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## **CBCT accuracy for detection and measurement of bone defects – a comparative study with stereomicroscopy as a gold standard**

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### **Introduction**

Due to its high spatial resolution characteristics, CBCT may prove a useful tool for quantification of the bone structure of the maxillo-facial area.

### **Objectives**

To assess the sensitivity of two different CBCT machines and one MSCT for identification and linear measurement of cortico-trabecular bone defects using stereomicroscopy as the gold standard.

### **Material and methods**

Five pig hemimandibles prepared using formalin fixation and soft tissue simulation were selected to simulate spherical bone defects on the lingual cortex. Another 5 pig hemimandibles were sectioned at the premolar/molar level, obtaining 20 bone blocs, designated for the creation of standardized cortico-trabecular bone defects (diameters 0.5; 0.8; 1; 1.2 and 1.5 mm). CBCT scans and MSCT scans (Bright Speed 8, GE) of all specimens were performed. Seven examiners evaluated these images independently under controlled viewing conditions to identify the presence, number and dimensions of the bone defects. The results were compared to gold standard measurements obtained by stereomicroscopy and dedicated image analysis software.

### **Results**

The smallest lesion size that could be detected on CBCT images was 0.8 mm in trabecular bone (sensitivity=0.58) in contrast to MSCT images, on which only trabecular bone defects larger than 1.2mm (sensitivity=0.50) could be detected. MSCT tended to overestimate the trabecular hole size, while CBCT tended to underestimate the size compared to stereomicroscopy measurements.

### **Conclusions**

CBCT could detect smaller bone defects than MSCT, although lesion size tended to be underestimated compared with MSCT.