

Peak Performance Training Begins with PowerLung

Inhale. Exhale. Breathing just seems so natural. Why do you need to train the muscles you use in breathing? After all, aren't you breathing? You are doing cardio workouts, running, wind sprints or aerobic activity; isn't that the same?

But, if they are so well conditioned, why do you "get out of breath"? If you are doing aerobic activity, you are aerobically exercising the muscles used in breathing along with your other muscles. If you have been working out aerobically training your breathing muscles, when was the last time you trained them?



If your breathing is so well conditioned then why do you still "get out of breath"?

You may think you have been training your breathing, but in reality, you have never trained it at all.

"the respiratory muscles can be trained for improvement in strength, endurance or both."

Pardy et al. (1988)

Just like any other set of muscles "the respiratory muscles can be trained for improvement in strength, endurance or both." Pardy et al. (1988)¹. This is supported by a number of other studies, notably Dupler & Amonette², who found, using the PowerLung, that in a relatively short period of time, four weeks, respiratory training produced "significant changes in maximal V_E (ventilation), maximal V_T (tidal volume), and sub-maximal V_E ..." The study revealed a 1.99 breath/minute decrease in RR (respiration rate) coupled with a 4.93 L/min increase in V_E and a .81L/breath increase in V_T for the treatment group. Subjects in the treatment group also had a 28.25mm/Hg increase in P_{ex} (peak exhalation force) as compared to only a 2mm/Hg increase for the control group." These findings are supported conclusively by a number of researchers, using a wide range of people, proving that these specific muscles have become stronger.

The only way to train your breathing.

PowerLung is the **original AND only** training machine with **integrated EXHALE and INHALE** progressive resistance to train and strengthen respiratory muscles. It has two load resistance cells, one for inhale and one for exhale, that work and adjust completely independently of each other.



For anyone who breathes.

PowerLung is the only training machine with various models and series specifically designed to meet the needs all types of people, whether they are athletes, performing artists, or those who just want to breathe easier.

12 sets of breathing muscles to train.

The muscles that provide the power, and therefore the pressure for training with PowerLung, are located around the lungs. Those used to inhale are: the diaphragm, external intercostals and the interchondral part of the internal intercostals, while the accessory muscles are the sternocleidomastoid and the scalenes. Those required for exhale are the internal intercostals, except for the interchondral part, the rectus abdominis and the external and internal obliques.

There are also, for want of a better phrase, "core body muscles" that are involved in the breathing process. Specifically these are the transverses abdominis, the muscles of the pelvic floor, the multifidus and the lower trapezius. These muscles are activated as a result of the deep breathing required to perform the respiratory muscle training.

PowerLung provides a resistance on both the inhale and exhale part of the breathing, against which, all the muscles mentioned above have to work so that air can be drawn in and expelled from the body.



Artwork courtesy of James Duffin, University of Toronto.

And what can better breathing do?

The question of whether or not this has an effect on either exercise performance or living everyday life can be examined in terms of basic physiological principles and then backed up by the research. The relationship between strength, power and endurance must be fully understood before embarking on an explanation of how this affects our breathing.

The strength of the muscle is the maximum possible output that it can produce. The power of the muscle is a combination of strength and speed defined as the amount of work done in a unit of time. To increase power, therefore, the person could either lift a heavier weight in the same time, or lift the same weight in a faster time.

The endurance capacity of the muscle is the number of repetitions it can produce before it fatigues. Equating this to a bench press, the person may be able to lift 100kg once. If they were wanting to then build up the power of the muscles, they would look at working at around 80% of that maximum, i.e. 80kg, trying to contract the muscles as quickly as possible. They would attempt the lift 8 – 12 times. As they move in to endurance they would lift 40 - 60% of their maximum and repeat the motion 20+ times.

These are obviously rough guidelines depending on how much endurance, or number of repetitions the person wants to do, or how fast they want the contractions to be as contraction speed is vitally important in a number of sports.

What is important is that as we move from strength at one end of the spectrum, to endurance on the other, the weight decreases. Therefore, in very crude terms, if we increase the strength of the muscle, still keeping power and endurance work, then the range shifts up. So, the person that is required to work at a certain level will find it easier to work at that level if the muscle is stronger because they are working at a lower percentage of their maximum.

“Respiratory muscle training can be effective in addressing the limitations of the respiratory system during exercise.”

Sheel et al. (2002)

