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# **DIGITAL VS. ANALOG X-RAY IMAGES AND THEIR APPLICATION IN DENTISTRY THEN AND NOW**

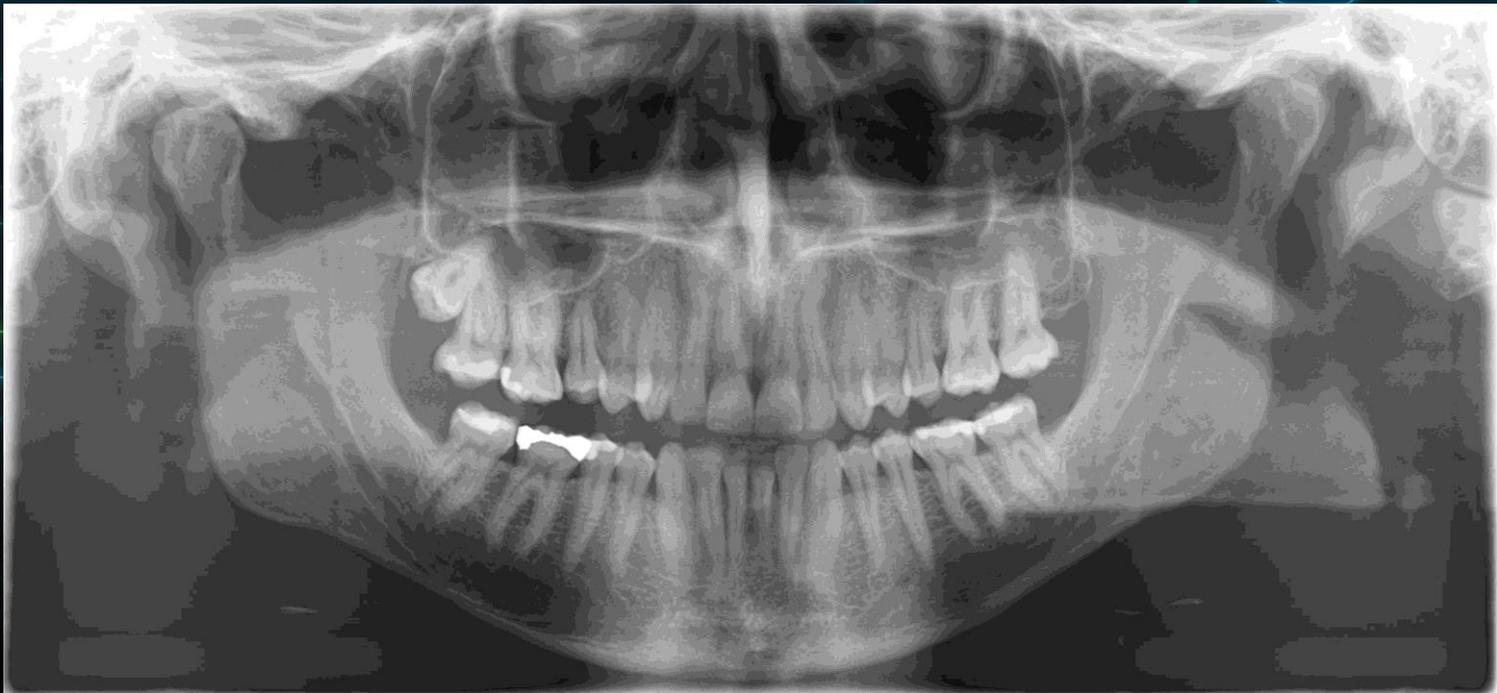
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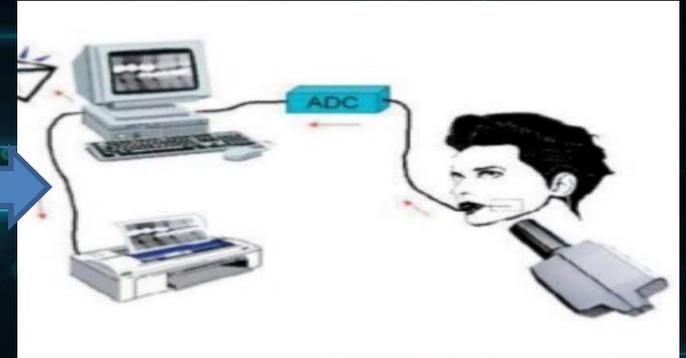
# PURPOSE:

**FOCUS OF TODAY'S DIGITALIZATION ERA**

Clinical use of X-ray imaging is featured in dental practice in almost every clinic and it is an indispensable part of everyday life.



