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"Monday Morning Pearls of Practice by Bobby Baig"

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Fundamentals and Guidelines for CBCT Imaging: Part II

Dentoalveolar Region and Endodontics

CBCT Imaging in Dentoalveolar Region and Beyond:

Introduction:

The multiplanar images acquired by cone beam computed tomography (CBCT) provides an opportunity for radiologists to inspect the entire volume of the acquired image and the anatomic variations and abnormalities that can be found in the image volume. However, this responsibility is frequently neglected when interpreting images of areas at a distance from the dentoalveolar region, such as the full anatomical aspect of the maxillary sinus, vertebrae and other head and neck anatomical structures. Failure to detect incidental abnormalities is associated with the limited ability and experience of oral radiologists when interpreting volumetric images and negligence when undertaking a systematic visual scrutiny of the whole image, including the dentoalveolar region and all adjacent structures of the maxillomandibular complex. As with all other imaging, the decision to prescribe a CBCT scan must be based on the patient's history and clinical examination and justified on an individual basis. CBCT imaging can be used to augment clinical examination and conventional radiography in complex dentoalveolar conditions

Radiographic Incidental Findings on My Implant Patients:

A) Intracranial calcification of internal carotid arteries: Fig A and B:

1. Focal calcifications are visible lining the walls of the parasellar segments of the right and left internal carotid arteries.
2. These findings may represent signs of cerebral atherosclerosis, which could potentially increase the risk of future cerebrovascular events.
3. The significance of this finding cannot be determined based on CBCT imaging alone.

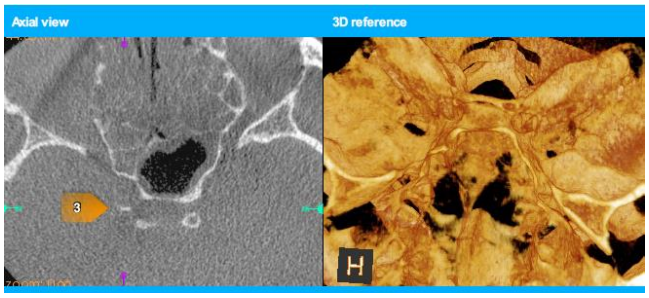

Fig A)

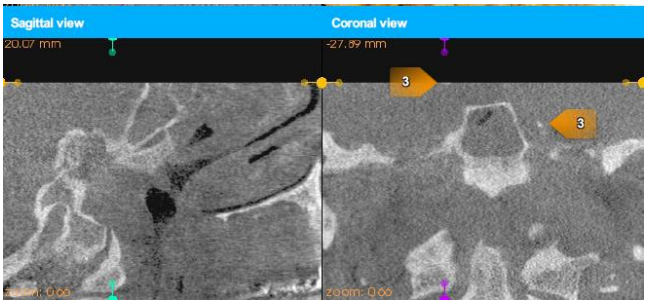

Fig B)

B) Pansinusitis: Fig C and D:

1. The ethmoid air cells and left maxillary sinus are completely opacified, and extensive mucositis is present in the right maxillary sinus and the sphenoid sinus.
2. This appearance is suggestive of pansinusitis. Referral to an ENT specialist is recommended for further evaluation.

Fig C)

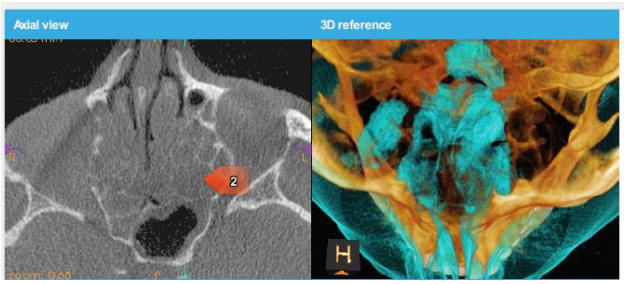

Fig D)

C) Mild cervical degenerative joint disease: Fig E and F:

1. Small osteophytes and mild subchondral sclerosis are present in the articular regions of the atlas and dens of the cervical vertebrae.
2. This is a common incidental finding with no clinical significance that is suggestive of mild cervical degenerative joint disease.

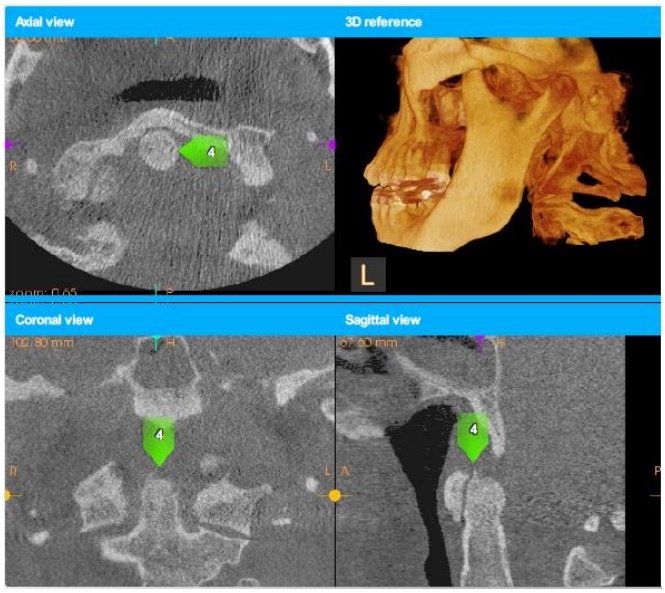

Fig E)

Fig F)

D) Maxillary sinus mucositis and calcified stylohyoid ligaments: Fig G-H:

1. Mild mucositis is present in both maxillary sinuses. This is a non-significant incidental finding. Fig G.
2. The stylohyoid ligaments are partially calcified bilaterally. This is an incidental finding with no clinical significance. Fig H.

