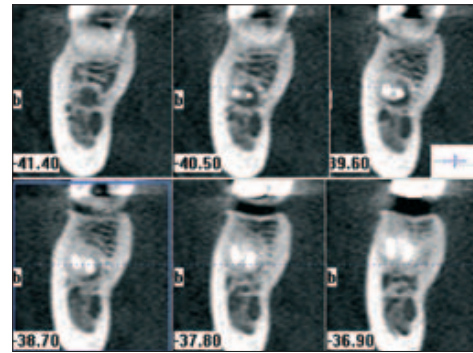
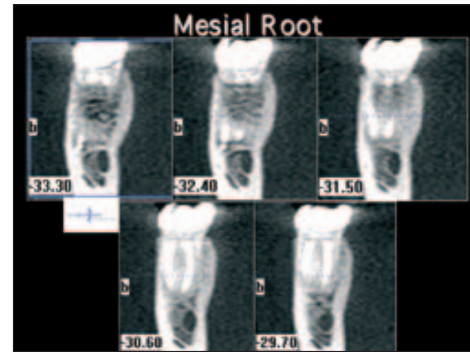


Classic periapical radiography before, during and at completion of RCT on tooth 46.



CBCT scans of the RCT performed on tooth 46. Very good opportunity to evaluate the cone fit (www.ct-dent.co.uk).



CBCT scans of the RCT performed on tooth 46 (www.ct-dent.co.uk).



Classic periapical radiography before, during and at completion of RCT on tooth 15.

Cone Beam CT the change of paradigm in modern dentistry – clinical applications in endodontics and periodontology

By Prof. Dr. Liviu Steier

Panoramic radiography changed the paradigm of diagnosis when introduced in the early 1960s. The limitations of two-dimensional radiography are:

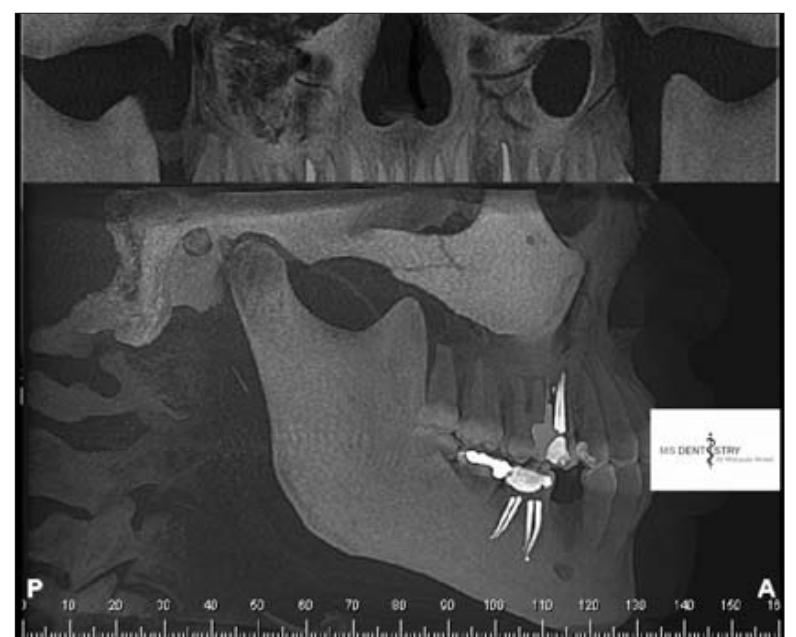
1. Magnification,
2. Distortion,
3. Superimposition,
4. Misrepresentation of structures.

Due to this the use is and was limited.

