Breathing MECHANICS

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"The science of breathing is probably the oldest in the world, having formed a basic part of religious and health cults of the most ancient civilisations."

Margaret Morris 1935

Margaret completely understood the relevance of correct breathing for health and wellness. Along with posture and walking exercises she maintained these to be the vital key elements to her work.

It took her 10 years without using any set rhythms to the breath combined with her exercises to realise that a natural breathing capacity could not be fully developed. It took another 15 years to set and experience the breathing techniques we use in MMM today to convince her that breathing should be taught before anything else.

'I cannot emphasise too strongly the importance of teaching the breathing and getting the correct timing before any new exercise…. For then instead of being part of the exercise and assisting the performance of the movements, it is just an extra thing to remember, and is therefore apt to be forgotten.'

It goes without saying how we MMM'ers know the beauty of the breath when used correctly with the corresponding exercise, it adds strength without restraint and a deeper feeling to the expression of the dance, creating a fuller experience for the performer and audience alike.

Why do we breathe?

The technical term for breathing is **pulmonary ventilation**, the movement of air in and out of the lungs: inspiration and expiration.

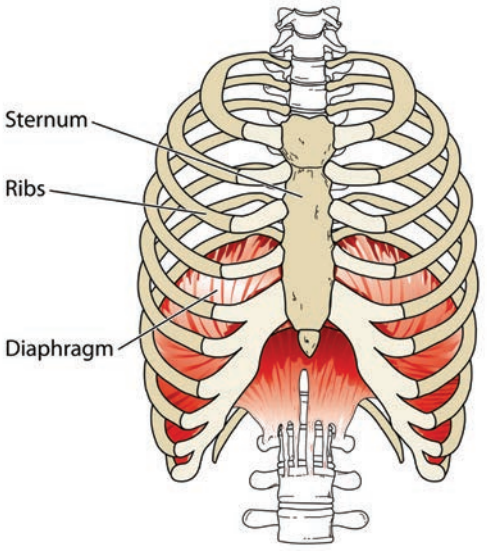
A gaseous exchange occurs between the lungs, the blood and the body's cells in two ways:

- **Pulmonary**, or **external, respiration:** The exchange in the lungs when blood gains oxygen and loses carbon dioxide.
- **Systemic**, or **internal, respiration:** The exchange that takes place in and out of capillaries when the blood releases some of its oxygen and collects carbon dioxide from the tissues.

Cellular Respiration occurs when oxygen comes into contact with glucose for the production of energy creating CO2 as a by-product which is released during expiration.

The Anatomy of Breathing

INHALATION: The diaphragm is a dome shaped wall of muscle separating the lungs in the thoracic cavity (the chest) from the abdominal cavity. It is one of the primary muscles used in breathing. During inhalation, the diaphragm contracts, moving its centre downward. This compresses the abdominal cavity, raises the ribs upward and outward expanding the thoracic cavity. Assisting in the expansion of the thoracic cavity are the external intercostal muscles, pulling each rib upward toward the other, expanding the chest cavity for inspiration and drawing air into the lungs.



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We can see that Margaret's emphasis on the flaring of the lower ribs laterally in

Basic Breathing and also incrementally worked through in **Progressive Breathing** is vital in increasing the full inspiration to the lower lungs (bottom lobes), which are positioned more laterally and posteriorly than the middle and upper lobes.

'On inspiration the abdominal muscles should be relaxed, since any contraction of the abdominal wall interferes with the normal descent of the diaphragm. If the lungs are expanded laterally so that the ribs are flared and the thorax lifted there can be no sagging of the abdomen on inspiration and good posture is inevitable.'

EXHALATION: The internal intercostal muscles assist in depressing the rib cage, reducing space in the chest cavity, adding force to the exhalation. When the diaphragm relaxes, elastic recoil of the lungs and thoracic wall causes the thoracic cavity to contract, forcing air out of the lungs. The lower abdominal muscles contract to assist the pushing up of the diaphragm, decreasing the thoracic cavity further, allowing for **complete** ventilation of the lungs.

'... If as the lungs are emptied and the abdomen is left relaxed, the thorax will be depressed and the abdomen will sag. Therefore, it is on expiration that the lower abdomen should be contracted, thus assisting the normal ascent of the diaphragm on expiration, and maintaining good posture.'

