

Which Advantages Does CT Offer?

Diseases and their control are as old as humankind itself.

Over the past millennia

nature and better

understanding of human

anatomy have gradually

displaced mystic,

supernatural and religious

explanations of the origin of diseases.

Curing work often was hindered from wrong and false diagnoses due to insufficient examination procedures. The idea of those who practised medicine to have a look into the living constitution without having harmed it seemed to be a utopia for several centuries.

The right turning point probably arrived in 1895 when Conrad Röntgen, a renowned German physicist, experimenting with cathode rays invented the 'X' radiation commonly called X-rays today. As he observed this yet unknown 'X' radiation can penetrate particular objects that light cannot. His discovery of the ray which can move through muscles and soft tissue but is absorbed by bone structure gave an absolutely new direction not only for the science of physics but advance in medical diagnostics.

Taking and assessing of various and specific X-ray pictures has become daily routine in the modern examination procedures.

In this article there is no possibility to go through all important stages in the development of radiographic

diagnostic but alone the widespread use of panoramic radiography is a great help for dentists despite of its capacity of showing a single layer thickness. The launch of CT devices is the next milestone which resulted in a qualitative change in this progress.

The incredible development of computers enabled us to transform enormous amounts of digital datasets of CT pictures to stereoscopic images and the dentist can generate a section for studying anywhere and carry out 3D examinations along an arbitrarily chosen rotational axis. The common use of PCs allows the dentist to diagnose in the dental office on his own in particular, to study areas where the most amount of information can be gained from. That is the way to eliminate any misinterpretation arising from findings summarised

- in the field of Endodontics and Orthodontics
- to determine spatial location of impacted and incompletely erupted teeth
- to plan the operation time effectively
- to demonstrate the patient a treatment plan.

Panoramic versus CT

The digital panoramic radiograph provides an accuracy of 90-95% if using software for the measurement. In case of a traditional panoramic radiograph with incorrect adjustment it can occur that data must be corrected even by 25-30%.

True reality shown in the CT picture (Fig. 1).

- measuring error in a panoramic picture: 3-7.5 mm

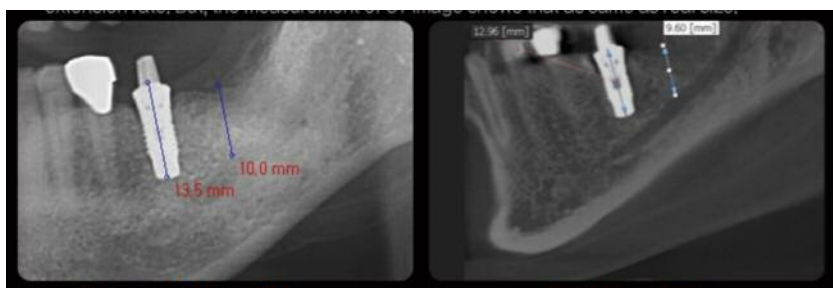


Fig. 1.

in some words on an A4 sized paper.

Which purposes can we actually use CT pictures for?

- to study the anatomy of dento-maxillo-facial region
- to detect areas not visible during clinical facial and jaw bone examinations
- to determine bone quality
- to assess bone absorption in the jaw bone crest
- to examine maxillary sinus, nasal cavity, canalis incisivus and temporomandibular joint

- measuring error in a periapical picture: 1-5.5 mm
- measuring error in a CT picture: 0,2-0,5 mm.

Bone thickness and quality

In case of the maxilla labial concavity of the bone and the site of canalis incisivus can be easily determined and relative bone density assessed (Fig. 2).

To avoid diagnostic mistakes it is advisable to take a panoramic radiograph with CT for the orientation, especially when planning an implant. It may occur that there is

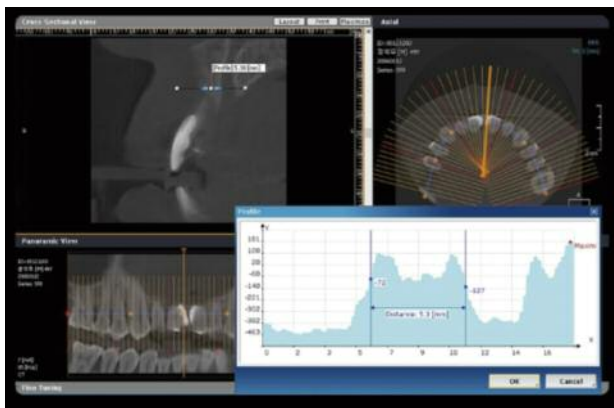


Fig. 2.

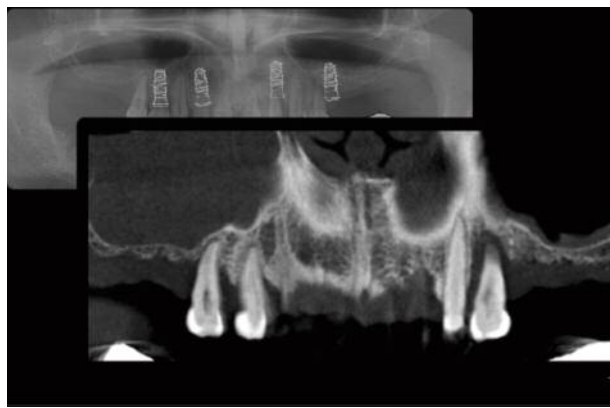


Fig. 3.