- Digital or electronic imaging has been available for more than a decade
- Digital radiography is the latest advancement in dental imaging
- Incorporates computer technology in the capture, display, enhancement and storage of direct radiographic images

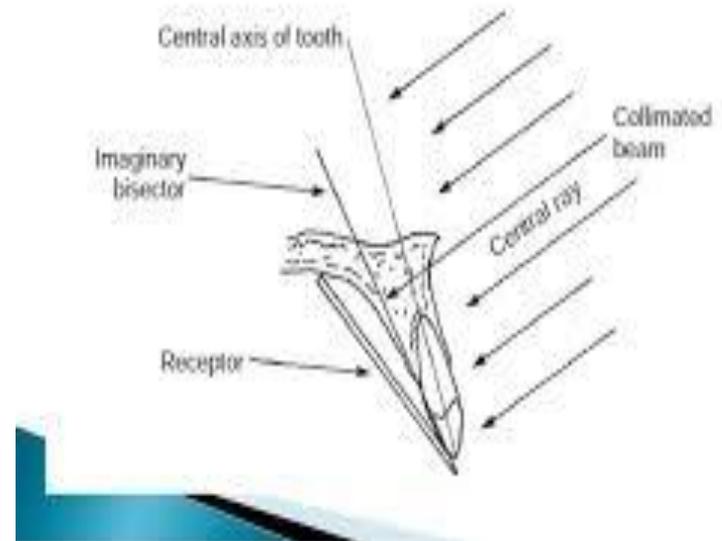


- Film- based imaging consists of X-ray interaction with electrons on the film emulsion
- Through chemical processing we transform the latent image into a visible one

# X-ray techniques :

Paralleling technique  
(right angle)

## BISECTING ANGLE TECHNIQUE



## Paralleling technique (right angle)

- **Principle:** The central concept of the paralleling is that the “x-ray receptor is supported parallel to the long axis of the teeth and the central ray of the x-ray beam is directed at the right angles to the teeth and receptor”

