

BIO 212:
ANATOMY & PHYSIOLOGY II



LAB
**RESPIRATORY
PHYSIOLOGY**

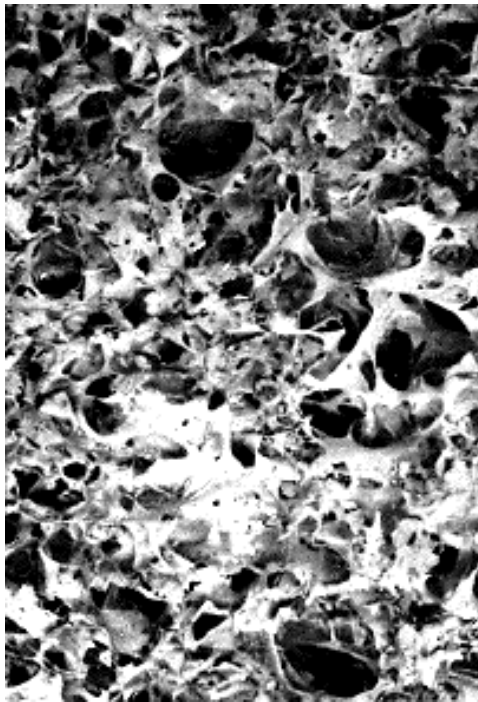
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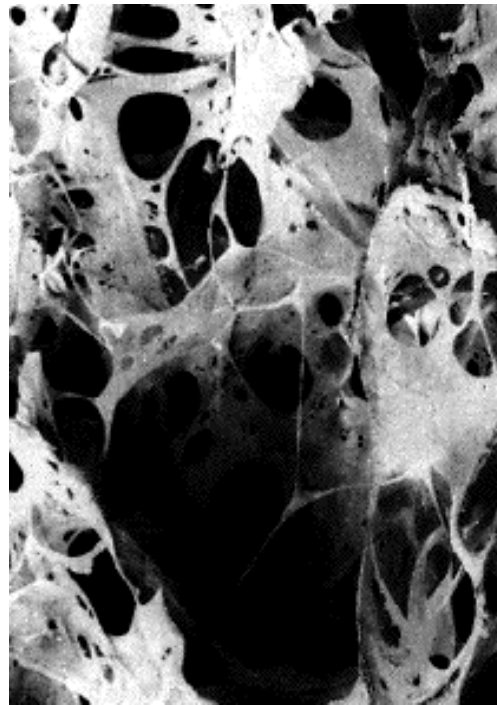
Some illustrations are courtesy of McGraw-Hill.

LAB

RESPIRATORY PHYSIOLOGY



NORMAL LUNG
(x100)



EMPHYSEMA
(x100)

EMPHYSEMA

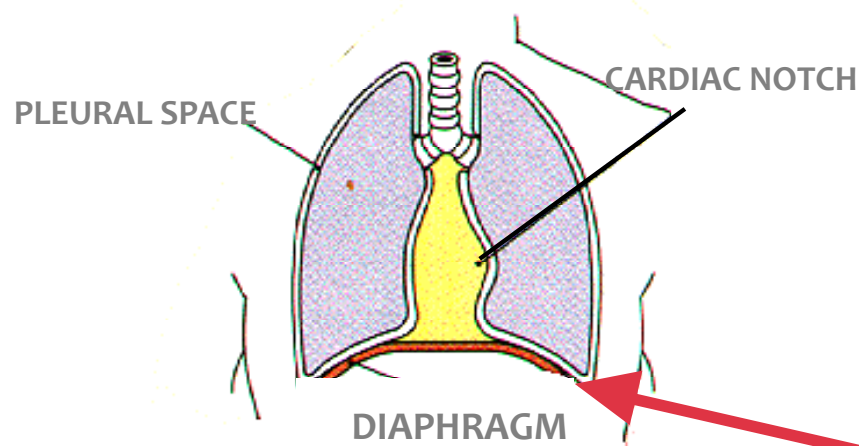
Among elderly,
heavy cigarette smokers
and city dwellers.

Bronchial enlargement.
Damage to alveoli.
Partial airway collapse.