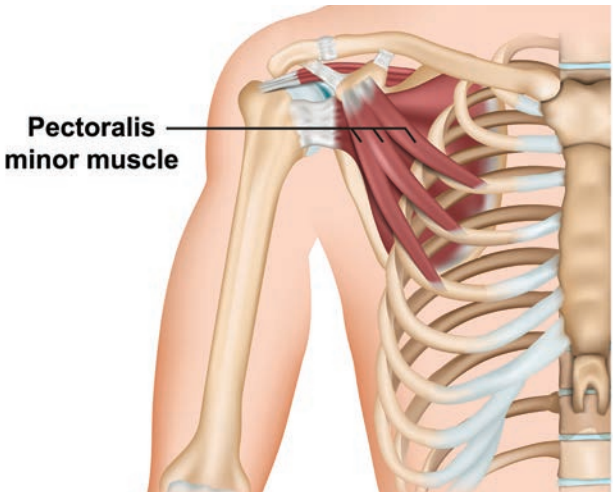
In 'Basic Breathing' we engage the lower abdomen required to push the diaphragm upward, and in Yellow 'Sustained Contraction Breathing' we strengthen it further.

Accessory Muscles

Muscles that assist, but do not play a primary role, in breathing:

Sternocleidomastoid Muscles (left and right) of the neck for example, originate from two locations: the manubrium of the sternum and the clavicle. They travel obliquely across the side of the neck and insert at the mastoid process of the temporal bone at the back of the skull. Their involvement depends on respiratory effort and is often relied upon in the case of damage or disease to the lower lobes of the lungs as the sufferer will lift the shoulders and look strained in the neck on inspiration. It is useful to note that the apexes of the lungs rise above the first rib almost into the neck itself.

Scalene Muscles attach to the 1st rib. MMM Basic 'Head and Neck Exercises' as the name suggests are specifically for the purpose of working these muscles.



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Pectoralis Minor also gives extra lift to the upper ribs (3,4,5) for the upper apices of the lungs to be engaged in the breath. When the muscle is contracted forwards through shoulder injury or bad posture it can limit the mobility of the ribs.

There are many other muscles of the back, spine and upper ribs that are classed as accessory muscles for breathing. 'Spinal Mobility' and any of the limbering exercises assist in the freeing of these muscles supporting free movement of the breath.

Pleura

Pleura translates the movement from the thoracic cage to the lungs in order to decrease and increase the volume within the thoracic cavity for inspiration and expiration, increasing the volume within the lining and drawing air into them.

Parietal pleura is the outermost of the pleural membranes, it is affixed to and lines the wall of the thoracic cavity, covering also the superior (uppermost) diaphragm surface. Fascia (connective tissue) on the inside of the ribs connects to the inner side of the thoracic cavity. Visceral Pleura cover the lungs and adjoining structures, in fact Visceral and Parietal pleura are one and the same sheet of pleura: as it covers the lung it folds back on its self at the route of the lung creating two layers.

If you take an inflated balloon and push your fist into the side of it, you will see two layers are created and yet the structure is still 'as one', remaining air and water tight.

Pleural Fluid is produced by the pleura. It helps the surfaces of the visceral and parietal pleura to easily glide over each other when the lungs dilate and contract during respiration. Sensory nerve endings are present within the parietal pleura so any inflammation is very painful. Pleurisy is a condition that causes inflammation of these tissues.

