DOWN SYNDROME: A RADIOGRAPHIC STUDY AND INCIDENTAL FINDINGS IN SIX

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Background: Down syndrome (DS), also known as trisomy 21, is the most well-known chromosomal disorder, characterized by generalized growth and mental deficiency. It affects 1 in 600 to 1 in 2000 live births.

Objective(s): The purpose of this study was to report the radiographic features and incidental findings in 6 cases with Down syndrome.

Study Design: A cephalometric analysis, airway volumetric measurements, temporomandibular joint measurements, and interpretation of 6 cone beam computed tomography (CBCT) scans for a patient with Down syndrome were performed using Dolphin software.

Results: Incidental findings of intracranial calcifications were noted in all the cases.

Discussion/Conclusions: Basal ganglia calcification is more frequently seen in young patients with Down syndrome and may be related to the premature aging characteristic of Down syndrome.

EFFECT OF TOOTH POSITION AND CBCT SETTINGS ON IMAGE ARTIFACT AND CONTRAST-TO-NOISE RATIO GENERATED BY 4 TYPES OF ROOT-END FILLING MATERIALS.

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Background: After endodontic surgery, radiographic assessment is the method of choice to monitor bone defect healing. Cone beam computed tomography (CBCT) scans are useful to identify the cause of surgical intervention failure or to confirm healing; however, the artifacts generated by some root-end filling material might compromise this objective.

Objective(s): The aim of this study was to compare the artifact and contrast-to-noise ratios generated by four root-end filling materials at multiple CBCT exposure settings and positions within the field of view (FOV).

Study Design: Twelve central incisors were endodontically treated, obturated, and then retrograde-filled using amalgam, Biodentine, SuperEBA (ethoxy benzoic acid), and mineral trioxide aggregate (MTA). A phantom was created; then, tooth samples were inserted and scanned in the center and periphery of a 4×4 mm field of view (FOV) using a Morita MCT-1 F8 (at multiple kV and degree acquisition settings). Image J was used to determine the artifact and contrast-to-noise generated at the same relative slice image of each tooth.

Results: *Artifacts FOV position*: periphery had less artifact than central (P value $< .0001$); scan setting (Degrees): 360° had less artifact than 180° (P value $< .0001$); tube voltage (kV): artifact decreased with increased kVp (P value $< .0001$); Materials: Biodentine was associated with less artifact compared with MTA (P value $= .031$)

CNR FOV position: Periphery had higher contrast-to-noise ratio (CNR) than central (P value $< .0001$); scan setting (Degrees): 360° had higher CNR compared with 180° (P value $<.0001$); *Tube voltage (kV):* CNR increased with increased kVP (P-value $< .0001$); Materials: Amalgam was associated with lower CNR than all others (P value $= .002$)

Discussion/Conclusions: Biodentine, MTA, and Super-EBA are biomechanically adequate for retrograde obturation because they generated significantly less artifact compared with amalgam. The use of the 360° image slice acquisition mode generated significantly less artifact than the 180° setting for all materials. Finally, a periphery position led to lower artifact and higher CNR compared with the central position, a finding that was contrary to previous findings in the literature.

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EFFECTS OF IMAGE PROCESSING UPON RADIOGRAPHIC IMAGE QUALITY.

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Background: There is evidence that capture and processing of the digital radiographic images may contain artifacts that could reduce the diagnostic value of dental radiographs. This phenomenon has been reported through various case reports. However, its effect on radiographic image quality has not been studied.

Objective(s): The purpose of this study was to evaluate the effect of image processing on the quality of dental digital radiographs using the most common type of filter—sharpening.

Study Design: Three imaging modalities (2 complementary metal-oxide-semiconductor [CMOS], 1 photostimulable phosphor [PSP]) were used to image a DDQA imaging phantom (Digital Dental Quality Assurance phantom) and to create a flat-field radiograph. Contrast resolution, spatial resolution, dynamic range, and radiographic noise were assessed for image quality. Overshoot artifact was also assessed. Each image was sharpened and then highly sharpened. Images were compared using Friedman's 2-way nonparametric analysis of variance (ANOVA).

Results: Image sharpening significantly affected spatial resolution and noise. Conversely, dynamic range and contrast resolution were not significantly affected by image sharpening. Overshoot artifact increased with image sharpening.