Picture This
Imaging & Beyond by Jankharia

INNER SPACES

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Still planning your Implants using OPG? Think Again!

- Dr. Prachi Chaubal

Fig 1 (a-c) OPG of 13 region (a) shows adequate height of bone for implant placement. When seen on CBCT, paraxial sections (b), show the bone is thin and irregular (arrow), which could not be assessed by conventional imaging. Inclination of the alveolar bone also cannot be assessed without CBCT, e.g. lingually inclined bone (c).

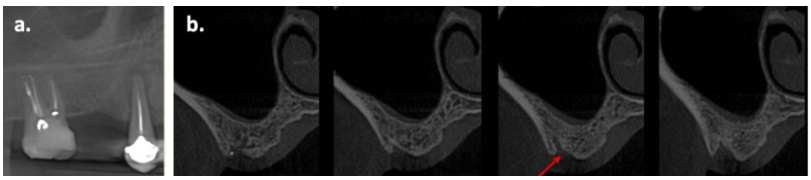

Fig 2 (a,b): Implant planning for the region of 16. When seen on 2D view (a) the bone appears to be suitable for implants. However, CBCT images (b) show suboptimal height of bone and irregularity of crestal ridge which is not clearly seen in (a).

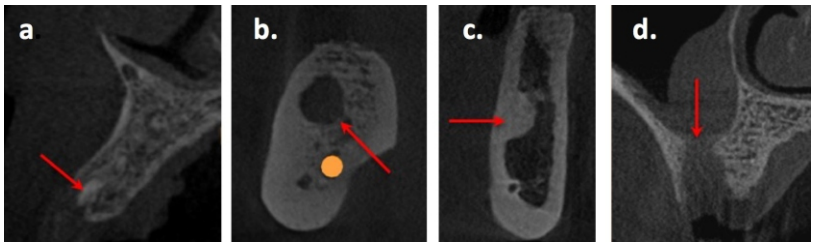

Fig 3 (a-d): Incidental findings seen on thin sections of CBCT during implant planning: small root remnant (a), residual cyst (b), bone island (c), unhealed socket (d) with discontinuity of sinus floor.

Implant planning using conventional methods may seem to be very straightforward, but in some cases the anatomy of the residual alveolar bone can be deceptive when seen clinically or on standard radiographs. The advent of CBCT has made 3 dimensional imaging available to dental surgeons, by providing highly accurate 3D images from a single, low-radiation scan. You can now see what lies below the soft tissue and within the bone and have a complete understanding of your patient's jaw and adjacent anatomical structures. This allows a thorough analysis and preplanning, greatly reducing the probability of implant failure and complications. So the next time you plan your implants, here is some food for thought!

Don't miss the third dimension: OPG and IOPA are unable to assess buccolingual width (Fig 1a). Similarly, crestal ridge variations (knife edged ridge/ irregularities/ unhealed socket), surface irregularities of the cortical bone and inclination of alveolar bone cannot be appreciated (Fig 1 b,c)

Small differences may go a long way: Measurements made on OPG may be

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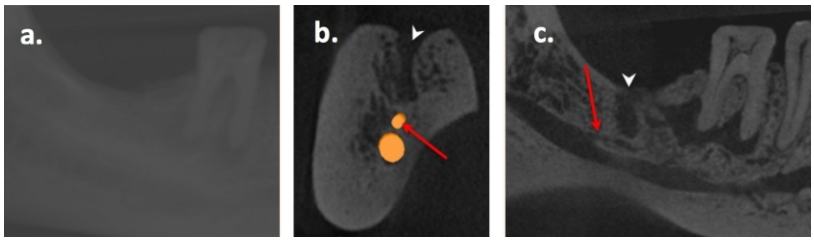

Fig 4 (a-c). OPG (a) of a patient referred for implant planning in 47 region, reveals no significant findings. On CBCT (b, c) however, a small branch of the mandibular nerve is seen extending into the 47 region (arrow). In addition, an unhealed socket (arrowhead) and extension of the periapical lesion of 46 into the 47 region is seen.

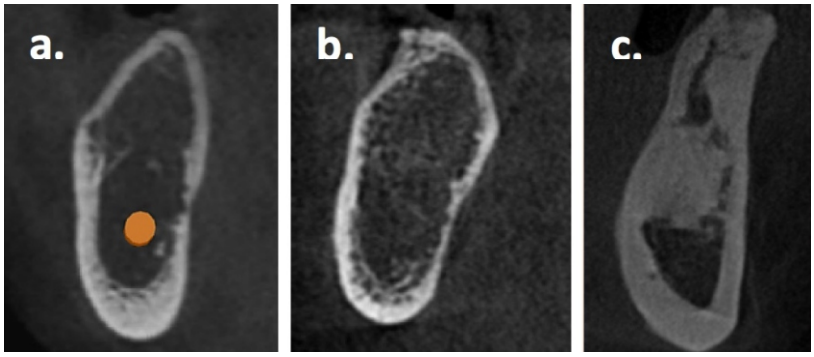

Fig 5 (a-c): CBCT (a,b) showing sparse trabeculation and decreased bone density. In another patient, CBCT shows patchy areas of sclerosis and increased bone density

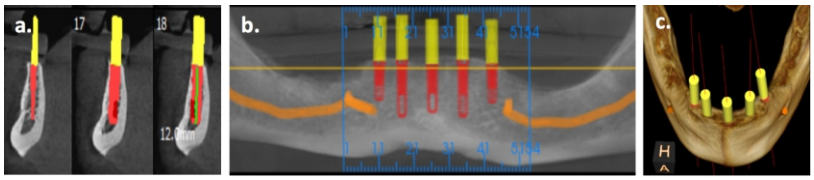

Fig 6 (a-c): Virtual implant planning of mandible as seen on CBCT in paraxial (a), panoramic (b) and 3D (c) images.

less accurate as distortion is more significant on OPG. Also, in some cases, superimposition of overlying structures may give inaccurate dimensions. For example, it is hard to assess the exact dimension of the maxillary resorbed ridge due to superimposition of the overlying bone (Fig 2).

Thinner is better: CBCT can provide sections as thin as 90µm. This can help detect small root remnants, incidental lesions, nerve canal or sinus variations, etc which may be missed on OPG/ IOPA (Fig 3,4).

Is the bone strong enough: It is well established that implant failure is associated with low bone density. With the help of CBCT, you can have a subjective analysis of bone density and trabecular pattern (Fig 5).

Other advantages of CBCT: CBCT uses software which is specific to dental use. You can now do nerve canal tracings, virtual implant simulations and have oblique and panoramic reformats (Fig 6).

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