



University of Al-Mustaqbal
College of Science
Department of Medical
Physics



Name of subject : Medical physics 3

Number stage : fourth

Lecture name : Terminology, modeling ,and measurement

Lecture number : 1

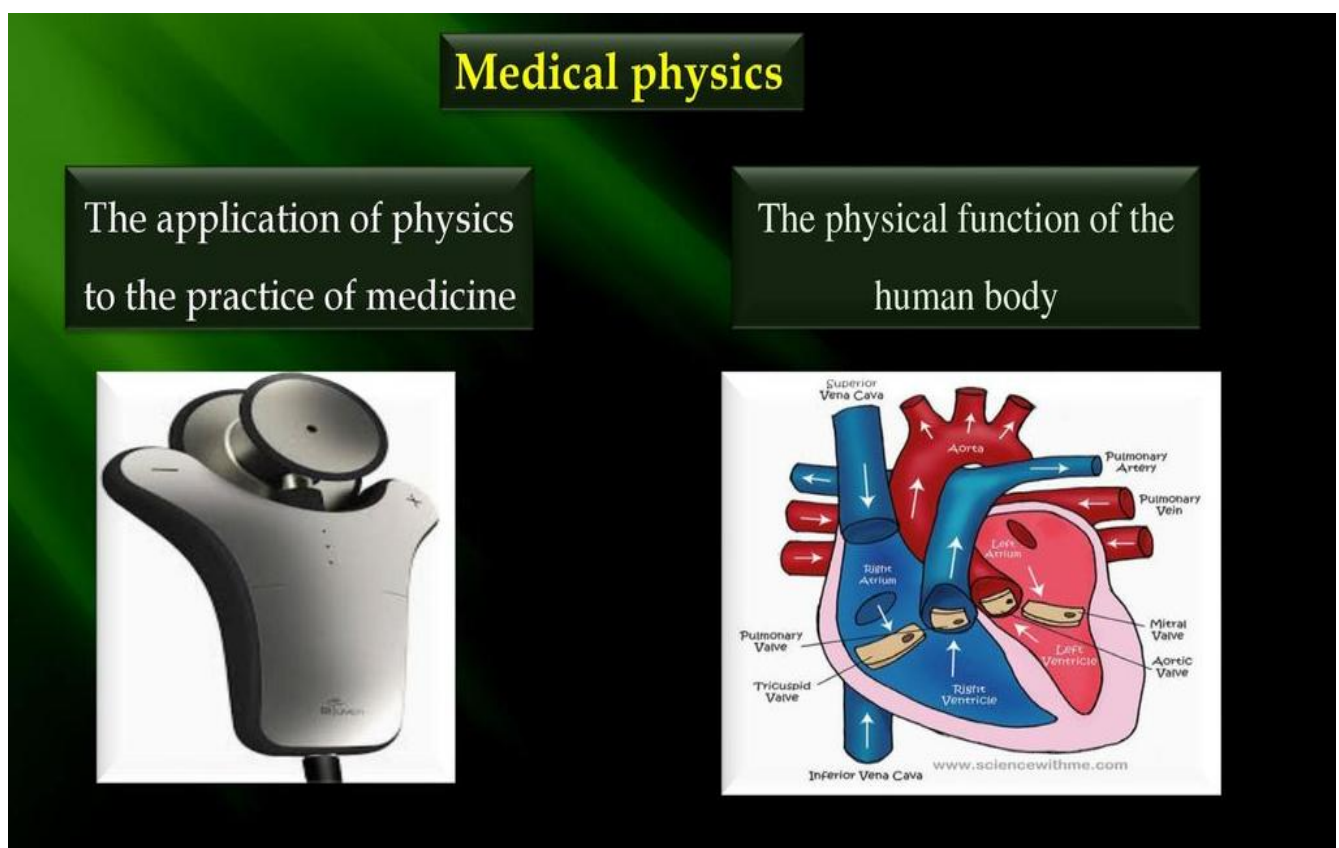
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Terminology, modeling, and measurement

Medical physics (also called biomedical physics, medical biophysics, and applied physics in medicine, physics applications in medical science, radiological physics or hospital radio-physics) is, in general, the application of physics concepts, theories, and methods to medicine or healthcare.