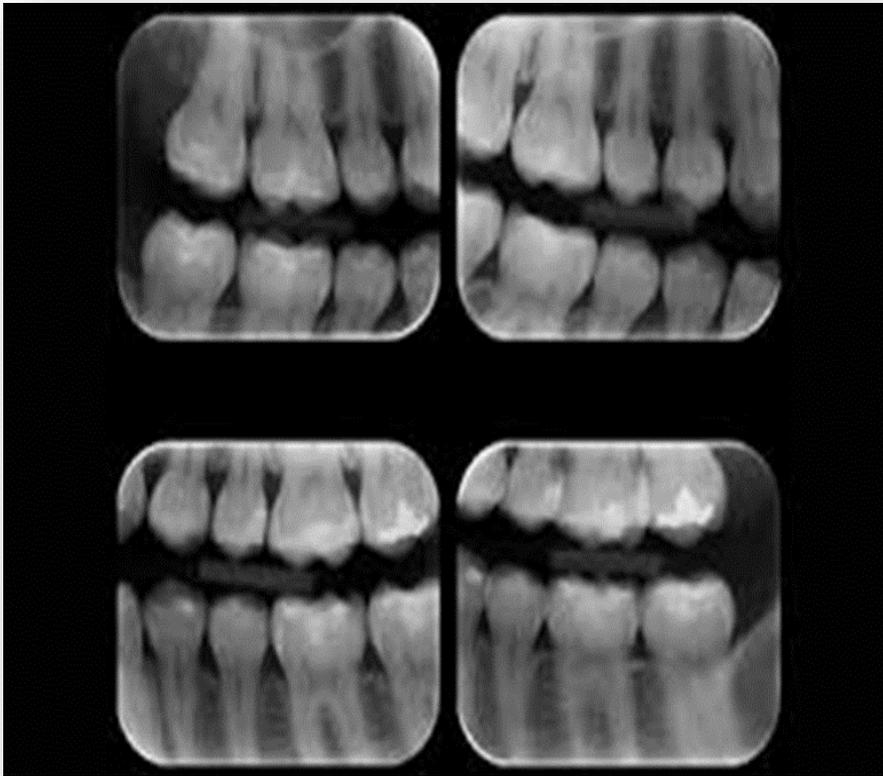
### □ **Advantages**

- Accuracy
- Simplicity
- Duplication

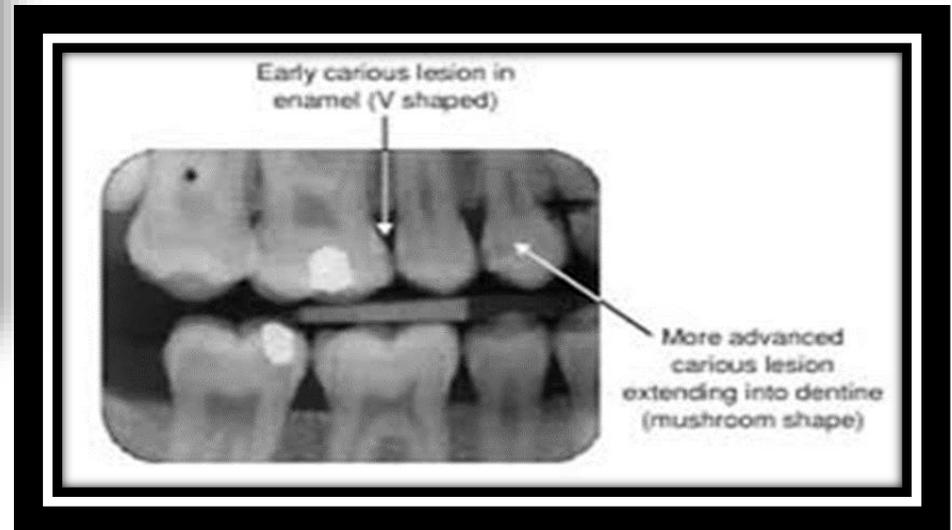
### □ **Disadvantages**

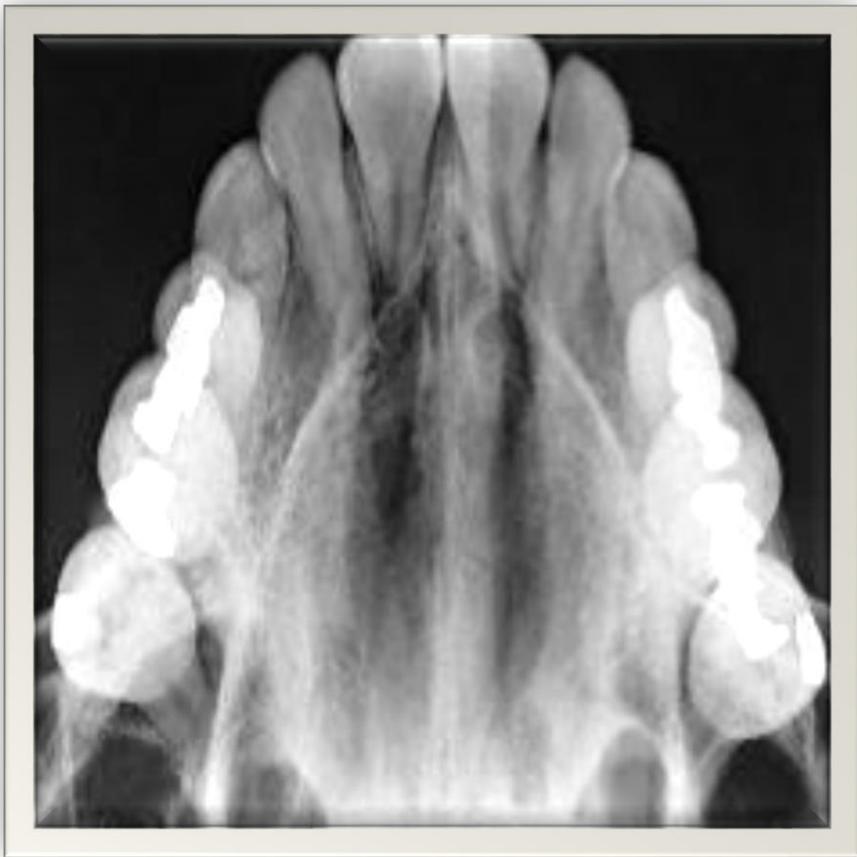
- Difficult for beginners
- Discomfort
- Patient compliance

# Bitewing (interproximal)



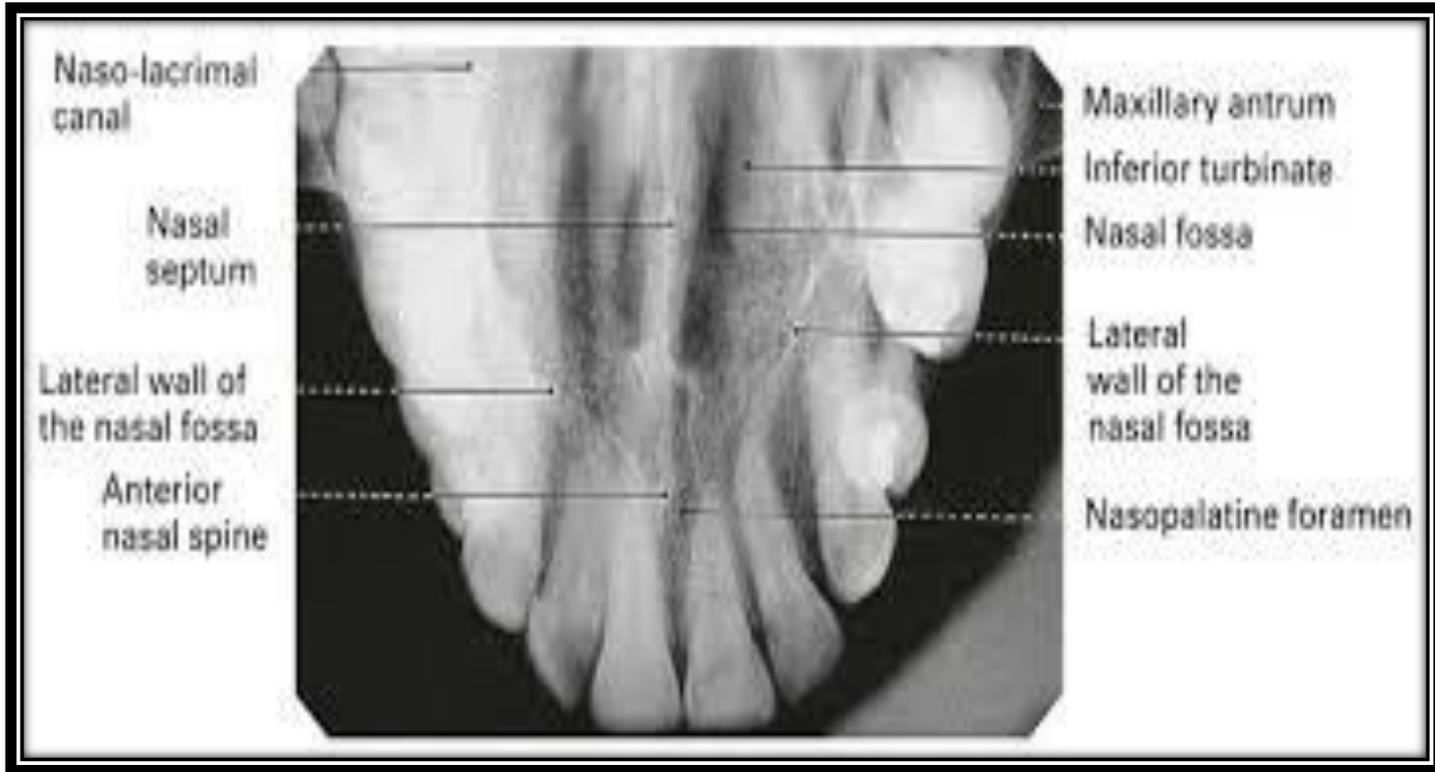
Bitewing is also called interproximal radiograph include the crowns of the maxillary and mandibular teeth and the alveolar crest on the same receptor





