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GIZI KEBUGARAN
PERTEMUAN VIII

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Respiration During Exercise

INTRODUCTION

- The Respiratory System
  - Provides a means of gas exchange between the environment and the body
  - Plays a role in the regulation of acid-base balance during exercise

Major Function

1. Supply oxygen required in metabolism
2. Eliminate carbon dioxide produced in metabolism
3. Regulate hydrogen ion concentration [H+] to maintain acid–base balance

Respiration

1. Ventilation (breathing) and the exchange of gases (O_2 and CO_2) in the lungs
2. Relates to O_2 utilization and CO_2 production by the tissues

Function of the Lungs

- Primary purpose is to provide a means of gas exchange between the external environment and the body
- ventilation refers to the mechanical process of moving air into and out of lungs
- diffusion is the random movement of molecules from an area of high concentration to an area of lower concentration

Conducting and Respiratory Zones

Conducting zone

- Conducts air to respiratory zone
- _Components:
  - Trachea
  - Bronchial tree
  - Bronchioles

Respiratory zone

- Exchange of gases between O2 & CO2
- Components:
  - Respiratory bronchioles
  - Alveolar sacs

Anatomy of Ventilation

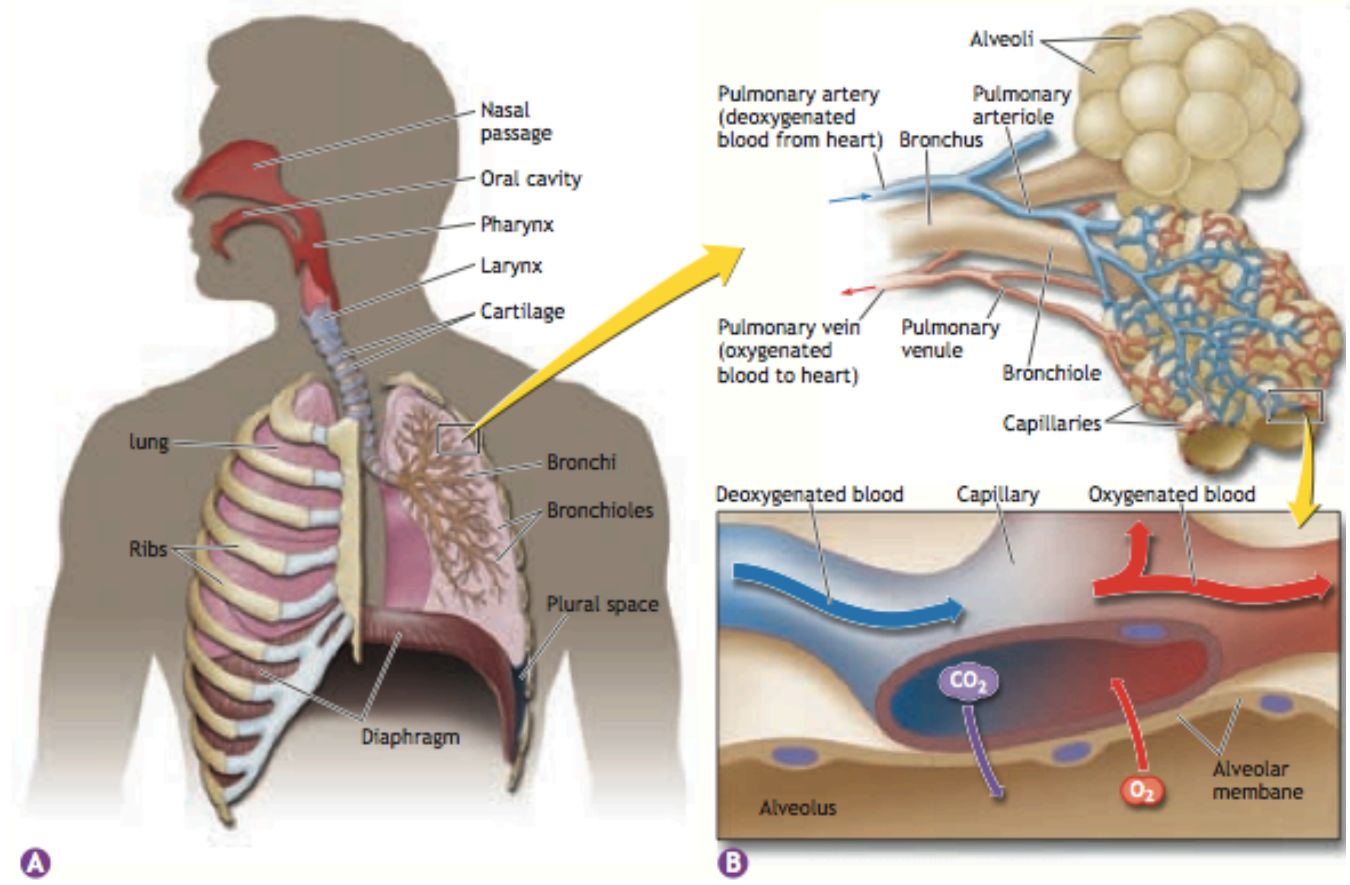
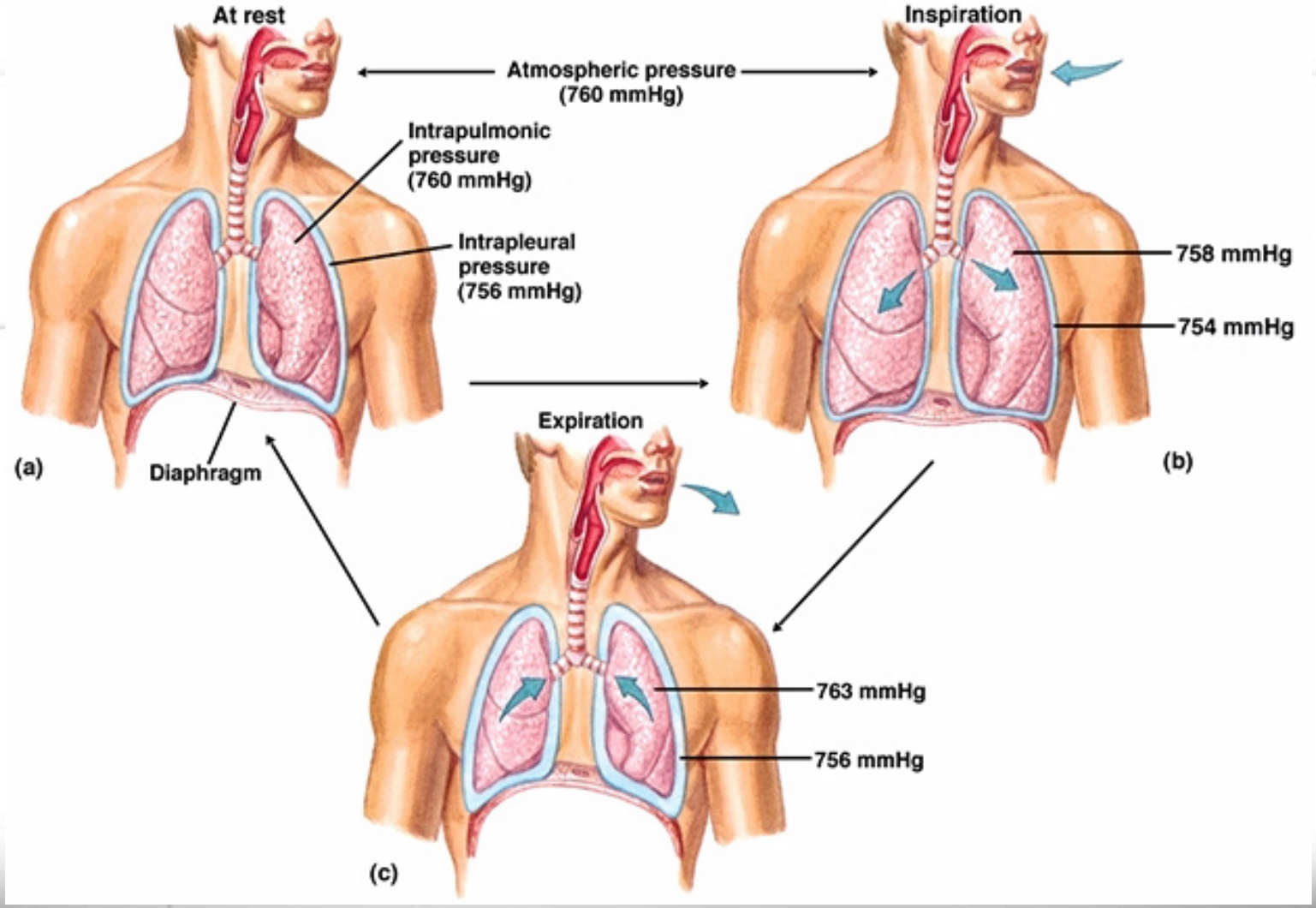