As application, the term medical physics refers to two major areas: -

- ✚ The applications of physics to the function of the human body in health and disease.
- ✚ The applications of physics in the practice of medicine.





Medical physics is generally split into two major subgroups, specifically

a) Radiation therapy.

b) Radiology.

***Medical physics of radiation therapy can involve work such as:**

1-Dosimetry.

(Radiation dosimetry in the fields of health physics and radiation protection is the measurement, calculation and assessment of the ionizing radiation dose absorbed by an object, usually the human body).

2-linac quality assurance.

(A **medical linear accelerator (LINAC)** is the device most commonly used for external beam radiation treatments for patients with cancer. It delivers high-energy x-rays or electrons to the region of the patient's tumor).

3-brachytherapy.

(**Brachytherapy** is a procedure that involves placing radioactive material inside your body. **Brachytherapy** is one type of radiation therapy that's used to treat cancer. **Brachytherapy** is sometimes called internal radiation).

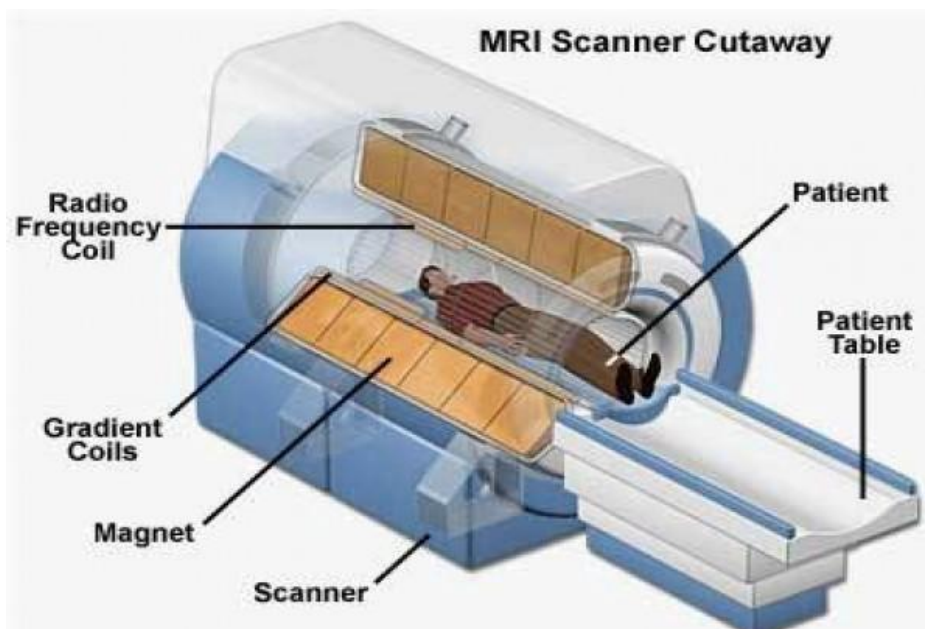
***Medical physics of radiology involves:** medical imaging techniques such as

1-magnetic resonance imaging.

2-ultrasound.

3- computed tomography.

4- positron emission tomography. 5- x-ray.



In the case of clinical work, the term medical physicist is the title of a specific healthcare profession, usually working within a hospital or other clinic. Medical physicists are often found in the following healthcare specialties:

Radiation oncology.

Diagnostic and interventional radiology (also known as medical imaging).

Nuclear medicine.

Radiation protection.

Mission statement of medical physicists.

In the case of hospital medical physics departments, the mission statement for medical physicists as adopted by the European Federation of Organisations for Medical Physics (EFOMP) is the following:

- 1-Medical Physicists will contribute to maintaining and improving the quality, safety and of healthcare services through patient-oriented activities.

2-control and optimized clinical use of medical devices and regarding patient risks and protection from associated **physical agents** .Also including the prevention of unintended or accidental exposures.



The term "**physical agents**" refers to

- 1- Ionizing and non-ionizing electromagnetic radiations.
- 2- Static electric and magnetic fields.
- 3- Ultrasound.
- 4- Laser light.
- 5- Other physical agents associated with medical e.g.
 - a-X- rays in computerized (CT).
 - b- Gamma rays/radionuclides in nuclear medicine.
 - c- Magnetic fields and radio-frequencies in magnetic resonance imaging (MRI).
 - d- Ultrasound in ultrasound imaging and Doppler measurements.