

التصوير الطبي

Medical Imaging

LECTURE SEVEN

Ultrasound Imaging

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Ultrasound Imaging

Introduction

The human ear responds to sounds with frequencies in the range from 20 Hz to 20,000 Hz. This is called the audible range of the human ear. In audible sound waves whose frequencies are less than 20 Hz are in the infrasonic range. Frequencies above 20,000 Hz are in the ultrasonic range. The audible range of dogs, cats, moths and mice extends into ultrasound frequencies. They can hear very high frequencies that humans cannot. Several animal species are able to hear frequencies well beyond the human hearing range. Some dolphins and bats, for example, can hear frequencies up to 100,000 Hz. Elephants can hear sounds at 14–16 Hz, while some whales can hear infrasonic sounds as low as 7 Hz (in water).

Hearing range describes the range of frequencies that can be heard by humans or other animals, though it can also refer to the range of levels. The human range is commonly given as 20 to 20,000 Hz, although there is considerable variation between individuals, especially at high frequencies, and a gradual loss of sensitivity to higher frequencies with age is considered normal. Sensitivity also varies with frequency, as shown by equal-loudness contours. Routine investigation for hearing loss usually involves an audiogram which shows threshold levels relative to a normal.

Ultrasound imaging uses sound waves to produce pictures of the inside of the body. It is used to help diagnose the causes of pain, swelling and infection in