Instrumentation for Bone Densitometry
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The attention of the healthcare industry has become increasingly focused on osteoporosis. As the age of the population increases the need to accurately diagnose and track the progression of the disorder will increase. This demand has led to the development of a variety of instrumentation designed to measure bone density, the best indicator of osteoporotic fracture risk. The instrumentation runs the spectrum of tools available to radiology including the use of standard x-rays to sophisticated x-ray, CT, MR, and ultrasound devices specifically designed to measure the density of specific bones.

Common methods of measuring bone mineral density (BMD) include radiographic absorptiometry, single-photon and dual-photon absorptiometry, quantitative computed tomography, dual energy x-ray absorptiometry (DEXA) and quantitative ultrasound. Other methods, less common at present, include magnetic resonance imaging and neutron activation analysis. At present the most common and perhaps the most reliable method available today is DEXA.

As with any use of x-rays, radiation and radiation safety must be of concern for those planning to use DEXA (or other radiation based measurements of bone mineral density or BMD). Quality control is also very important to ensure the reliability of the measurements. If a device is used to track BMD over time, well-maintained equipment and well-trained personnel are essential for consistency in the measurement of BMD.

References


Guglielmi, G. Qualitative computed tomography (QCT) and dual X-ray absorptiometry (DXA) in the diagnoses of osteoporosis. Euro J Rad 1995; 20:185-187.


* These issues of Seminars in Nuclear Medicine are dedicated to Bone Disease contains several good articles related to bone mineral density, osteoporosis, and the use of DEXA.

** This paper provides an overview of bone structure, osteoporosis and therapy on a level appropriate for technologists.