

Dento-maxillofacial radiology as a specialty

Kıvanç Kamburoğlu

Kıvanç Kamburoğlu, Department of Dentomaxillofacial Radiology, Faculty of Dentistry, Ankara University, 06560 Ankara, Turkey

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Correspondence to: Kıvanç Kamburoğlu, DDS, MSc, PhD, Associate Professor, Department of Dentomaxillofacial Radiology, Faculty of Dentistry, Ankara University, Döğol Caddesi, 06560 Ankara, Turkey. dkivo@yahoo.com

Telephone: +90-312-2965632

Fax: +90-312-2123954

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Core tip: Dento-maxillofacial radiology is one of the dental specialties recognized under different names and divisions by around forty countries in the world. It includes, intra-oral imaging, dental panoramic imaging, cephalometric imaging, sialography, cone beam computed tomography (CT), multislice medical CT, ultrasonography, magnetic resonance imaging, positron emission tomography and nuclear medicine. All over the world, assigned committees work on the development of the training curriculum, determination of scientific and physical standards for institutions offering specialty training and arrangement of dental codes for reimbursement issues.

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Abstract

This editorial discusses a relatively new specialty in dental and medical field namely dentomaxillofacial radiology. As a relatively newborn specialty it is obvious that there is a long way to go before dentomaxillofacial radiology is commonly known and respected by the society. All over the world, assigned committees work on the development of the training curriculum, determination of scientific and physical standards for institutions offering specialty training and arrangement of dental codes for reimbursement issues. Furthermore, adjustment of educational, scientific and legal regulations and prospective benefits are expected to boost this specialty's attractiveness to colleagues' worldwide.

DENTO-MAXILLOFACIAL RADIOLOGY AS A SPECIALTY

Dento-maxillofacial radiology is one of the dental specialties recognized under different names and divisions by around forty countries in the world. Diagnostic imaging techniques have always been a tremendous asset in clinical dentistry. Since the early 1900s, dental faculties in developed world have been engaged in teaching Oral Radiology^[1]. It includes, intra-oral imaging, dental panoramic imaging, cephalometric imaging, sialography, cone beam computed tomography (CBCT), multislice medical computed tomography, ultrasonography (US), magnetic resonance imaging (MRI), positron emission tomography and Nuclear Medicine. Also, application of

computer aided and image guided procedures with Haptic and Robotic devices are in progress^[2]. In addition, visible light, optical coherence tomography, and terahertz imaging are other methods in use or under development^[3,4].

Intraoral imaging, continues to provide the best spatial resolution of any imaging method currently available. Also, panoramic radiography is a commonly used two-dimensional technique which gives the broad view of both jaws without the detail offered by the intraoral images. In response to the high demand for a technique that could provide three-dimensional data at a lower cost and with lower radiation doses than the conventional computed tomography used in medical radiology, CBCT was developed specifically for dento-maxillofacial imaging. A spate of revolutionary CBCT applications reached the dental market in the 2000s, marking the beginning of a new era in the field of dento-maxillofacial radiology. New technological specifications and settings include multiple field of views and voxels that can better address a variety of specific tasks. There are also several hybrid machines offering CBCT imaging along with panoramic and cephalometric radiography. CBCT has come into common use for a variety of purposes in the fields of endodontics, dental implantology, dento-maxillofacial surgery and orthodontics^[5].

On the other hand, scientists have also been searching for safer and comparable alternative imaging modalities to X-ray imaging due to increasing concerns regarding radiation dose and economic limitations. In this context, MRI and US were introduced and now widely utilized for a variety of tasks in medicine. MRI is a powerful and versatile imaging modality and most work in the field of dental MRI aimed at imaging soft tissues and imaging of the morphology and function of the temporomandibular joint^[6]. Recent development of the US equipment enables the visualization of fine detail of the surface structure of the oral and maxillofacial tissues without the use of ionizing radiation. In the field of dentistry, US technique can be used in clinical practice for bone and superficial soft tissue examination, major salivary gland or duct stone and salivary gland lesion detection, temporomandibular joint imaging, detection of fractures and vascular lesions, lymph node examination, measurement of the thickness of muscles and visualization of vessels of the neck including the carotid for atherosclerotic plaques. More recently, development of three-dimensional US imaging allowed multiplanar reformatting, volume rendering and color power doppler (CPD). In endodontics, CPD is used in the evaluation of periapical lesions and follow up of periapical bone healing and for differentiation between vital and root filled teeth. US imaging is also used to

guide fine-needle aspiration biopsy in the neck with the advantage of low cost, ease of usage and radiation safety. Ultrasound provides a number of advantages for dento-maxillofacial imaging when compared to other advanced imaging modalities such as; absence of harmful ionizing radiation, portability, possibility of dynamic and repeated examinations and relatively low cost^[7].

Depending on the imaged area, diagnostic images obtained from the dento-maxillofacial region may show part or the entire nasal cavity, paranasal sinuses, airway, cervical vertebrae and temporal bone. Finally, even when scans are taken for primarily unrelated reasons, assessment of the all imaged area, should always be performed in order to rule out any significant pathological changes. Incidental findings require follow-up, and further treatment options may be identified in conjunction with clinical findings, including referral to a specialist not directly linked to the field of dentistry, where appropriate.

As a relatively newborn specialty it is obvious that there is a long way to go before dento-maxillofacial radiology is commonly known and respected by the society. All over the world, assigned committees work on the development of the training curriculum, determination of scientific and physical standards for institutions offering specialty training and arrangement of dental codes for reimbursement issues. Furthermore, adjustment of educational, scientific and legal regulations and prospective benefits are expected to boost this specialty's attractiveness to colleagues' worldwide.

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