Essential concepts in oral radiology: A comprehensive overview.

Gokhan Ebren*

Department of Oral and Maxillofacial Radiology, Qazvin University of Medical Sciences, Iran

Introduction

Oral radiology, also known as dental radiology or maxillofacial radiology, is a crucial aspect of modern dentistry. It plays a pivotal role in diagnosing and managing various oral and maxillofacial conditions. This comprehensive overview delves into the essential concepts that underpin oral radiology, shedding light on its importance, techniques, and applications. Oral radiology is indispensable in the field of dentistry for several reasons. First and foremost, it allows dental professionals to visualize structures that are not visible during clinical examinations. This is especially critical when dealing with conditions that affect the internal components of teeth, bone, and soft tissues [1].

Several radiographic techniques are employed in oral radiology, each serving a specific purpose. Here are some of the most common ones: Intraoral Radiography: Intraoral radiographs are taken inside the patient's mouth and are primarily used to assess individual teeth. The two main types are periapical and bitewing radiographs. Periapical radiographs focus on a single tooth and show its entire length, from crown to root tip. Bitewing radiographs, on the other hand, capture the crowns of upper and lower teeth in a single image, helping to detect interdental caries [2].

Panoramic Radiography: Panoramic radiographs provide a comprehensive view of the entire oral and maxillofacial region. They are particularly useful for evaluating the status of wisdom teeth, detecting jaw fractures, and planning orthodontic treatment. Cone Beam Computed Tomography (CBCT): CBCT is a three-dimensional imaging technique that offers detailed views of the oral and maxillofacial structures. Extraoral Radiography: Extraoral radiographs are taken from outside the mouth and include techniques like cephalometric radiography and lateral skull radiography [3].

Radiation safety is a paramount concern in oral radiology. To ensure safety, modern digital radiography systems are designed to use the lowest possible radiation dose while still producing high-quality images. Lead aprons, thyroid collars, and rectangular collimation are employed to shield and limit the exposure area. Dental professionals must adhere to ALARA (As Low As Reasonably Achievable) principles when obtaining radiographs, which means using the lowest radiation dose necessary to achieve the diagnostic image quality [4].

Interpreting radiographic images is a specialized skill that requires training and experience. Here are some common findings that may be observed in oral radiographs: Caries: Dental caries, or cavities, appear as dark areas on radiographs, typically in the enamel or dentin. Periodontal Disease: Radiographs help assess the bone level around teeth, aiding in the diagnosis and management of periodontal diseases. Tumors and Cysts: Oral radiographs can identify abnormal growths in the jaws, allowing for early diagnosis and appropriate referrals. Orthodontic Assessment: Radiographs are essential for orthodontic treatment planning, allowing orthodontists to evaluate tooth position and jaw alignment [5].

Conclusion

In summary, oral radiology is an integral part of modern dentistry, providing invaluable insights into oral and maxillofacial conditions. It enables early diagnosis, treatment planning, and monitoring while emphasizing radiation safety. With various radiographic techniques at their disposal, dental professionals can deliver better patient care by ensuring accurate diagnoses and effective treatments. As technology continues to advance, the field of oral radiology will likely see further enhancements, making it an exciting and essential aspect of dentistry.

Reference

1. Bueno MR, Azevedo BC, Estrela C. A Critical Review of the Differential Diagnosis of Root Fracture Line in CBCT scans. Braz Dent J. 2021;32:114-28.

2. Ramezani K, Tofangchiha M. Oral cancer screening by artificial intelligence-oriented interpretation of optical coherence tomography images. Radiol Res Pract. 2022;2022.

3. Hung K, Yeung AW, Tanaka R, et al. Current applications, opportunities, and limitations of AI for 3D imaging in dental research and practice. Int J Environ Res Public Health. 2020;17(12):4424.

4. Bamgbose BO, Suwaid MA, Kaura MA, et al. Current status of oral and maxillofacial radiology in West Africa. Oral Radiol. 2018;34:105-12.

5. Hung KF, Ai QY, Leung YY, et al. Potential and impact of artificial intelligence algorithms in dento-maxillofacial radiology. Clin Oral Investig. 2022;26(9):5535-55.