**Occlusal view**

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## Occlusal view

An occlusal radiograph displays a relatively large segment of the dental arch

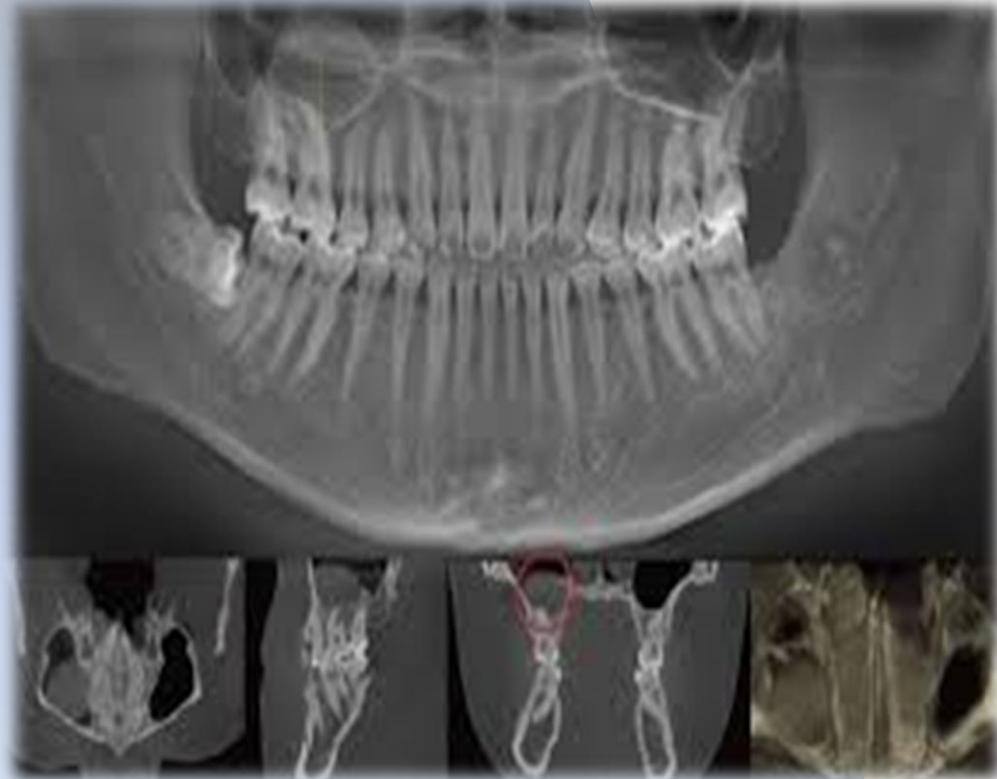
# Computed Tomography ( CT scan )

