Physics of the stethoscope

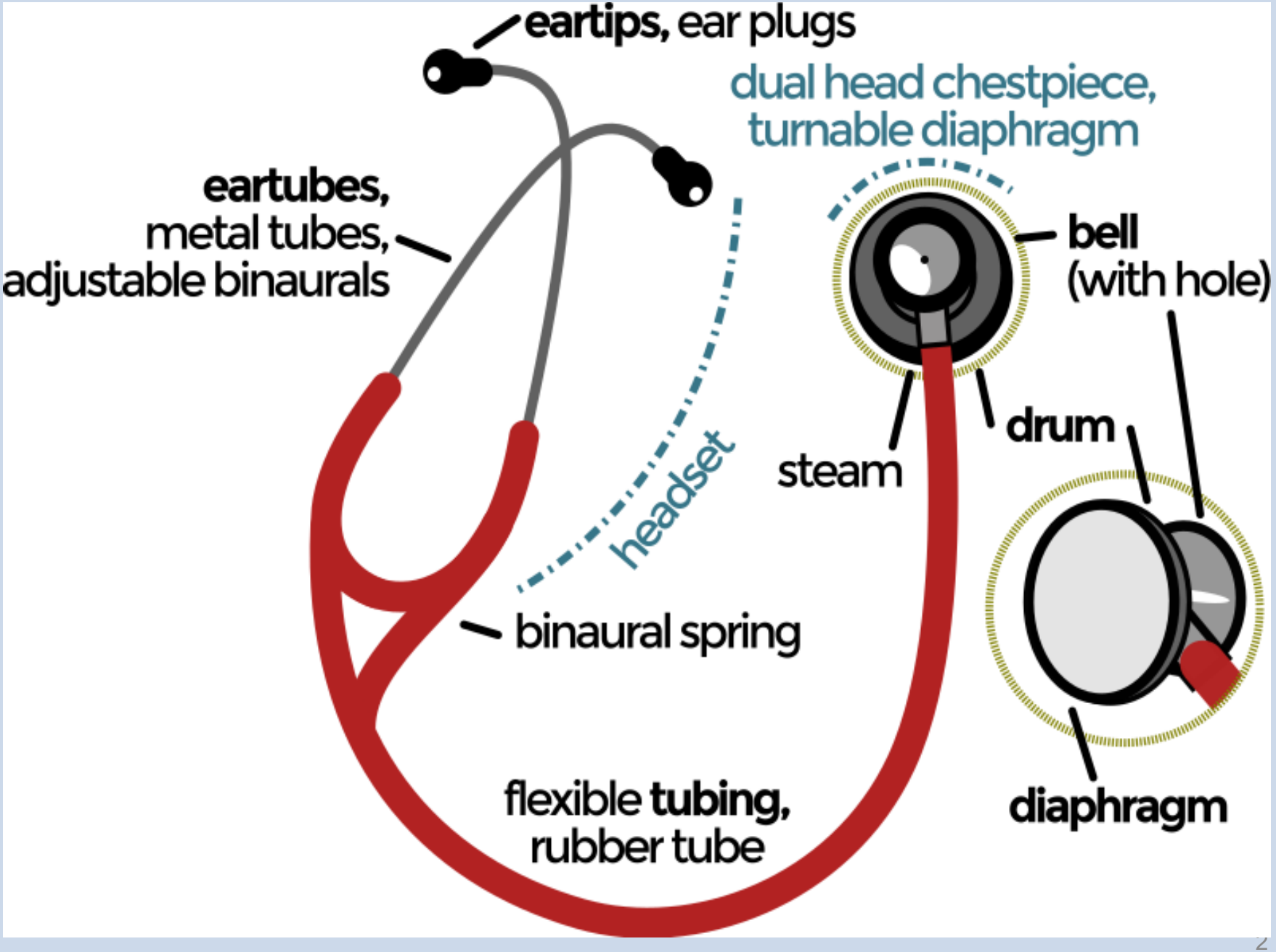
Tishk International University

TISHK INTERNATIONAL UNIVERSITY
FACULTY OF APPLIED SCIENCE

Anesthesia Department

Physics of the stethoscope

Fall Semester
Course Name : Medical Physics
Stage : First
Prof. Dr. Fatiheea F Hassan
2026


eartips, ear plugs
dual head chestpiece,
turnable diaphragm
eartubes,
metal tubes,
adjustable binaurals
bell
(with hole)
drum
steam
headset
binaural spring
flexible tubing,
rubber tube
diaphragm

Acoustic stethoscopes operate on the transmission of sound from the chest piece, via air-filled hollow tubes, to the listener's ears. The chest piece usually consists of two sides that can be placed against the patient for sensing sound; **a diaphragm (plastic disc)** or **bell (hollow cup).**

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If **the diaphragm** is placed on the patient, body sounds vibrate the diaphragm, creating acoustic pressure waves which travel up the tubing to the listener's ears

The diaphragm transmits higher frequency sounds. The disc and the tube of the stethoscope amplify small sounds

If the **bell** is placed on the patient, the vibrations of the skin directly produce acoustic pressure waves traveling up to the listener's ears.

The bell transmits low frequency sounds, while the diaphragm transmits higher frequency sounds. The disc and the tube of the stethoscope amplify small sounds by having a large surface to collect the sound, then channeling it to the small tubes that lead to the listener's ears.

