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The accuracy of CBCT in the assessment of artificially induced periapical bone lesions for deciduous and permanent teeth

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Introduction

Cone Beam Computed Tomography (CBCT) may offer improved diagnosis of periapical disease, but the literature is still sparse on this subject.

Objectives

To assess the accuracy of CBCT for diagnosis of simulated periapical lesions in an animal model.

Material and methods

Six pig mandibles (3 with mixed dentition, 3 with permanent teeth) were obtained with ethical approval and prepared by formalin fixation and with soft tissue simulation. Standardized periapical bone defects of 1x1mm; 2x2mm and 3x3mm were made in the premolar and molar regions after tooth extraction and root length measurement. Two different CBCT machines were used to image the mandibles, after repositioning of the teeth in the respective sockets. Seven examiners assessed the presence of apical periodontitis using a 5-point probability scale. Statistical analysis of CBCT accuracy for assessing simulated apical periodontitis was performed.

Results

The accuracy for periapical diagnosis was lower for deciduous teeth (57.8% accuracy) than for permanent teeth (71.6% accuracy). Sensitivity of CBCT for periapical lesion detection increased with lesion size for permanent teeth (65.3% for a 1mm defect, 82.1% for 2 mm and 93.9% for 3mm) but remained much lower for deciduous teeth (40.5% for 1mm defect, 35.7% for 2mm and 55.1% for 3mm).

Conclusions

CBCT was a useful method for diagnosis of simulated periapical lesions in permanent teeth.