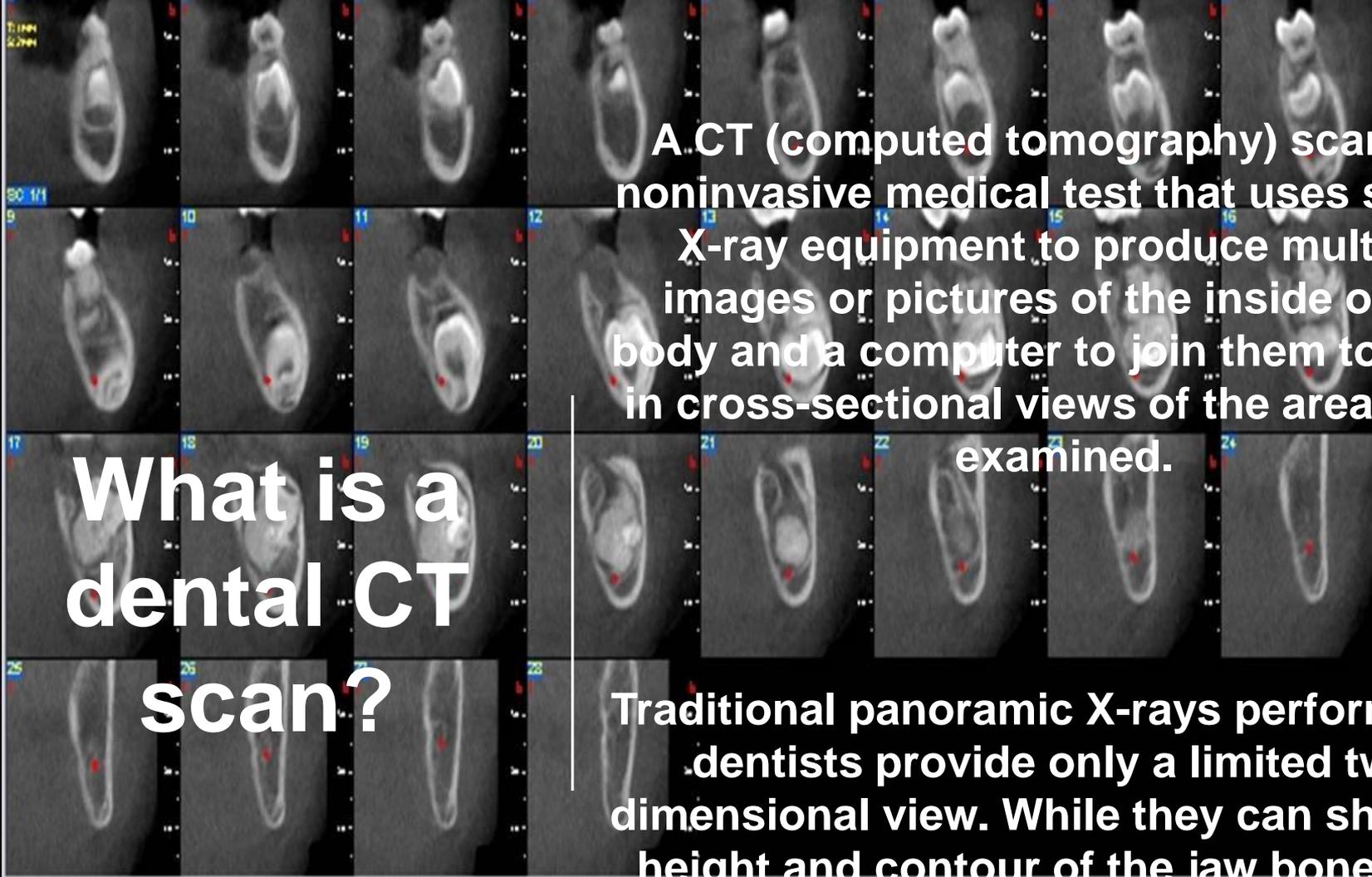
A CT scanner rotates to take X-ray images from different angles. A computer puts these images together to form detailed, two-dimensional pictures.

Exams typically take 15 minutes in total, the actual scanning takes just minutes.

Computed tomography (CT) is today commonly used in imaging of the maxillofacial area

Conventional CT is used for examination of larger areas in diagnosing e.g. facial anomalies, extensive injuries and tumours.

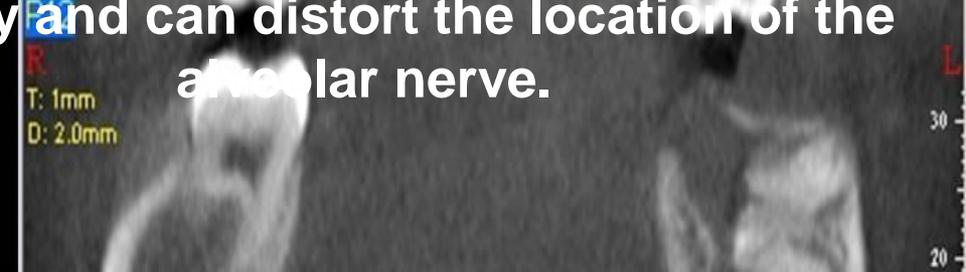
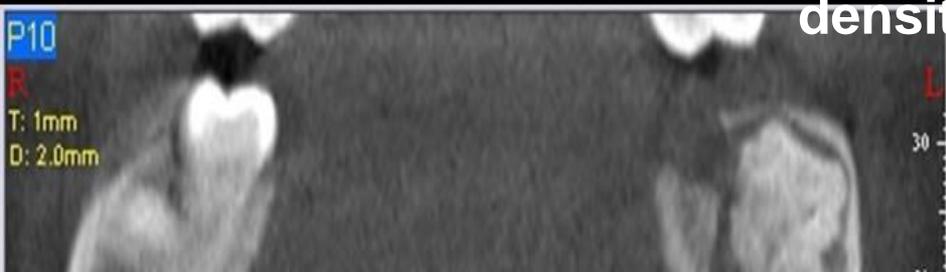




