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Case Report

Journal of Critical Care Research and Emergency Medicine

The Integral Role of Radiography in Dentistry: Diagnosis and Treatment Planning

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Submitted: 30 October 2024 **Accepted:** 06 November 2024 **Published:** 14 November 2024

Citation: *Shiun-Yen Wu. (2024). The Integral Role of Radiography in Dentistry: Diagnosis and Treatment Planning. J Cri Res & Eme Med, 3(6), 01-03.*

Abstract

Radiography stands as an indispensable tool in contemporary dentistry, serving as a cornerstone for precise diagnosis and strategic treatment planning. This paper delves the critical significance of radiographic imaging techniques within the dental field, emphasizing their pivotal role in the identification of dental pathologies, evaluation of treatment alternatives, and facilitation of informed decision-making processes. Through a comprehensive examination of various radiographic modalities, including periapical radiography and panoramic radiography, this study elucidates their distinct advantages and applications across diverse clinical contexts. Moreover, the seamless integration of advanced imaging technologies with digital platforms has ushered in a new era of enhanced visualization, manipulation, and storage of radiographic data, revolutionizing dental practice. Additionally, the paper underscores the paramount importance of implementing radiation safety protocols and fostering ongoing education and training initiatives among dental professionals to ensure proficient interpretation and utilization of radiographic findings. Ultimately, this paper underscores the indispensable role of radiography in dentistry, highlighting its pivotal contribution to precise diagnosis and optimal treatment outcomes.

Keywords: Radiography, Diagnosis, Treatment Planning

Introduction

Nowadays, radiography is an indispensable tool in contemporary dentistry, essential for precise diagnosis and strategic treatment planning. Radiographic imaging techniques are critical in evaluating the extent and severity of dental issues. In cases where caries has progressed to the pulp chamber; for instance, radiographs reveal the degree of the carious invasion, helping clinicians determine the necessity of endodontic treatment [1]. Additionally, radiographic imaging can detect periodontal and periapical pathologies, such as bone loss and periapical inflammation, which influence the treatment plan and prognosis [2]. This case highlights the importance of a multidisciplinary approach in managing complex dental pathologies. Caries-induced pulptitis is a common dental condition characterized by the inflammation of the dental pulp due to bacterial invasion resulting from untreated dental caries [3]. When the caries extends to the pulp chamber, it can lead to irreversible damage and necessitate endodontic intervention [4]. In this case where the carious lesion extends to the level of the alveolar bone, the management becomes more challenging, often requiring a combination of surgical and endodontic approaches. This paper illustrated the essential role of radiography in dentistry, showing its critical contribution to diagnosis and leading to effective treatment outcome.

Case Presentation

A 45-year-old female presented to the dental clinic with complaints of persistent pain in the upper left posterior region. Clinical examination revealed a deep carious lesion involving tooth #25 (maxillary left second premolar) with the cavity extending to the level of the alveolar bone. Upon cold test, the tooth elicited a lingered pain, indicating irreversible pulpitis.

Treatment Plan: A multidisciplinary treatment approach was planned, involving periodontal surgery, endodontic therapy, and prosthetic restoration. The treatment plan included the following steps: Crown Lengthening: Periodontal surgery was performed to expose an adequate amount of tooth structure for restoration by crown lengthening procedure. Endodontic therapy: After

crown lengthening, endodontic treatment was initiated. Access to the pulp chamber was achieved, and thorough cleaning and shaping of the root canals were performed followed by obturation with gutta-percha. Crown restoration: Once the endodontic therapy was completed, the tooth was restored with a custom-made crown to restore its form and function.

Figure 1: Panoramic X-ray at first visit.

- Missing tooth: 18 28 38 47
- Carious tooth: 25(secondary caries involving pulp at bone level, PDL widening, no apical lesion).
- Generalized horizontal bone loss. 36 presents furcation bony loss.
- Several subgingival calculus can be noticed.