What causes the heart sounds heard with a stethoscope?

1- Blood flow creates vibrations in the heart chambers

2-and valves

which both of them produce audible sounds that can be heard through a stethoscope.

Define auscultation?

Auscultation is the medical term for using a stethoscope to listen to the sounds inside of your body

Normal heart rate and pulse rate is:-

A normal resting heart rate for adults ranges from 60-70 and may reach to 100 beats per minute.

Generally, a lower heart rate at rest implies more efficient heart function and better cardiovascular fitness.

For example, a well-trained athlete might have a normal resting heart rate closer to 40 beats per minute

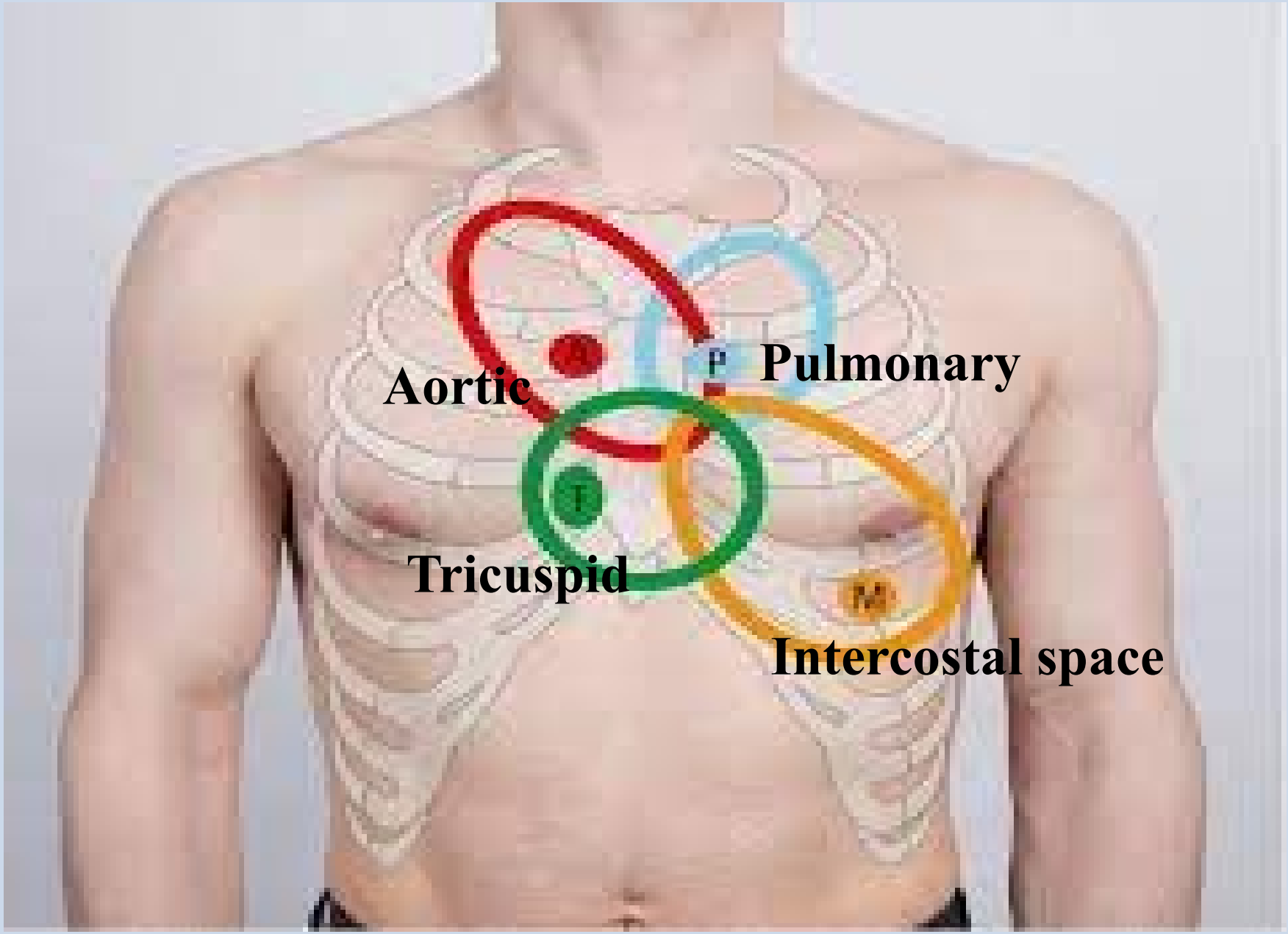
The four standard points of auscultation for the heart are:

1- Aortic – on the patients right side of the sternum.

2- Pulmonary – on the left-hand side of the patients' sternum.

3- Tricuspid (relating to a valve formed of three triangular segments, particularly that between the right atrium and ventricle of the heart.)

4- Intercostal space (The intercostal space (ICS) is the anatomic space between two ribs), along the lower-left border of the sternum.


Aortic
P
Pulmonary
T
Tricuspid
M
Intercostal space

Name of the experiment:- The physics of the stethoscope

Date of the experiment:- 27/4/2026

Name of the students:-

Group:-

Results and Measurements

Name of the student	Heart rate/min. During rest	Heart rate/min. After exercises

Discussion (discus the results)

THANKS….