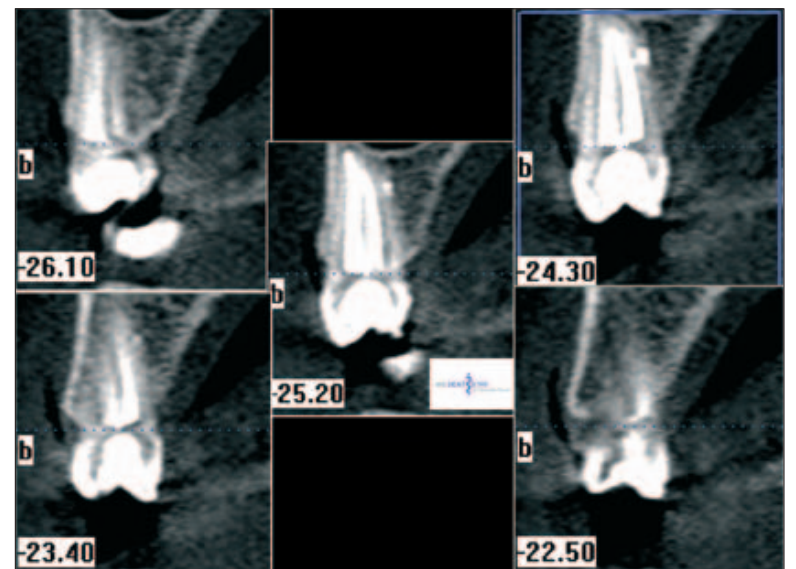
Cone beam technology (CBCT) is a recent introduced technology in dentistry which succeeded to change and continues to change diagnosis, treatment indication and treatment approach – having as such a more comprehensive impact than the introduction of

panoramic radiography. Of course one of the most impressive topics is the availability of software for 3D – reconstruction.

It is of great importance to mention that CBCT provides data at lower cost and absorbed doses than conventional CT.



CBCT of the same case. Upper picture demonstrating the panoramic view while the lower shows the cephalometric view



CBCT scans of the RCT performed on tooth 15. Good opportunity to evaluate the successfully obturated lateral canal in the periapical third of the palatal canal



Clinical picture of the patient showing a very thin periodontal biotype.

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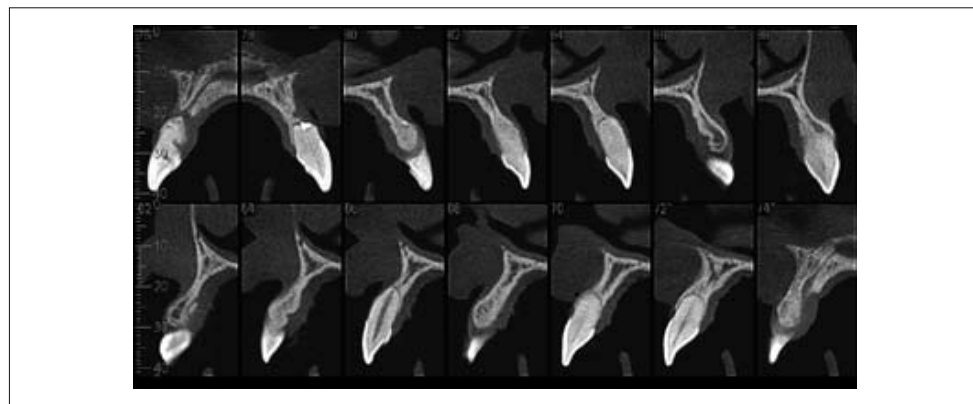
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Panoramic image of the upper jaw produced by the CBCT



CBCT Image showing an almost completely resorbed buccal alveolar plate and a very thin periodontal biotype.

The author has resumed this article for the purpose of demonstration how CBCT aided tremendous value to routine dental practice.

1. Use of CBCT in endodontics

2. CBCT in periodontics

2.1 CBCT and soft tissue

In 2008 Januario et al published in the Journal of Esthetic Restorative Dentistry (J Esthet Restor Dent 20: 366-374, 2008) a paper called: 'Soft Tissue Cone Beam Computed Tomography: A Novel Method for the Measurement of Gingival Tissue and the Dimensions of the Dentogingival Unit'. In this paper, the authors described a simple method to diagnose the thickness of the gingiva specially in the anterior aesthetic zone. The scans were performed with an iCAT (Imaging Science International, Inc., Hatfield, PA; USA). The authors positioned the subject for the scan wearing a plastic lip retractor.

A 28-year-old female patient was referred to our practice for evaluation and treatment planning of the periodontal status. No special remarks regarding medical or dental history. The patient has undergone orthodontic over a couple of years.

The patient was referred for the completion of the diagnostic to take a CBCT at CTdent (2 Devonshire Place, W1G 6HJ, London, see also www.ct-dent.co.uk).

