

# Comparison of Technique Errors of Intraoral Radiographs Taken on Film v Photostimulable Phosphor (PSP) Plates

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## Introduction

Digital receptors are replacing film in dentistry. Because of the physical similarity of the photostimulable phosphor (PSP) plate to film, the PSP is a popular digital receptor when converting to a digital environment (1). For conventional film, the incoming X-ray photons interact with silver halide crystals in the film emulsion to generate latent images, which become visible images after chemical processing. The PSP system uses a plate covered with phosphor crystals. The phosphor crystals absorb energy from X-ray photons and store the energy as a latent image. The latent image is scanned by a laser beam, releasing the stored energy in the form of blue light. The blue light is processed by a photo-multiplier and converted into electronic signals and finally digitized (2).



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## Abstract

**Objective:** The objective of this study was to compare the technical errors of intraoral radiographs exposed on film v photostimulable phosphor (PSP) plates.

**Methods:** The intraoral radiographic images exposed on phantoms from preclinical practical exams of dental and dental hygiene students were used. Each exam consisted of 10 designated periapical and bitewing views. A total of 107 film sets and 122 PSP sets were evaluated for technique errors, including placement, elongation, foreshortening, overlapping, cone cut, receptor bending, density, mounting, dot in apical area, and others. Some errors were further subcategorized as minor, major, or remake depending on the severity. The percentages of radiographs with various errors were compared between film and PSP by the Fisher's Exact Test.

**Results:** Compared with film, there was significantly less PSP foreshortening, elongation, and bending errors, but significantly more placement and overlapping errors. Using a wrong sized receptor due to the similarity of the color of the package sleeves is a unique PSP error.

**Conclusions:** Optimum image quality is attainable with PSP plates as well as film. When switching from film to a PSP digital environment, more emphasis is necessary for placing the PSP plates, especially those with excessive packet edge, and then correcting the corresponding angulation for the beam alignment. Better design for improving intraoral visibility and easy identification of different sized PSP will improve the clinician's technical performance with this receptor.

**KEY WORDS:** intraoral, radiography, film, PSP

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## CASE REPORT

# Evaluation of an Ameloblastic Fibro-Odontoma with Cone Beam Computed Tomography

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## Introduction

The ameloblastic fibro-odontoma (AFO) is classified as a benign mixed odontogenic tumor that usually does not demonstrate aggressive growth (1,2,3). Histologically, the AFO resembles an ameloblastic fibroma but also contains enamel and dentin consistent with those of a complex odontoma (2,4,5,6). AFO's are not common odontogenic neoplasms (7,8,9). The reported frequency among odontogenic tumors is 1-3% (1,4). Ameloblastic fibro-odontomas occur primarily in the posterior region of the jaws of chil-



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## Abstract

**Background:** The clinical presentation, radiographic features, and histopathological findings of a case of ameloblastic fibro-odontoma are described. The clinical and radiographic presentations of this case are typical of this benign odontogenic tumor. The patient was young and asymptomatic with the exception of the clinical absence of the permanent mandibular left first molar. Treatment consisted of simple enucleation with removal of the primary mandibular left second molar.

**Methods:** A panoramic image and cone beam computed tomography (CBCT) scan were acquired in order to determine the reason for clinical absence of the permanent mandibular left first molar. The CBCT image proved to be a valuable supplement to the conventional radiographic examination as it provided information not apparent on the 2-dimensional panoramic image. Both the extent of the lesion and its effects on adjacent structures were better delineated with CBCT. Additionally, the presence of calcifications, an important radiographic characteristic of this particular lesion, were visible on CBCT versus the panoramic image.

**Conclusions:** This case report demonstrates that the CBCT scan provided important management and treatment planning information that was not apparent in the panoramic image.

**KEY WORDS:**  
cone-beam computed tomography,  
radiology, odontogenic tumors

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# Biologically Based Treatment of Immature Permanent Teeth with Pulpal Necrosis: A Case Series

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## Introduction

Although contemporary nonsurgical endodontic procedures confer high degrees of clinical success (1, 2), the root canal system is obturated with synthetic materials, preventing any of the advantages that might ensue by regeneration of a functional pulp-dentin complex (3). This is a particular problem when treating the necrotic but immature permanent tooth, where conventional treatment often leads to resolution of apical periodontitis, but the tooth remains susceptible to fracture (4) as a result of interruption of apical and dentinal wall development. Thus, one alternative approach would be to develop and validate biologically based endodontic procedures designed to restore a functional pulp-dentin complex.

For more than 50 years, clinicians have evaluated biologically based methods to restore a functional pulp-dentin complex in teeth with necrotic root canal systems caused primarily by trauma or caries. Although case series from the 1960s–1970s in general were not successful in producing this outcome, it should be appreciated that they were performed without contemporary instruments or materials and without insight generated from the trauma or tissue engineering fields (5–7). More recent case reports, published during the last 15 years, have demonstrated that it is possible in humans to restore a functional pulp-dentin complex in the necrotic immature permanent tooth (8–13). Human histologic studies have not yet been reported, so it is not known whether

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## Abstract

This case series reports the outcomes of 8 patients (ages 9–14 years) who presented with 9 immature permanent teeth with pulpal necrosis and apical periodontitis. During treatment, 5 of the teeth were found to have at least some residual vital tissue remaining in the root canal systems. After NaOCl irrigation and medication with ciprofloxacin, metronidazole, and minocycline, these teeth were sealed with mineral trioxide aggregate and restored. The other group of 4 teeth had no evidence of any residual vital pulp tissue. This second group of teeth was treated with NaOCl irrigation and medicated with ciprofloxacin, metronidazole, and minocycline followed by a revascularization procedure adopted from the trauma literature (bleeding evoked to form an intracanal blood clot). In both groups of patients, there was evidence of satisfactory post-operative clinical outcomes (1–5 years); the patients were asymptomatic, no sinus tracts were evident, apical periodontitis was resolved, and there was radiographic evidence of continuing thickness of dentinal walls, apical closure, or increased root length.

**KEY WORDS:** endodontics, immature permanent tooth, open, apex, regeneratives, revascularization, stem cell

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