# Application of a new 3D x-ray in orthodontic diagnosis

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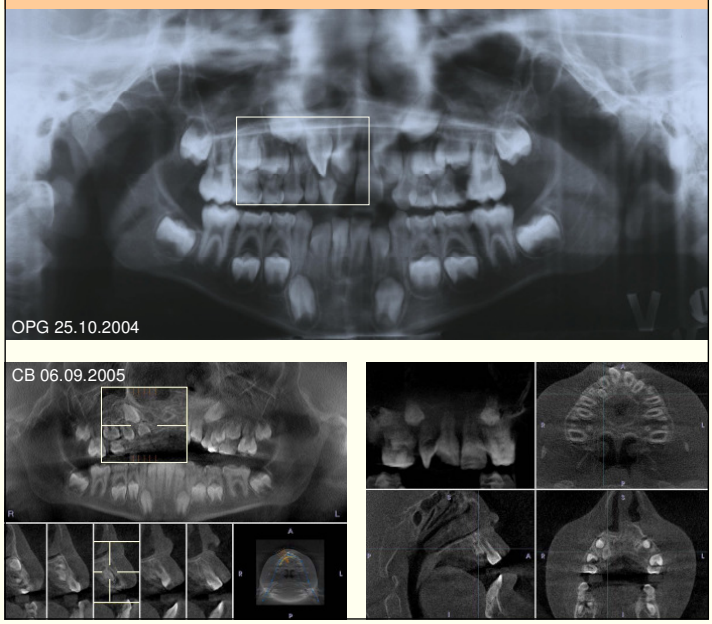
## Introduction

The cone beam (CB) technique allows three-dimensional (3D) imaging of the skull and has the potential to visualize especially high contrast structures like bone and teeth.
The aim of this investigation was to assess the clinical use of a new 3D x-ray system based on the CB technique (Sirona Dental Systems, Bensheim, Germany) and the application of its software tools in orthodontic diagnosis.
The application software provides the examiner with sagittal, coronal and axial as well as 3D volumetric views.

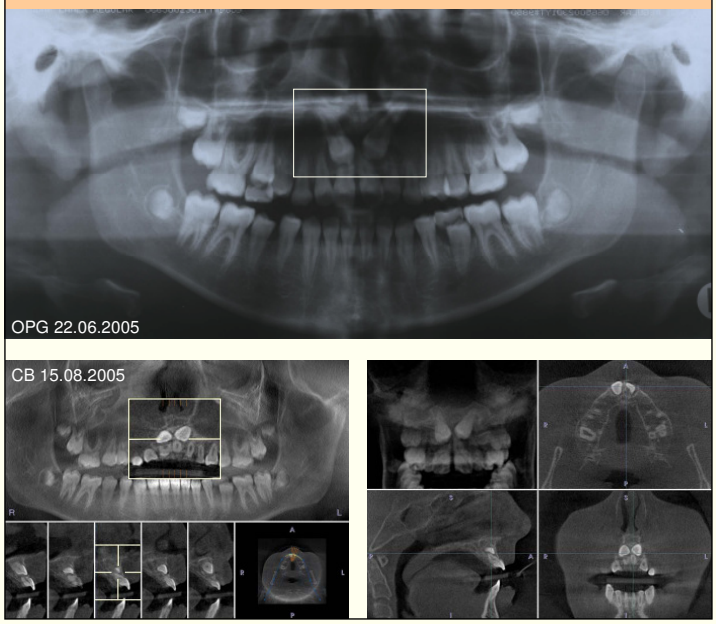
## Material and Methods

3D data sets of 45 patients were produced because their conventional panoramic radiographs needed further evaluation. The scan parameters were a tube voltage of 90kV and an energy dose of 28mAs. The duration of the scan was 14s. The reconstructed volume had a size of 15x15x15 cm.
In Case 1 a 9 year old boy with an additional tooth in the region of the right lateral upper incisor is presented. Case 2 shows images of a 12 year old girl with dislocated upper canines and suspected root resorptions of the upper incisors. Case 3 presents a 12 year old girl with an ectopic impacted upper left canine.

## Case 1




## Case 2




## Case 3


## Conclusions

Because this emerging technology produces images with high resolution and a low radiation dose, it is ideally suited for dentomaxillofacial scanning. It offers orthodontists more accurate information about the location and quality of anatomic structures than on conventional radiographs. It has wide implications on the orthodontic treatment plan as well as surgical procedures.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