Figure 9.1 A. Major pulmonary structures within the thoracic cavity. B. Respiratory passages, alveoli, and gas exchange function
an alveolus.

Mechanics of Breathing

- Inspiration
- Diaphragm pushes downward, lowering intrapulmonary pressure
- Expiration
  - Diaphragm relaxes, raising intrapulmonary pressure
- Resistance to airflow
  - Largely determined by airway

The Mechanics of Inspiration and Expiration

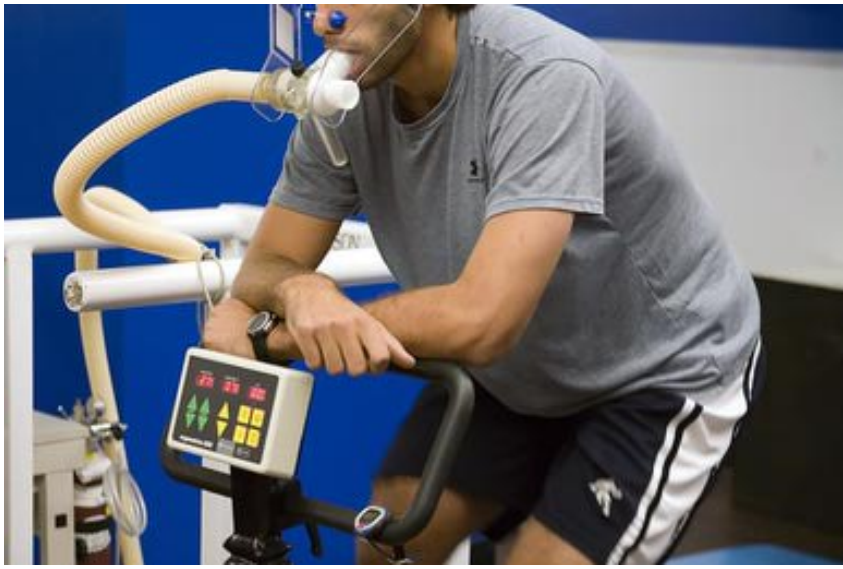


Effect of Training on Ventilation

- Ventilation is lower at same work rate following training
  - May be due to lower blood lactic acid levels
  - Results in less feedback to stimulate breathing

VO2Max

- Vo2 Max = Maximal oxygen uptake
- VO2 max refers to the maximum amount of oxygen that an individual can utilize during intense or maximal exercise. It is measured as "milliliters of oxygen used in one minute per kilogram of body weight."
- VO2 is one factor that can determine an athlete's capacity to perform sustained exercise and is linked to aerobic endurance.



https://www.youtube.com/watch?v=09uSmVFnmDk

Respiratory Problem in Exercise

- Dyspnea
- Hypoxia : a fall in the partial pressure of oxygen (fall in oxygen content)
- Cyanosis : dark bluish or purplish coloration of the skin and mucous membran from deficient oxygenation. (PaO_2 decline, $PaCO_2$ increase)
- Cough
- Chest pain

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