A CT (computed tomography) scan is a noninvasive medical test that uses special X-ray equipment to produce multiple images or pictures of the inside of the body and a computer to join them together in cross-sectional views of the area being examined.

# What is a dental CT scan?

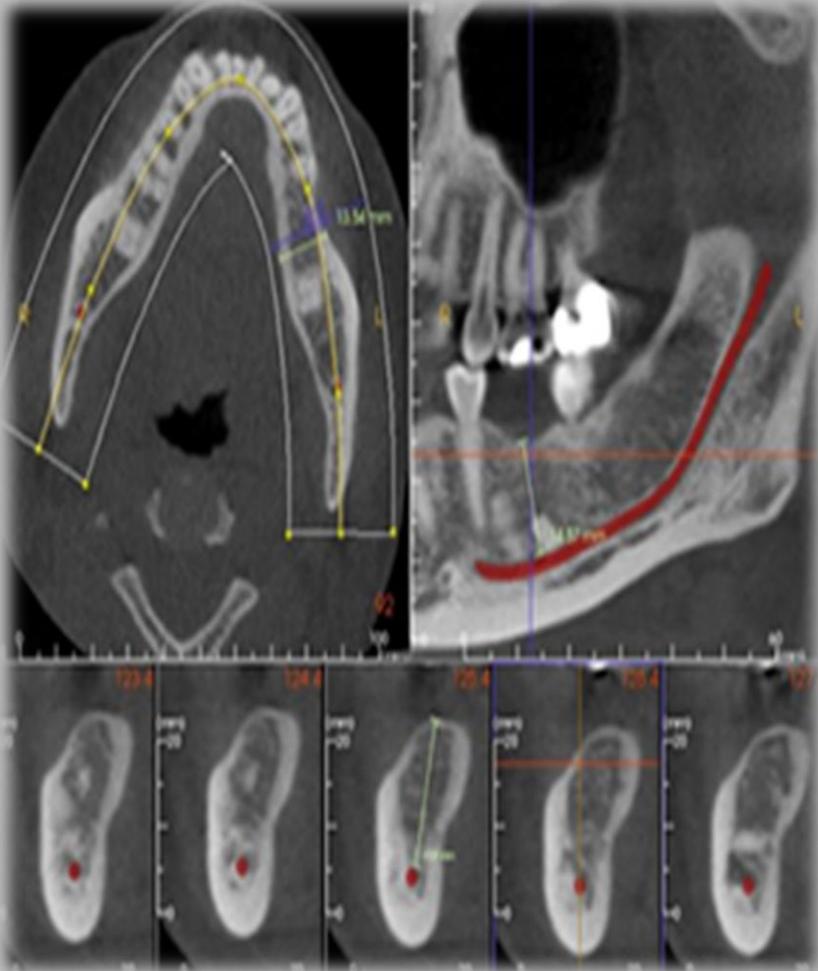
Traditional panoramic X-rays performed by dentists provide only a limited two-dimensional view. While they can show the height and contour of the jaw bone, they give no indication of the bone width and density and can distort the location of the alveolar nerve.

