Radiation exposure in X-ray-based imaging techniques used in osteoporosis.

Abstract:
Recent advances in medical X-ray imaging have enabled the development of new techniques capable of assessing not only bone quantity but also structure. This article provides (a) a brief review of the current X-ray methods used for quantitative assessment of the skeleton, (b) data on the levels of radiation exposure associated with these methods and (c) information about radiation safety issues. Radiation doses associated with dual-energy X-ray absorptiometry are very low. However, as with any X-ray imaging technique, each particular examination must always be clinically justified. When an examination is justified, the emphasis must be on dose optimisation of imaging protocols. Dose optimisation is more important for paediatric examinations because children are more vulnerable to radiation than adults. Methods based on multi-detector CT (MDCT) are associated with higher radiation doses. New 3D volumetric hip and spine quantitative computed tomography (QCT) techniques and high-resolution MDCT for evaluation of bone structure deliver doses to patients from 1 to 3 mSv. Low-dose protocols are needed to reduce radiation exposure from these methods and minimise associated health risks.