

## IMAGE QUALITY ANALYSIS IN DENTAL CONE-BEAM COMPUTED TOMOGRAPHY

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Office-based cone-beam computed tomography (CBCT) has been used in oral and maxillofacial radiology practice. This article presents the limitations and potentialities in the development of QC protocols adjustable to different dental CBCT models. This assessment was based on the analysis of image quality parameters in different equipments, using standard procedures and maximum values provided by Brazilian regulations for multi-slice detector computed tomography (MDCT). CT number uniformity, noise level, high and low contrast spatial resolution were analyzed qualitatively and quantitatively in two equipments: i-CAT (Imaging Sciences International Inc., USA) and Planmeca 3D s (Romexis, Finland). Different attenuating objects were developed through rapid prototyping using ABSplus deposition for data acquisition. Uniformity was measured in 5 regions (central, left lateral, right lateral, anterior, and posterior). Lateral regions showed better results (5 HU) than posterior and anterior (15 HU), compared to 5 HU, maximum difference between CT numbers. Measured noise in a water phantom was lower for i-CAT (6.3%), than Planmeca 3D s (11.9%), exceeding 10% maximum noise. Low and high contrast, and spatial resolution were qualitatively analyzed using variable diameter holes and internal pattern visibility, produced by deposition. Image analysis showed that higher noise prejudiced low contrast resolution. Both equipments showed acceptable high contrast spatial resolution (1 mm). The main limitations for adapting MDCT procedures for CBCT quality control are: variety of gantry geometries; kVp and mAs limited range regulation; FOV differences; difficulties for using standard CT phantoms; lack of QC specific regulation for office-based CBCT. The study showed the high potentiality of ABSplus deposition for phantoms prototyping with variable and complex geometries and different densities, representing a flexible tool for the development of QC models for image quality analysis.

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