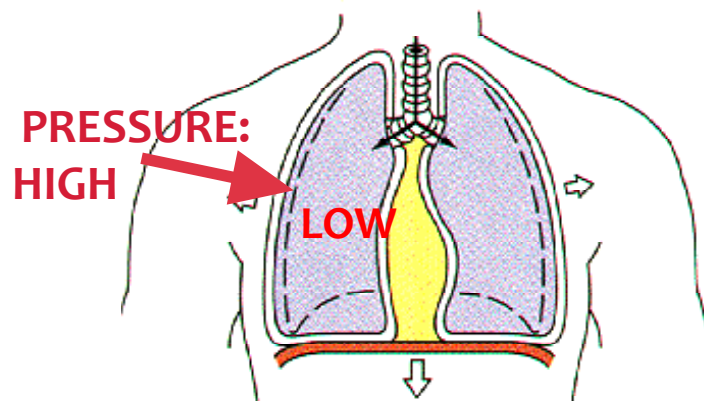
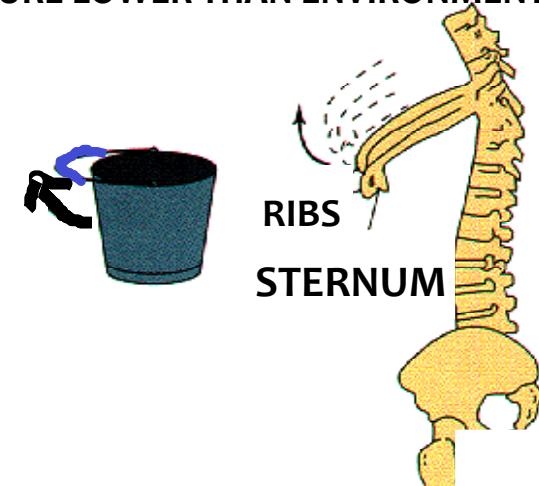
Loss of elasticity in the
lungs characterized by
difficulty exhaling.

INTRO to MECHANICS of PULMONARY VENTILATION

WHEN RIBS ELEVATED/DIAPHRAGM DEPRESSED:
THORACIC CAVITY VOLUME INCREASES.
(THORACIC CAVITY PRESSURE LOWER THAN ENVIRONMENT)