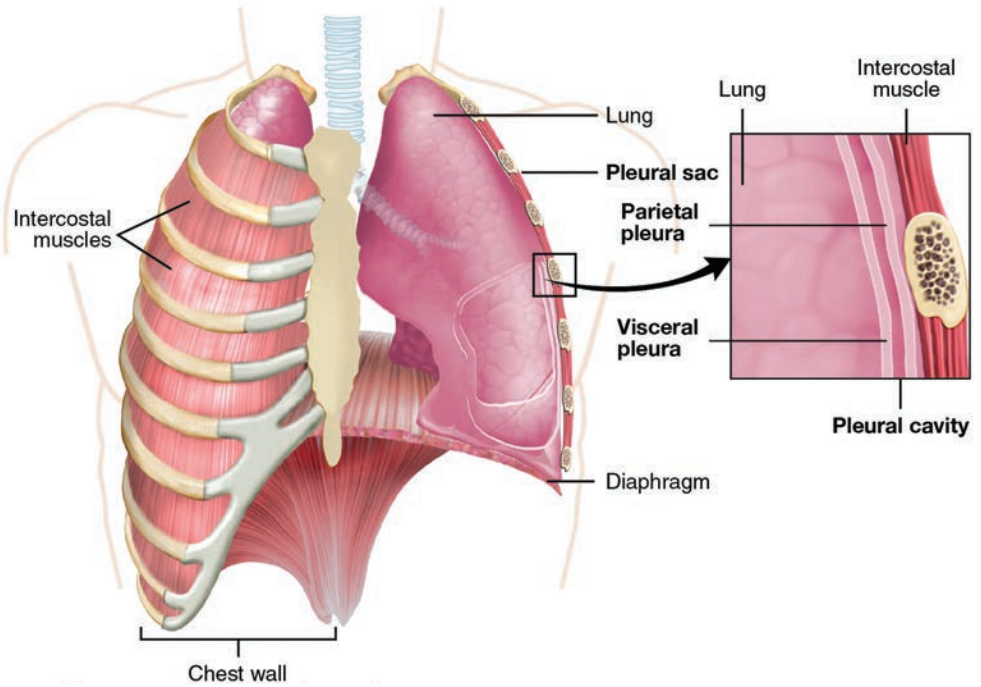
Elastic Recoil

The lungs are full of elastic material externally and internally. Inspiration causes them to stretch and expand, on expiration they recoil. When this elasticity is impaired through lung disease, breathing becomes hard work and takes a lot of effort as the in and out breaths are never fully executed. Developing the muscles used for breathing including the diaphragm can only assist with respiration in these cases.

But by no means should any exercise be undertaken without the approval or supervision of your medical professional.

If you take an elastic band it takes some effort to pull it to its capacity stretch. However, when you let go it only takes a moment for it to recoil with the least effort. Once the elasticity is lost it is impossible for it to return to its original shape or indeed stretch it to its capacity without breaking.

Continued overleaf...



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Where Exercising the Breath is Helpful

Stress/anxiety, poor posture, scoliosis, injury can also be responsible for inhibiting correct breathing. In MMM there are exercises to support all of these instances. Some examples are as follows…

- White 'Alternate Lung Breathing' assists in expanding the contracted side of the rib cage such as in cases of scoliosis.
- Basic 'Easy Breathing' brings a physical flow to the movement of the body in line with the breath, it is a pleasant delicate exercise which aids both inspiration and expiration, it frees the body to breathe better without over emphasis on the breathing itself which can be a trigger for those suffering with anxiety.
- Basic 'Pelvic Tilting' and 'Basic Breathing' assist with poor posture.

Nose or Mouth Breathing?

It is essential that the air should always be taken in by the nose, or it is not fulfilling its proper function of filtering, warming and moistening the air. In normal breathing the air should be inhaled and exhaled entirely through the nose. But in MMM we also use breathing that we call "synchronised" or "expiratory" This is dependent on the movement of the exercise; in these following cases, it is better to exhale through the mouth and here is why…

- There is less resistance to the out breath when breathing through the mouth
- A more complete expiration is achieved as air is consciously blown out through the mouth, contracting the abdomen and relaxing the thorax.
- The air cannot be as completely expelled through the nose, as proven by the fact that after exhaling through the nose, more air can always be expelled through the mouth.

Exceptions to breathing out through the mouth:

All special relaxation exercises when a sedative effect is desired.

Exceptions to Breathing in by the Nose:

In every strenuous and prolonged exercise such as athletics and vigorous games.

Well, there can be no doubt that the importance of breathing and breathing correctly with movement is key. We must not forget that before our beloved NHS in the UK where treatment for conditions was standardised, MMM was prescribed by many Doctors. Margaret's exercises were used in TB clinics and infirmaries where her method was truly embraced and successful. We are seeing a rise back into 'Social Prescribing' by GPs in the UK. I think this is where MMM can really flourish again.

A Little Extra Bit

The breath and the visceral body come together within the lungs, and the heart sits in between the lungs; they work together to keep us alive.

In Eastern traditions, which are commonly practiced now in the West, it is believed that the heart is the divine union between the Heavens and the Earth. Whatever your beliefs, there is a feeling toward the inbreath as a taking in and the outbreath a releasing… or if you like, a giving and receiving. The lungs are within the Heart Chakra (energy centre) of the body. Its colour is Green and relates to Love, Compassion and Acceptance of self and others.

