

Reporting Findings in the Cone Beam Computed Tomography Volume



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KEYWORDS

- Cone beam computed tomography • CBCT • Diagnostic • Reporting • Liability
- Interpretation

KEY POINTS

- It is the responsibility of health care providers to acquire information data from patients to best determine the health status of patients and if treatment is indicated and to provide a basis for informed patient consent.
- The use of CBCT for dental treatment planning poses a situation in which the additional data in the acquired image volume that are outside of the scope of the primary dental concern could detect systemic conditions that possibly have a direct influence on the overall health and longevity of a patient.
- Patients can make informed decisions about their health or dental care and treatment. The CBCT report becomes a component of the informed consent standard of care.
- Who provides the report may not be as important as whether or not a report is actually performed.
- The quality, accuracy, and use of a report are subject to medicolegal scrutiny, and knowledge of such issues determine whether or not a primary provider or a secondary radiology reader evaluates the image data and issues the final report.

INTRODUCTION

As in any disruptive technology introduced to a profession, the education lags far behind the technological advance. This is especially true of cone beam imaging. Dentists and dental professionals are quick to grasp the advantages and applications of using cone beam technology but, once adopted, often make the following statements:

These images are great, but what am I looking at? and

Where can I get more information on interpreting the scan?

Unfortunately, there is no easy answer and no quick way for dentists to re-educate themselves. Understanding CBCT takes time and effort and even some guidance.

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Manufacturers, also quick to understand the popularity of this technology, often fail to provide even the basic education that is necessary so that clinicians do not inadvertently cause harm to patients. Reporting the findings in a CBCT volume is probably the most essential process in the total diagnostic evaluation of a patient, even if it is something as simple as implant planning. Dentists and dental specialists must not be caught in the trap of only looking at the data they are interested in, such as an impacted tooth or implant site evaluation or characterization of some pathologic entity that they found in another radiograph. They must examine all the data in the scan and must do so in a systematic and somewhat regimented fashion.

This article is designed to help clinicians understand the process and expose them to the methodology the authors use and a software tool the authors developed to help dentists completely examine and report all findings in a scan and take the appropriate next steps when the findings dictate additional action, such as referral to a dental specialist or a colleague in the medical profession. This methodical, diagnostic approach is for precise communication with the referring clientele. When the authors examine and report findings in a 3-D scan, they are looking for occult pathology, that is, anything that might have an impact on a patient's health that the dentist needs to know about and sometimes takes action on.^{1,2} The authors cannot afford to miss an important finding or fail to communicate these findings to referring clinicians. For those individuals to examine their own data, this is also true. No clinician would be in trouble for misdiagnosing a condition or problem, but that same clinician is definitely placing himself or herself at risk for not examining the volume for these occult findings. The authors support each of the areas of discussion with cases from their files to illustrate the common and not so common findings discovered in cone beam scans and know this will be helpful to all dentists.

SYSTEMATIC REVIEW OF IMAGE DATABASE

- A. Confounds: axial sections, smaller field-of-view (FOV) confusion, and anatomy outside the dentists' comfort zone
- B. Suggested method of review

Confounds—Some of the Obstacles to Overcome When Examining the Volume

Most dentists carefully and systematically examine bitewings for interproximal carious lesions; periapical radiographs for signs of bone loss or apical problems; or panoramic images for dental, temporomandibular joint (TMJ), and sinus problems. Through training and clinical experience, they develop their own approaches for a systematic review of the radiographic images. All these images that they were taught to look at, however, are oriented in a sagittal anatomic plane of section. That is, all these images of a patient are looked at from the side. Cone beam data sets significantly alter this paradigm. The coronal and axial anatomic planes of section can also be viewed. Although the coronal plane is understandable, the axial plane of section is a significant departure from the dental paradigm. **Fig. 1** demonstrates a finding in the 3 planes of section.

In addition to the confound of these new planes of orientation, dentists were also informed by the manufacturers that a smaller FOV represented less diagnostic responsibility. Unfortunately, although this is true in most cases, an axial image from a limited field cone beam machine, such as the unilateral capture of the TMJ condyle, when seen in an axial orientation, is confusing. **Fig. 2** illustrates this point.

Another obstacle dentists must overcome is educating themselves to look beyond the dental bases to anatomic regions with which they are less familiar. These include

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