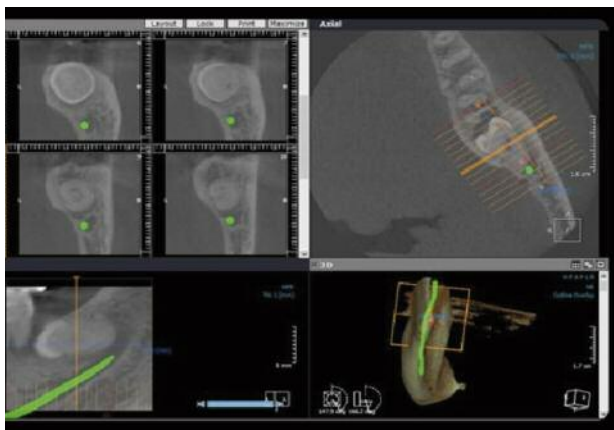


Fig. 4.

seemingly sufficient amount of bone in the place designed for the implant but sometimes a CT can be misleading due to the paper-thin bone quality and the implant insertion can be achieved only through sinus lifting (Fig. 3).

Location of canalis mandibulae (Fig. 4)

Length and width of the canal can be correctly measured in the operational area. It is also possible to show the canalis with colours.

In a panoramic radiograph root absorption caused by impacted tooth 38 and proximity of 38 and canalis mandibulae is clearly recognizable (Fig. 5) but real anatomic relationships can be assessed correctly only after taking a CT picture (Fig. 6).

In the panoramic radiograph taken

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Éljen a 3 dimenziós képkalkotás szabadságával!

IMPLANTÁCIÓS MODELLEZÉS

**E-WOO tech,
a három az egyben
megalkotója!**

**Picasso trio röntgen
készülék tulajdonságai:**

- Panorámafelvétel
- cephalometria felvétel
- CT felvétel (FOV 12x7)

Több, mint amit el tud képzelni!



Szolgáltatásaink:

- hagyományos és digitális röntgenkészítés
- 3 dimenziós CT készítése, melyet CD-n adunk át segédprogrammal együtt

**Várjuk Önt vagy
betegét Buda szívében,
a Moszkva tér 4. alatt!
Nyitva: H-Cs: 8.30-19.00
P: 8.30-18.00**

A 3D Bt.

az **E•WOO** magyarországi forgalmazója

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Fig. 5.



Fig. 6.



Fig. 7.

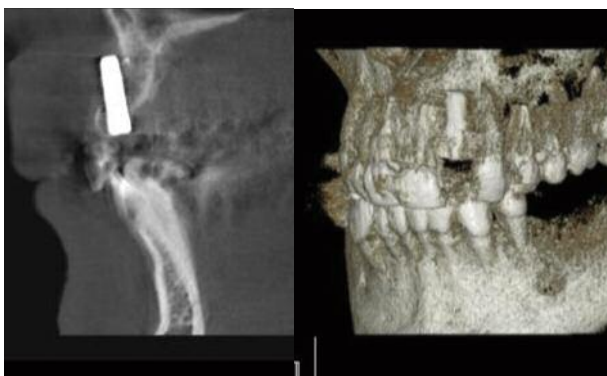


Fig. 8. a-b



Fig. 9.

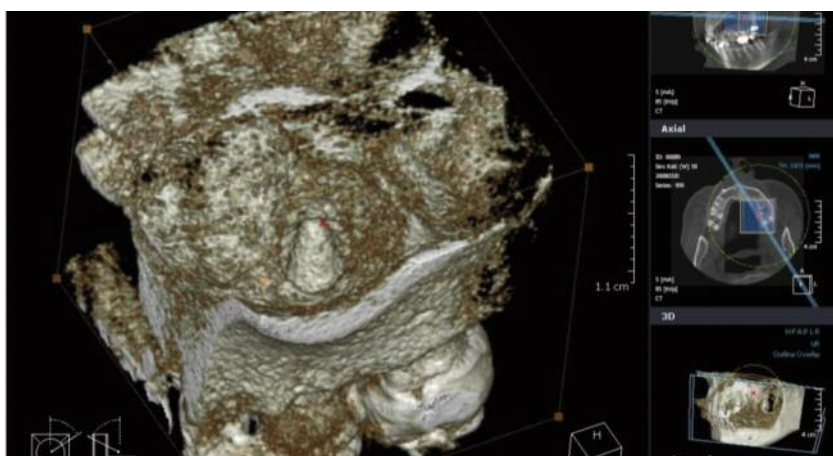


Fig. 10.

prior to surgery we can see in position of tooth 22 anatomic relationships believed to be perfect to insert the implant (Fig. 7), however, in the post-operative CT picture bone and implant locations are shown according to reality (Fig. 8a-8b).

A CT is also absolutely helpful for measuring the periapical and periodontal alterations. In the panoramic radiograph we can see the periodontal involvement of tooth 26 but without any possibility to judge its real size and spatial extent (Fig. 9).

CT picture just like a movie provides the clinician with unlimited freedom to constantly check the periapical alterations in three dimensions. When studying the projection-free picture the considerable bone defect around the palatal root of tooth 26 and the involvement of the sinus cannot remain undetected (Fig. 10).

It is highly advisable to benefit from the easy access to CT examinations nowadays both for our peace of mind and that of our patients.