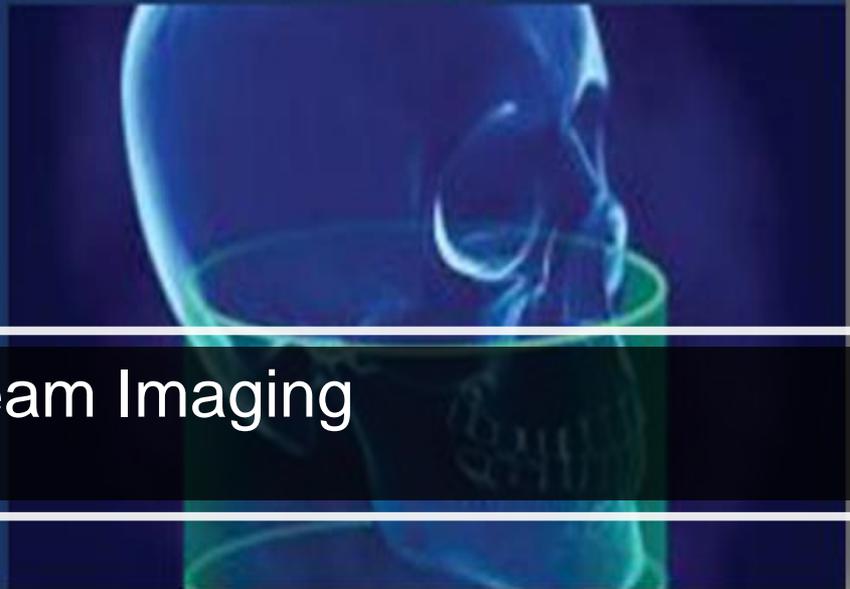
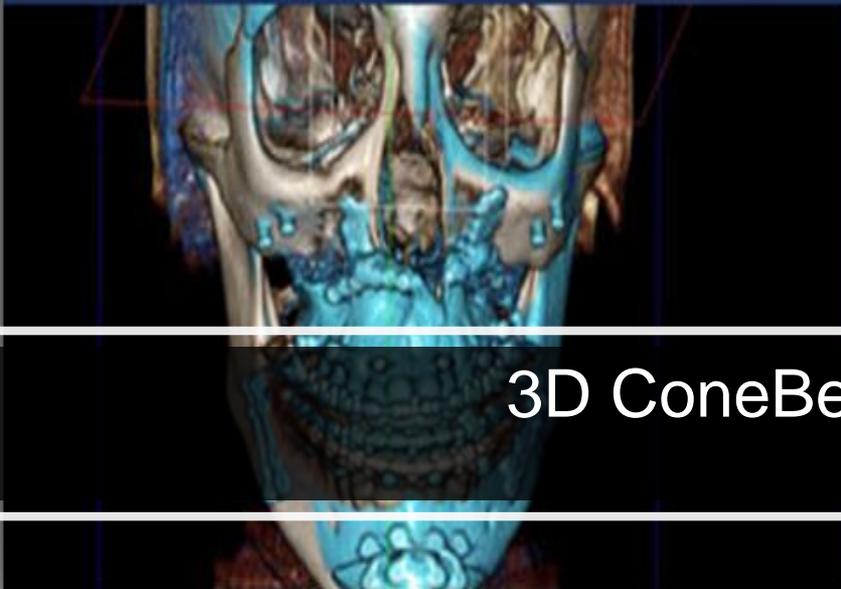
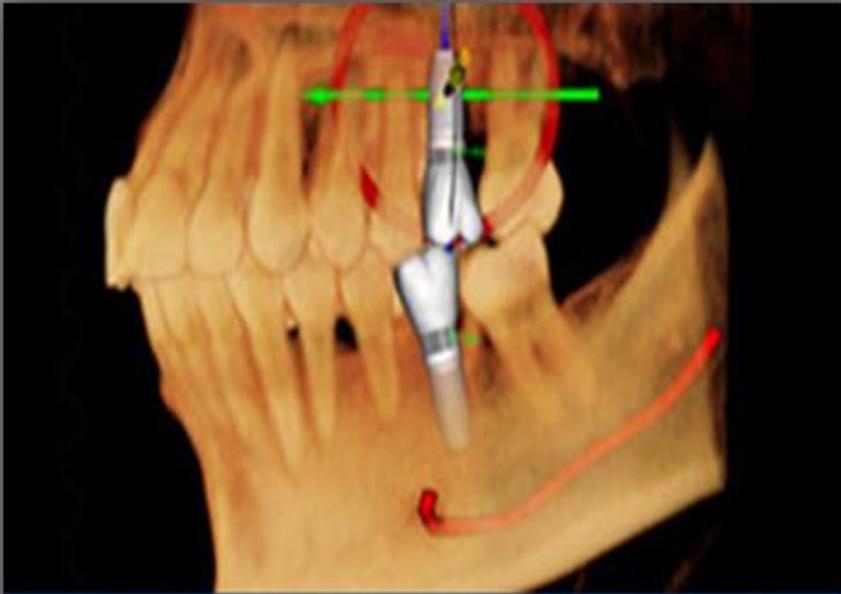


**DENTAL CT IMAGING** is used when patients are being prepared for implants. The more information a surgeon has about the anatomy of the patient's mouth before a dental implant, the better the outcome.

Important measurements for the surgeon to know include the width and density of the jawbone ridge in order to assess implant feasibility and the exact placement of the alveolar nerve in order to prevent painful nerve damage.

Dental CT imaging can also help visualize nerve location prior to wisdom tooth extraction.