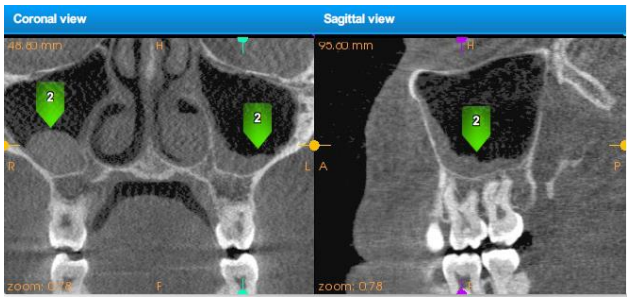

Fig G

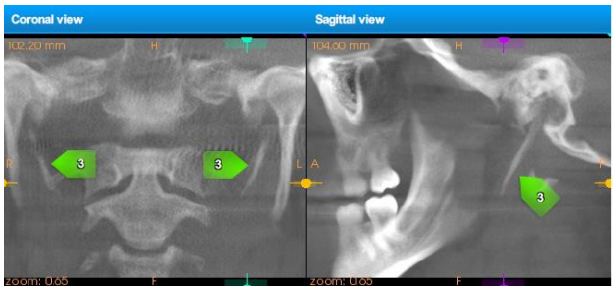

Fig H.

E) Mild cervical degenerative joint disease: Fig I and J

1. Small osteophytes and mild subchondral sclerosis are present in the articular regions of the atlas and dens of the cervical vertebrae.
2. This is a common incidental finding with no clinical significance that is suggestive of mild cervical degenerative joint disease.

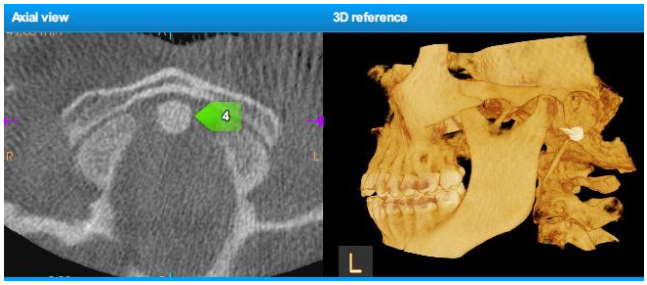

Fig I

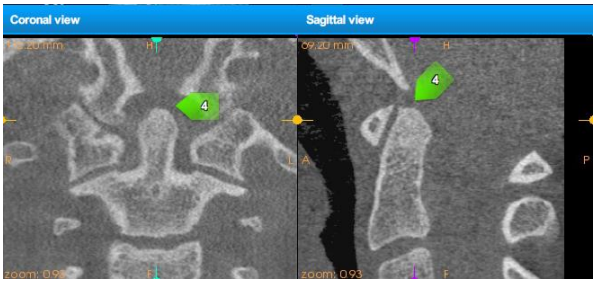

Fig J

Summary:

This above diagnostic information is discussed with the patient and this information is forwarded to patient's MD for additional evaluation and necessary treatment.

CBCT Imaging in Endodontics

Introduction:

Radiographic imaging is an indispensable component of endodontic diagnosis and treatment planning. It provides an assessment of pulpal morphology, recognition of periapical disease and the presence of anatomic variations in the root and surrounding periapical structures. Additionally, it provides assessment of internal and external root resorption, perforations and root fractures. The complex anatomy of the teeth and the surrounding periapical structures complicates radiographic interpretation of these pathologies on conventional 2-D intraoral and panoramic radiographs. CBCT imaging overcomes these limitations, and thus, has been used increasingly in endodontic diagnosis and treatment planning.

CBCT Influence in Endodontic Diagnosis and Treatment

The role of CBCT in some of these complex clinical situations is listed below.

1. CBCT provides valuable information on the presence of additional or accessory canals, the extent of canal calcification, an assessment of root curvature and the proximity of roots to adjacent vital structures such as the mandibular canal.
2. CBCT is particularly useful in investigating the potential cause for endodontic treatment failures. Several studies have demonstrated that CBCT is more accurate than periapical radiography to detect root fractures, periapical disease and root resorption.
3. CBCT imaging should be prescribed for patients who present with nonspecific or poorly localized clinical signs and symptoms of periapical pathology, but in whom conventional radiography fails to identify such pathology.
4. Diagnosis of VRF (Vertical root fracture) is often challenging, except when the clinical findings are distinctive. Several studies have examined the value of CBCT imaging to assess VRF.
5. Patients with dento-alveolar trauma may benefit from CBCT evaluation. In these patients, CBCT enables detection of root fractures, luxation, alveolar fractures and displacement of teeth.
6. CBCT imaging is particularly useful in evaluating root resorption.

Root Resorption and CBCT:

1. It allows differentiation of internal from external resorption.
2. It localizes the resorption, delineates its extent, identifies the presence and degree of root perforation and its location relative to the alveolar crestal margin.
3. CBCT imaging should also be contemplated for presurgical endodontic treatment planning. It localizes root apices and their proximity to adjacent anatomical structures.

Summary:

The diagnostic tasks in endodontic evaluations require high spatial resolution; for example, to detect accessory canals, root fractures and small root resorption or perforations. Often, the diagnostic area of interest is limited to a few adjacent teeth. Thus, a limited FOV is the preferred imaging protocol for most endodontic applications. When diagnostic information if not provided by conventional intraoral radiography and when the additional information from CBCT is likely to aid diagnosis and treatment planning

Continued in next editions; Diagnostic value of CBCT imaging guidelines for usage in, Orthodontics and implant dentistry…….

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