In using the breath as a means of meditation, one can learn to sense where your breath is more dominant, using MMM exercises we can bring that into balance. We can also express those attributes in our dances creatively, good for us and better for others who witness them.

Credits

All quotes in italic are taken from Breathing Exercises by Margaret Morris 1935

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With special thanks to Wendy Jacobs Clinical Nurse Specialist Critical Care Outreach for fact-checking this article.

Resources & Anatomy Credits

Margaret Morris 'Breathing Exercises' published by Margret Morris 1935

Sam Webster's (Teacher of Human Anatomy) YouTube channel

Lungs – https://www.youtube.com/watch?v=_RhUBoM85vo&t=866s

Pleura – https://www.youtube.com/watch?v=0edPmmy3t4g

'Our life begins and ends with breathing, as long as there is breath there is life.'

Margaret Morris

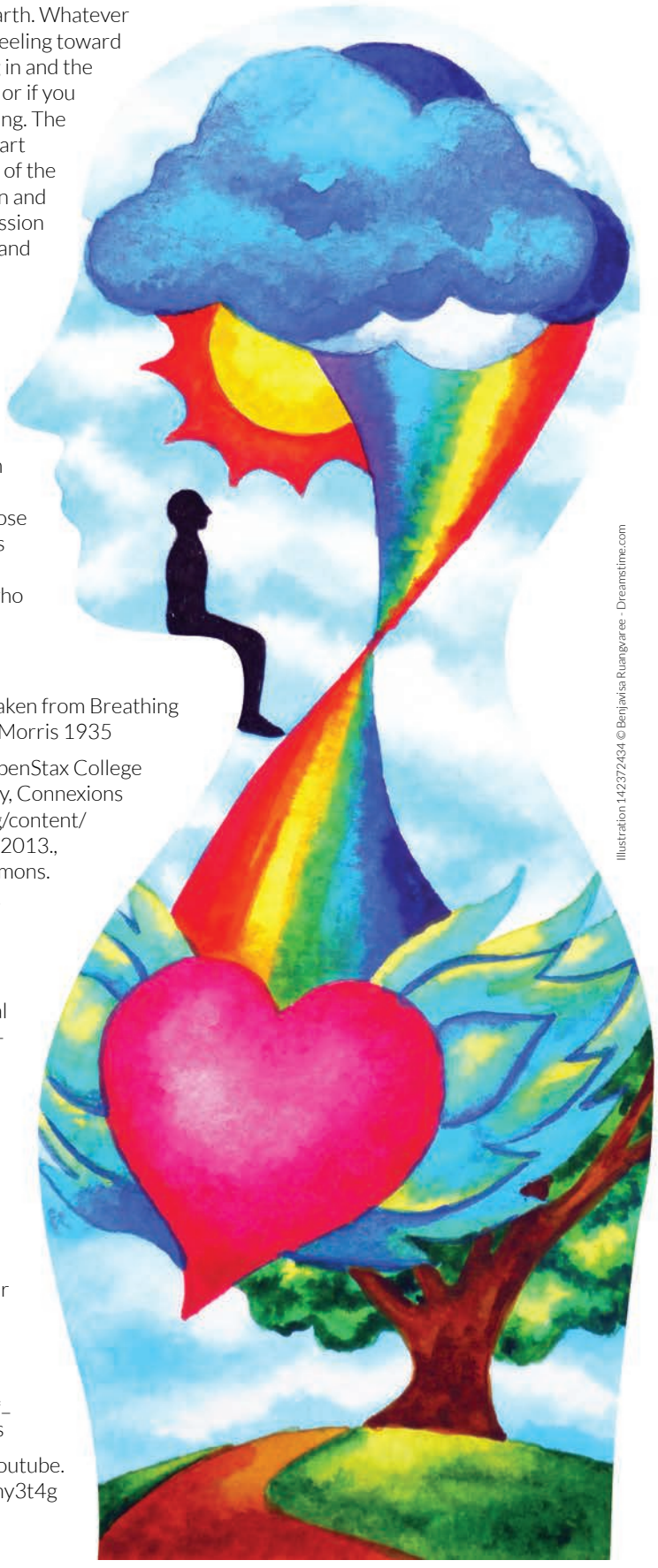


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