

Effects of exposure parameters and slice thickness on detecting clear and unclear mandibular canals using cone beam CT

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論 文 名	Effects of exposure parameters and slice thickness on detecting clear and unclear mandibular canals using cone beam CT (コーンビーム CT での明瞭あるいは不明瞭な下顎管検出における撮像条件とスライス厚の影響)			
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論 文 審 査 の 結 果 の 要 旨

The purpose of the present study is to clarify the effects of exposure parameters and image-processing methods when using CBCT to detect clear and unclear mandibular canals (MCs). Twenty-four dry half mandibles were divided into 2 groups with clear and unclear MCs based on a previous CBCT study. Mandibles were scanned using a CBCT system with varying exposure parameters (tube voltages 60 kV, 70 kV and 90 kV; and tube currents 2mA, 5mA, 10mA and 15mA) to obtain a total of 144 scans. The images were processed with different slice thicknesses using Image J software (National Institutes of Health, Bethesda, MD). Five radiologists evaluated the cross-sectional images of the first molar region to detect the MCs. The diagnostic accuracy of varying exposure parameters and image-processing conditions was compared with the area under the curve (Az) in receiver-operating characteristic analysis. The Az values for clear MCs were higher than those of unclear MCs ($p<0.0001$). With increasing exposure voltages and currents, Az values increased, but no significant differences were found with high voltages and currents in clear MCs ($p=1.0000$ and $p=0.9340$). The Az values of serial images were higher than those of overlaid images ($p<0.0001$), and those for thicker slices were higher than those for thinner slices ($p<0.0001$). The findings indicate that detection of unclear MCs requires either higher exposure parameters or processing of the images with thicker slices. To detect clear MCs, lower exposure parameters can be used.

He answered to the questions raised by the referees properly, which made the them satisfied. It could be considered that the present work is suitable and valuable for Doctor of Philosophy (Dental Science) in Graduate School of Dentistry, Kyushu University.