

BREATHING: FOUNDATIONS OF SINGING AND LUNG HEALTH

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BREATHING MATTERS

What can singing do to help people with lung disease?

Improves Breath

\longleftrightarrow

Improves Quality of Life

BREATHING MATTERS

How's your breathing?

shallow, deep, high, low, full, mid-range?

Does it make you anxious to think about it?


NORMAL BREATHING

Boyle's Law:
Pressure and volume are inversely related.

Pressure	↓	↑	Volume	When lungs are stretched, pressure decreases.
Pressure	↑	↓	Volume	When lungs are compressed, pressure increases.

NORMAL BREATHING

- Gas diffuses from high concentration to lower concentration.
- Balance of CO₂ and O₂ is key to many biological functions.
- Contributes to acid-base balance.
- Shifts in this balance change the breath rate.



Intake of O₂ needs to match metabolic needs.

BREATHING

The balance of CO₂ and O₂ levels in the body help regulate the pH (acid/base balance) in the body.

In stressful situations, breathing rate increases, which increases O₂ and lowers the CO₂ in the body.

Increased excitability
Increased muscle contractions
Reduced brain blood supply

THE AUTONOMIC NERVOUS SYSTEM

Unconsciously regulates bodily functions...

Parasympathetic Nervous System

Sympathetic Nervous System

Rest, Digest, Repair

Fight or Flight

Calm, Relaxed

Balance

Alert, Tense, Panic

Decreased breathing rate heart rate blood pressure



Increased breathing rate heart rate blood pressure

Five horizontal lines for notes.

BREATHLESSNESS CYCLE

Symptoms of Over-Breathing

- Reduced short term memory
- Poor balance
- Palpitations
- Excessive sweating
- Headaches
- Increased risk of infection

Five horizontal lines for notes.

BREATHLESSNESS CYCLE

Causes of Breathlessness

- Lung disease
- Heart Disease
- Anxiety
- Musculoskeletal conditions: scoliosis, kyphosis, lordosis
- Other Factors: deconditioning, obesity, illness, pregnancy

Five horizontal lines for notes.

WHEN IN DOUBT, BREATHE OUT!

Longer exhale allows for CO2 to build back up in the body and bring pH back to normal.

Homeostasis

~12-15 breaths per minute (goal).

Short inhale followed by long exhale.

Pause before inhale.

TYPES OF LUNG DISEASE

Obstructive	Restrictive
COPD	Idiopathic Pulmonary Fibrosis
Asthma	Paralysis
Cystic Fibrosis	Obesity
Bronchiectasis	Pregnancy?
Bronchitis	Radiation Fibrosis

TYPES OF LUNG DISEASE: OBSTRUCTIVE

Characterized by reduction in airflow due to airway inflammation and smooth muscle constriction/spasm.

May see increased mucus production

May see cough – dry or productive

Usually difficulty getting air out.

TYPES OF LUNG DISEASE: RESTRICTIVE

Characterized by a reduction in lung volume due to stiffness inside the lung tissue or chest wall
Difficulty taking air in.

BREATH PATTERN CHANGES

Breathing Dysfunction	Therefore emphasize
Mouth breathing	Nose breathing
Chest breathing	Diaphragm Breathing
Reduced inspiration	Inspiratory Efforts – altering volumes, speeds
Difficulty exhaling completely	Expiration Control – pursed-lip, fricatives, SOVT

PULMONARY REHABILITATION

Exercise and Education

Interdisciplinary in nature:
nurses, physiotherapists, occupational therapists, respiratory therapists

Learn how to manage disease and increase quality of life.

Safe and functional exercise program.

RESPIRATORY MUSCLE TRAINING

Inspiratory Muscle Training (IMT)

Inhale against a loaded valve.

Strengthens and thickens diaphragm.

Assists in coordinating the air.

Typically train at 40% MIP.

Not for severe lung disease, osteoporosis or history of ruptured ear drum.

RESPIRATORY MUSCLE TRAINING

Flowball

Assists with coordination of air.

Good for exhalation but can be inspiratory resistance.

Can be used for SOVTs.

SINGING FOR LUNG HEALTH

Two major outcomes:

1. Improvements in Maximal Inspiratory Pressure and Maximal Expiratory Pressure
2. Improvements in Quality of Life

Don't typically see changes in lung function...but this doesn't necessarily mean patients aren't feeling better.

PULMONARY REHABILITATION

What can we do to enhance participation?

“Teaching by Stealth”

Large portions of the population participate in musical activities, therefore combining music with pulmonary rehabilitation may contribute to longer term participation and better health outcomes.

SINGING FOR LUNG HEALTH

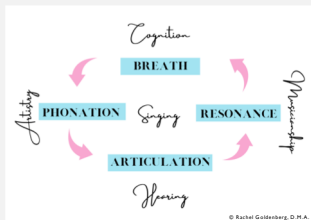
Why does singing improve breathlessness?

Physicality in singing as we meet the demands of the music.

legato slow inhales articulation quick inhales
staccato soft loud messa-di-voce

Singing requires inhalation to higher lung volumes.

SINGING FOR LUNG HEALTH



SINGING FOR LUNG HEALTH

Singing can benefit people living with lung disease and breathlessness.

Singing can "stealthfully" facilitate respiratory (and vocal) wellness.

Singing is a way to build community and ongoing support.

Singing classes should target specific functions to maximally benefit this population.

RESOURCES

The British Lung Foundation
www.blf.org

QUESTIONS

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