric oxide in the nasal passages. **From there, NO travels down our windpipe, clearing out bad bacteria and opening blood vessels as it travels down to the lungs and back again**.

- Nasal breathing is just one way to get your NO; other ways to increase your NO:

  - Sunshine :) helps our skin produce NO for use in our lungs. Researchers found that sunlight triggers your skin's production of nitric oxide. Your skin contains large stores of nitrite and nitrate, but only the nitrite is biologically active. Sunlight appears to prompt conversion of nitrate to nitrite and nitric oxide (NO).
  - Calcium, magnesium, and Vitamins C & E rich foods
  - Olive extract
  - Bitter melon
  - Electrical acupuncture
  - Taking a warm bath

Just a thought on nasal breathing to leave you with: Mouth breathing can produce an anterior open bite, a longer face, and some suggest that because of poor sleep quality produces a baggy appearance under the eyes. Mouth breathing also accelerates water loss increasing possible dehydration.

I was watching the new Star Trek movie a few years ago (2009); there was a line in it that made me laugh. James Kirk was hiding under a bed, the woman Lt. Nyota Uura walks in to talk with her friend, right away she says "who's that"? Her friend replies, who's who? She states "The mouth breather hiding under your bed?"

Clearly this term is not used in a complimentary tone here . . .