

# *Physics of Ultrasound*

*Lecture9*

## *Image Characteristics in Clinical Ultrasound*

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*Third Stage*

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*2022- 2023*

## **1. Introduction**

- ✚ The quality of a diagnostic image is of the utmost importance III determining its usefulness.
- ✚ The overall quality of the ultrasound image is the end product of a combination of many factors originating not only from the imaging system but also from the performance of the operator.
- ✚ All the components of the imaging system, including the transducer, the electronics, image processing, display, and recording devices, impact on the ultimate quality of the ultrasound image.
- ✚ It is necessary to emphasize the multi factor nature of image quality in clinical ultrasound because experience shows that the very best of equipment used by an unskilled operator will generate poor quality images, as will unsatisfactory equipment in the hands of a highly qualified operator.
- ✚ For the ultrasound image, components of resolution include spatial resolution, temporal resolution, and contrast resolution.
- ✚ It is appropriate to consider the factors which affect resolution in some detail, because the optimum choice of these factors very often involves making compromises in the manner of give and take, an essential feature in the optimization of the ultrasonic image

## **2. Spatial resolution**

- ✚ Spatial resolution describes the ability to distinguish between objects located at different positions in space.
- ✚ In reference to the ultrasound image, spatial resolution is concerned with the ability to distinguish between two reflectors in space.
- ✚ It affects in a major way the capability of the imaging system to depict structural detail.