F35 Comparison of the Diagnostic Accuracy of Cone Beam Computed Tomographys (CBCTs) and Orthopantomographs (OPGs): Clinical and Medicolegal Issues

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After attending this presentation, attendees will understand the evidence of the greater value of the CBCTs in the diagnostic resolution of pathological conditions in comparison to the OPGs.

This presentation will impact the forensic science community by suggesting the use of CBCT in some clinical circumstances as a consequence of the drastic reduction of the dose of exposure to X-rays permitted by the most recent radiographic devices and the reduction of the cost of a single examination.

Background: The OPG is the most widespread prescribed radiological examination. The introduction of digital imaging has allowed the reduction of the exposure dose and an important improvement in the quality of the images. Moreover, some three-dimensional radiological examinations, CBCTs among them, are used more often in dental diagnostic routines since they are a relatively inexpensive and easily accessible tool and provide for an accurate examination. Particularly, a CBCT scan allows one to accurately detect the site and dimension of oral pathological conditions which OPGs cannot definitely recognize, and implies very low radiation doses in comparison to the traditional CT. As such, the CBCT scan may become a recommended procedure in specific clinical conditions and omitting its use may raise medicolegal and ethical issues.

Goal: The goal of the present study is to evaluate the different diagnostic accuracies of CBCT compared with a digital OPG.

Materials and Methods: A total of 187 upper and lower dental arches CBCTs and OPGs, performed for ordinary clinical purposes in the same day, in the same radiology office, and with the same devices, have been submitted for the comparison to two general dentists. The operators examined the OPGs first and the CBCTs one week later, and listed in detail every detectable oral pathological condition or anomaly (transparencies, opacities, etc.). The difference in diagnostic accuracy between the two exams has been evaluated. The intra-operator variability has also been evaluated re-submitting 10% of the exams to the operators after two weeks. The inter-operator variability is also evaluated.

Results: The research is still in progress; however, it is already clear that the CBCT exam obtains a more accurate diagnostic evaluation of the oral clinical conditions than the OPG exam. The CBCT reveals more precisely the site and the actual dimensions of the pathological processes of the maxillary bones, which are only poorly or not at all detectable by the OPG. In most samples, at least one lesion not revealed by OPG is clearly shown by the CBCT, especially for periapical radiotransparencies of endodontically treated teeth. The most striking cases will be described and discussed. The ethical as well as the medicolegal implications will be discussed in terms of appropriateness of the two different radiological examinations, given their radiation dose, the costs and the difference in accuracy and efficacy in specific diagnostic procedures. The related medicolegal issues deserve further discussion to define the different radiological approaches and the possible implications in terms of standard of care.

Orthopantomograph, CBCT, Medicolegal Issues

