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The Significance of a Protocol in X-ray Radiography: Influential Parameters

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Background Information and Aims: X-ray imaging is one of the classical human health diagnostic procedures. The aim of this work was to explore and analyze the X-ray exposure parameters and their significance in a given protocol in relation to image quality.
Materials and Methods: Exposures were delivered on meaty cow ribs, which served as a human equivalent phantom with tissue heterogeneities. Six different protocols corresponding to the foot, wrist, ankle, forearm, chest, and hand were used in exposing the phantom with a Shimadzu RAD speed MC unit. The resultant images were analyzed with Image J software for relative intensities so as to index image quality per protocol.
Results and Discussions: There were variations in the relative intensities read at selected image pixels protocol by protocol. This showed that the relative intensities can be used to make predictions of image quality and associated dose.
Conclusions: It is crucial to use the appropriate protocol for any given X-ray imaging procedure to minimize the dose delivered to tissue without compromising image quality. Relative intensity and thus optical density can be used as a measure of image quality and radiation dose by protocol.

Primary authors: Dr MDZINISO, Nhlakanipho (University of Eswatini, Department of Physics); Mr KUNENE, Fanele (University of Eswatini, Department of Physics)

Presenter: Dr MDZINISO, Nhlakanipho (University of Eswatini, Department of Physics)

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