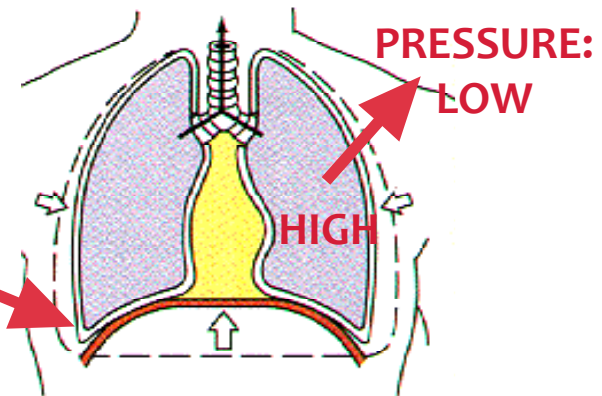


1. AT REST (anterior view)
NO AIR MOVEMENT



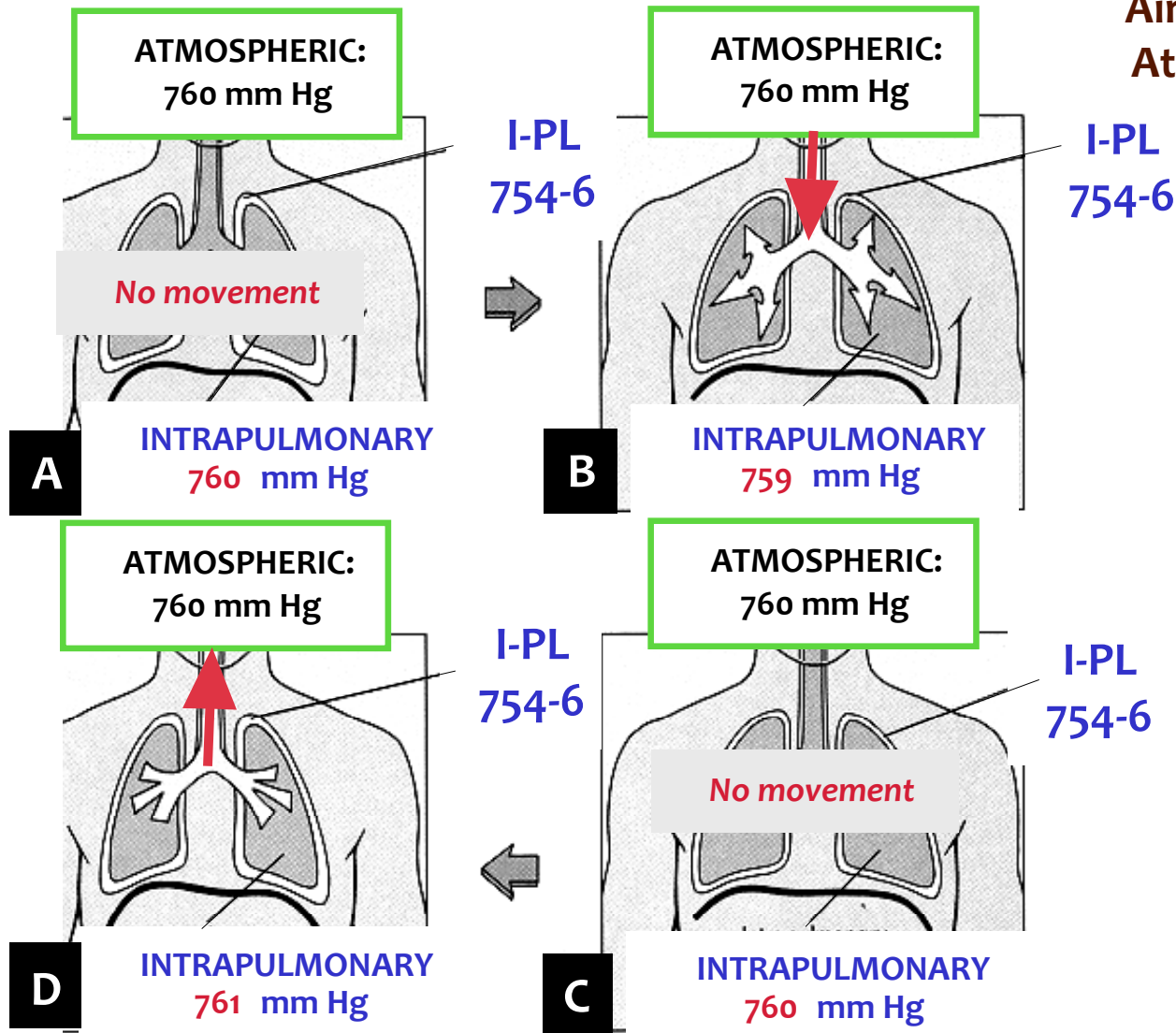
2. INHALATION: DIAPHRAGM CONTRACTS-
RIBS ELEVATE; PRESSURE DECREASES,
AIR MOVEMENT INWARDS.

DIAPHRAGM
RELAXED



3. EXHALATION:
RETURN to REST POSITION
PRESSURE INCREASES;
AIR MOVEMENT OUTWARDS

PRESSURE GRADIENTS



PNEUMOTHORAX:
Air gets into pleural cavity.
Atmospheric equalization.