Figure 2: Bite-wing X-ray at first visit

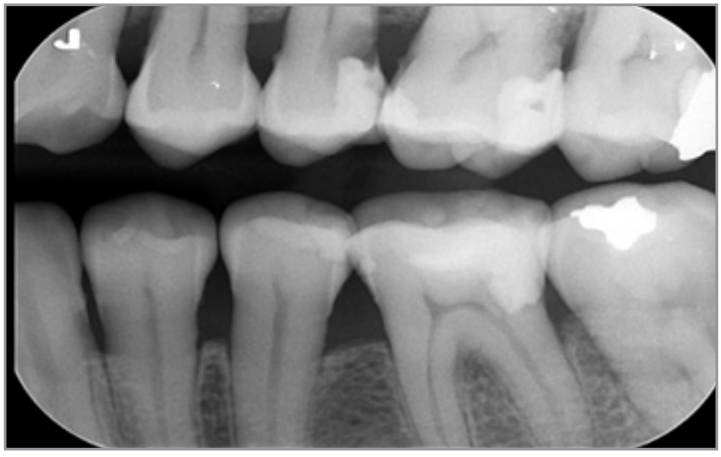

Figure 3: Bite-wing X-ray after CLP and endodontic procedure

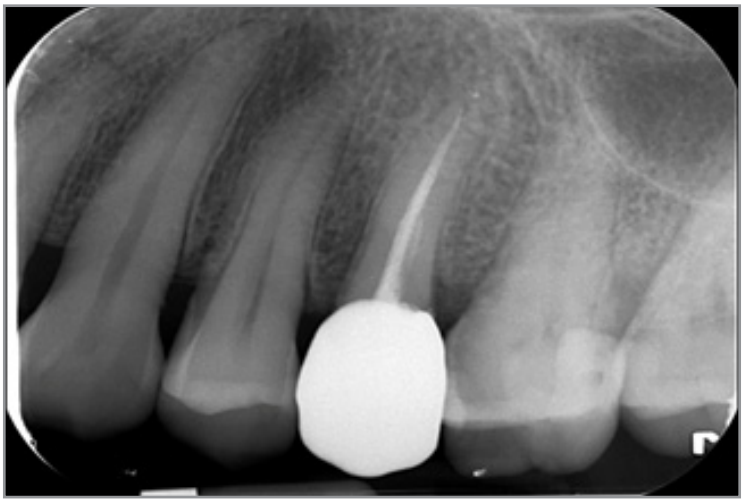

Figure 4: PA Xray after prosthetic restoration

Discussion and Conclusion

Radiographs provided valuable information regarding the extent of the carious lesion, periapical involvement, and bone loss, which influenced the treatment planning and prognosis. One of the significant advantages of radiographs was their ability to visualize the extent of caries and its relationship with the pulp chamber. In this case, the radiolucency extending to the pulp chamber indicated irreversible damage, necessitating endodontic intervention. This information was vital in determining the need for root canal therapy and guiding the access to the pulp chamber during the procedure. Additionally, radiographs provided valuable insights into periapical health and the presence of periapical pathology. The evidence of periapical rarefaction on radiographs indicated periapical inflammation and potential involvement of the periapical tissues. This finding emphasized the importance of addressing not only the pulpal pathology but also the periapical pathology to ensure successful treatment outcomes and long-term tooth survival. Furthermore, radiographs aided in explaining the pathological condition to the patient in a visual way. Moreover, radiographs served as essential tools for monitoring the healing process and assessing the integrity of the periapical tissues and the restoration postoperatively. Regular follow-up radiographs allowed for the evaluation of periapical health, detection of potential complications, such as recurrent caries or periapical pathology, and timely intervention if needed. In conclusion, the integration of radiographic findings into the clinical decision-making process was paramount in the successful management of caries-induced pulptitis with bone-level cavity involvement. Radiographs provided critical information regarding the extent of the carious lesion, periapical health, and bone loss, which guided the treatment approach, facilitated interdisciplinary communication, and ultimately contributed to achieving favorable treatment outcomes and preserving natural dentition.

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