The CBCT confirmed the preliminary diagnosis.

A treatment plan has been elaborated.

2.2 CBCT and hard tissue

Vandenberghe and coworkers researched periodontal bone architecture using 2D CCD and 3D full-volume CBCT-based imaging modalities.

Their investigation concluded that CBCT offered a significant benefit over conventional radiography.

The authors concluded that CBCT can be used to diagnose the bony support as well as surrounding soft tissue and may reveal valuable informations for

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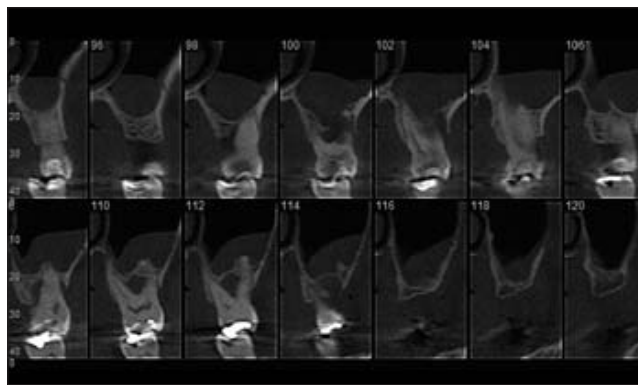
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Panoramic view CBCT image showing the advanced bone resorption at the level of the first upper molars.



The CBCT confirms the class III furcation involvement

← **PI** page 19

example regarding furcation involvement.

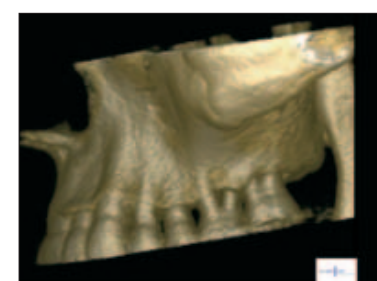
A 55 old human patient was referred to our practice for evaluation, treatment planning and execution. Of major concern was the first upper molars. After performing the routine diagnostic approaches such as BOP, periodontal probing, etc, the patient was referred to CTdent for a CBCT.

Summary

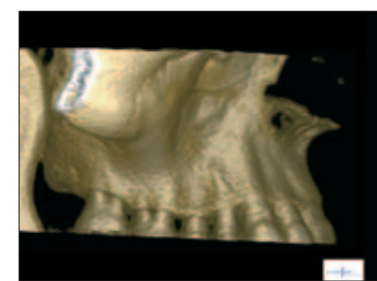
Information provided by this modern technology represents an invaluable milestone in diagnostic, treatment planning as well as evaluation of treatment outcome especially for periodontal applications, especially in the areas of intrabony defects, dehiscence and fenestration defects, and periodontal cysts, and in the diagnosis of furcation-involved molars.

Conclusion

1. For periodontology, CBCT proves to be superior to 2D imaging for the visualisation of bone topography and lesion architecture as well as for the covering soft tissue.



The CBCT centre sent along as 3D reconstruction of the left side



The CBCT centre sent along as 3D reconstruction of the right side

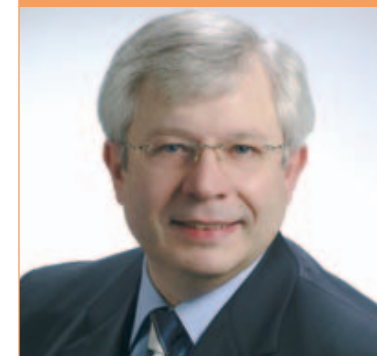
2. For endodontics CBCT seems to be the most promising applications for diagnosis, treatment planning and treatment evaluation.

CBCT images and 3D reconstructions allow for visualisation and exact measurement of dimensions.

Diagnosis built on the combination of clinics and CBCT are a reliable aid in planning and execution of simple as well as advanced dental procedures. **PI**

References are available on request.

About the author



Dr. med. dent. Liviu Steier is a visiting professor at the School of Dental Medicine in Florence; visiting professor at Tufts School of Dental Medicine on its endodontic postgraduate programme; and an honorary clinical associate professor at Warwick Medical School. He is a registered specialist in endodontics (GDC) and Spezialist fuer Prothetik (www.dgzpw.de).

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