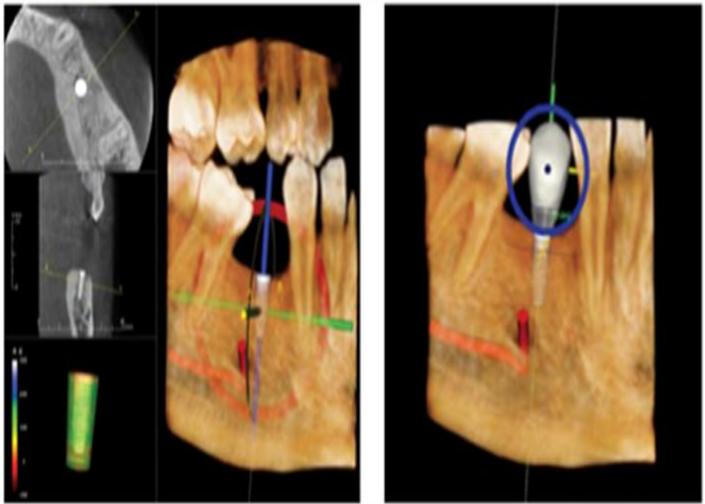




## 3D ConeBeam Imaging

# 3D ConeBeam Imaging

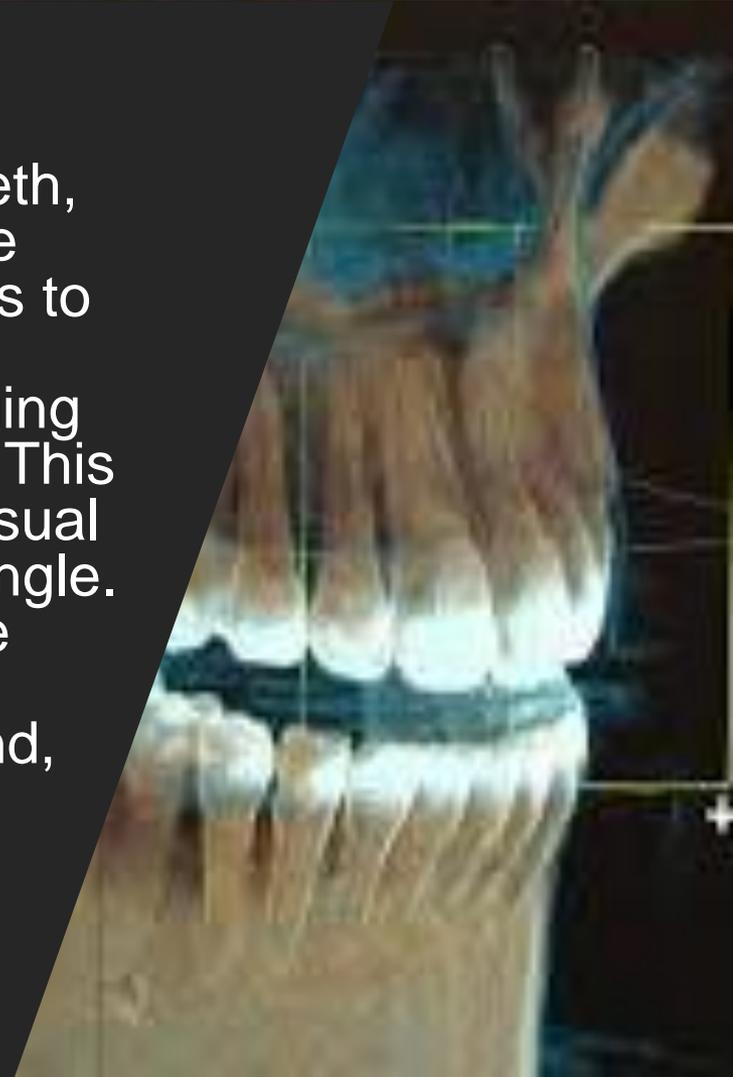
A dental 3D scan allows clinicians to view dental anatomy from different angles. A 3D scan can help gain a better view of bone structures, such as adjacent root positions, in order to locate canals and root fractures, as well as provide the ability to more accurately measure anatomical structures.



These scans also support a wide range of diagnosis and treatment planning, making them extremely flexible. Further, they increase the possibility of treatment success, granting practitioners greater predictability and confidence in preparing for extractions, performing root evaluations, and placing implants.

# How Is It Different from Ordinary Dental X-rays?

Typical dental x-rays just focus on your teeth, and for each x-ray picture, you need one exposure. So it would take many exposures to even begin to compare to a single 3D ConeBeam scan. But 3D ConeBeam Imaging shows much more than simple "flat" x-rays. This new technology provides more complete visual information to study your case from every angle. Best of all, the original scan data can be duplicated anytime, to provide different specialists with images if needed later. And, there's no film to get lost.



### **Bone Quality Assessment:**

3D CBCT scans can also be used to assess bone quality, which is an important part of evaluating the presence of sufficient bone for implant placement. It is also helpful in determining the size and location of lesions and breaks.

### **User-Friendly:**

3D dental equipment is very easy to learn, and it's designed for a trained dentist or dental technician to learn and work with easily.

### **Interactive Display:**

The most important benefit for dental practitioners is the unique ability to demonstrate features in 3D that traditional imaging cannot. The practitioner can reorganize data and magnify and annotate the image.



# CI case 1





## Conclusion

The benefits of using computed tomography or 3D X-rays in our patients nowadays are huge, since for a very short time interval we get a very precise and clear picture of the condition of the dentition in each one.

With the use of the new and modern appliances the radiation is reduced to a minimum, both for the patient and the therapist that controls the X-ray machines.