Lung collapses

- Puncture wounds
- Alveolar rupturing

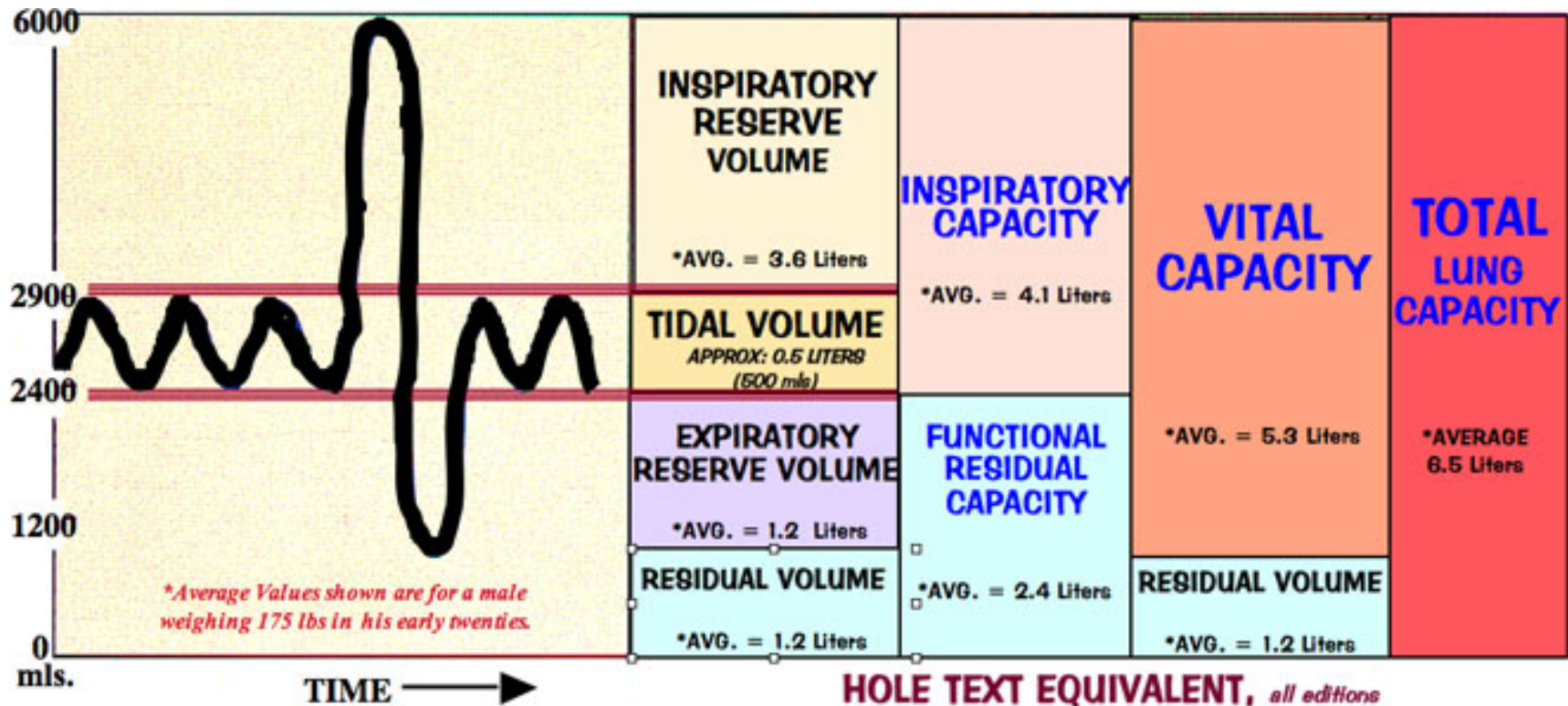
A END of EXPIRATION

B DURING INSPIRATION

C END of INSPIRATION

D DURING EXPIRATION

NOTE: BAROMETRIC = another term for atmospheric



TIDAL VOLUME

INSPIRATORY RESERVE VOLUME

EXPIRATORY RESERVE VOLUME

RESIDUAL VOLUME

Amount of air one breathes (IN or OUT) during a normal breath.

Amount of air one can breathe IN *over and above* a normal inhalation.

Amount of air one can breathe OUT *over and above* a normal exhalation.

Amount of air remaining in air passages after a maximum forced exhalation.

LUNG CAPACITIES:

VITAL CAPACITY

INSPIRATORY CAPACITY

FUNCTIONAL RESIDUAL CAPACITY

TOTAL LUNG CAPACITY

ADDING 2 or more Lung Volumes

Amount of air one can forcibly inhale after a maximum forced exhalation.

Maximum amount of air that can be inspired after a normal exhalation.

Amount of air remaining after a normal exhalation.

Sum of all four volumes.

Determination of Vital Capacity

Definition on the Handout and in Lab Manual:

Amount of air one can forcibly inhale
after
a maximum forced exhalation.

Instructor will demonstrate
how to use a spirometer

Determination of Breathing Rate (Breaths per minute)

Breathe normally.

Count number of times you breathe in 30 seconds.

(one breath = 1 inhalation + 1 exhalation)

Perform three trials.

Take average of the 3 trials.

Multiply by 2 (to equal minute).

Minute Respiratory Volume:
= Tidal Volume X Breathing Rate

LUNG CAPACITIES and RESPIRATORY DISEASES

Restrictive Diseases

Respiratory diseases which make it more difficult to get air INTO the lungs.
They *restrict* inspiration.

Includes:

- fibrosis (tissue between the walls of alveoli is damaged) -
 - sarcoidosis (granulomas associated with clumping and inflammation) -
 - muscular diseases -
 - chest wall deformities -
-

Obstructive Diseases

Respiratory diseases which make it more difficult to get air OUT of the lungs.
They *restrict* expiration.

Includes:

- emphysema -
- chronic bronchitis -
- asthma -

Last Slide