Panoramic radiograph a valuable diagnostic tool in dental practice-Report of three cases
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Abstract
Many pathologic conditions remain asymptomatic and observed only when they cause soft or hard tissue expansion or is secondarily infected. Routine panoramic views very often reveal hidden lesions other than those related to the patient’s chief complaint. The present case series reports three cases wherein pathologic conditions remain undetected due to lack of appropriate radiographic evaluation even after multiple dental procedures.

Key Words: Panoramic Radiographs; Dental; Diagnostic Yield

Introduction
Routine panoramic views very often reveal hidden lesions other than those related to the patient’s chief complaint. There have been sporadic case reports of such incidental discovery of lesions.(1-3) Many pathologic conditions remain asymptomatic and observed only when they cause soft or hard tissue expansion or is secondarily infected. This delay in detection increases morbidity and mortality associated with the disease and treatment. It is prudent to evaluate indicated cases with radiographs prior to dental treatment which might reveal incidental pathologies/findings helping to achieve early diagnosis and treatment. The present manuscript reports three cases where pathologic conditions remain undetected even after multiple dental visits along with a discussion on the versatility of panoramic radiograph in screening and early detection of many clinical problems.

Case 1
A 44 year old female patient reported to our center with a complaint of dull aching continuous pain in the left side of face for last two years. She had two decayed teeth in the left side of maxilla and underwent root canal treatment in a dental clinic. As the pain persisted she was referred to a maxillofacial surgeon for the management of temporomandibular joint pain. TMJ being found to be clinically normal she was referred to a periodontist who ruled out any periodontal involvement.

Clinical examination revealed fractured 25, 26 and mild obliteration of the upper buccal vestibule on the left side. Panoramic radiograph was advised which revealed endodontically treated 25, 26. Well circumscribed lesion with mixed radio opacity and radiolucency was observed apical to 25 and 26 pushing the maxillary sinus superiorly. Horizontally Impacted 18 was also observed deep to the alveolar crest. Lesion was enucleated under General anesthesia and submerged 18 was also removed. Histopathology examination of the lesion revealed a complex odontoma.

Case 2
A 33 year old female patient was presented with pain and swelling on the right side of maxilla. She noticed the swelling one month back and took antibiotics as per her dentist’s advice. She had one of her lower tooth extracted 4 years back, oral prophylaxis was done two years back and amalgam filling on two teeth a year back.

Panoramic radiograph of the patient revealed impacted right maxillary third molar in the right maxillary sinus close to medial wall with well circumscribed radiolucency surrounding the crown of the impacted tooth. Lesion was enucleated along with removal of the tooth and histopathology report confirmed it as dentigerous cyst.

Case 3
A 31 year female patient presented with abnormal mobility of two lower teeth (36 and 37) on left side which was restored five years back and had no history of extraction. Her left third molar was missing clinically.
Panoramic radiograph was advised which revealed a very extensive multilocular radiolucent lesion extending from second premolar till condyle. Root resorption was noted on 35, 36 and 37. The 38 was found close to the coronoid process. Incisional biopsy revealed an ameloblastoma of follicular type.

**Discussion**

Panoramic images are useful clinically for those patients requiring broad coverage of the jaws, such as evaluation of trauma, extensive dental or osseous disease, known or suspected large lesions, location of third molars, evaluation of missing teeth, teeth development and eruption status, retained tooth and root tips in edentulous patients, maxillary sinus and temporomandibular joint affictions and developmental anomalies like prognathism and retrognathism. Panoramic imaging is often used as the initial evaluation image that can provide the required insight and assist in determining need for other projections.

One of the strengths of the panoramic image is the demonstration of the complete dentition and allows diagnosing gross abnormalities in number, position and anatomy of the teeth. Panoramic radiographs reveal the proximity of impacted teeth with vital structures like inferior alveolar canal, floor and posterior wall of maxillary sinus, maxillary tuberosity and adjacent teeth. Above all patients readily understand the image and are useful visual aid in patient education.

In all three cases patients have visited dental clinics for various dental problems and taken routine dental treatments like oral prophylaxis, restorations, root canal treatments and extractions. Number of visits ranged from three to more than ten. None of the cases was evaluated with panoramic radiographs even in those patients with missing wisdom teeth and over retained deciduous teeth.

Panoramic radiographs cover a broad area of facial bones and teeth with low radiation dose.(4) Relative exposures dose from panoramic radiography has been estimated at 6.7 microSv and 26microSv carrying an associated risk of inducing fatal cancer of 0.21 and 1.9 cases per million examinations respectively.(5)

The main disadvantage of panoramic radiology is that the images does not display the fine anatomic details and so it cannot replace periapical radiograph or bite wing radiography in detecting small carious lesions or early periodontal and periapical lesions. Other problems include unequal magnification and geometric distortion across the image. The presence of cervical spine can obscure the image particularly in the incisor region.(6) Rushon et al suggested the following clinical factors as being the best predictors of a diagnostic yield of significance to treatment. Clinical suspicion of teeth with periapical pathology, presence of partially erupted teeth, clinically evident caries lesions swelling and clinically suspected unerupted teeth.(7) Asaumi et al observed lesions in 12.8% among 1092 patients in a retrospective study in pediatric population and among this 47.1 % had different lesions from those underlying the chief complaint.(1)

Panoramic radiographs are a valuable tool in early identification of problems in dental development during the mixed dentition stage. This gives information regarding dental maturity, leeway space, the eruption of permanent teeth, anomalies and developmental disturbances.(8)

Panoramic radiographs are used in assessment of root length and tooth axis prior to orthodontic treatment. It has been observed that the mean length measured were higher than the actual length by 22% for maxillary teeth and 1% by mandibular teeth.(9) There is a chance of overlooking significant dental abnormalities in the premaxillary area in a panoramic radiograph even though the chance is 43%. (10) Panoramic radiographs are used in forensic age estimation of unaccompanied minors, but this should be combined with hand and collar bone radiographs for better accuracy.(11) Mucousal thickening and mucosal antral cysts in the maxillary sinus are very frequent incidental finding in panoramic radiographs, dental infections are highly correlated with antral mucosal thickening.(12) Panoramic radiographs reveal calcified carotid artery atheromatous lesions in diabetic patients and help the dentist for appropriate referral for diabetic care.(13) Alteration of mandibular inferior cortical width and shape in panoramic radiographs in post-menopausal women is an accepted predictor of spinal osteoporosis.(14) A reliable diagnostic accuracy in panoramic radiographs is observed in preoperative evaluation of the relationship between third molars and the inferior alveolar canal.(15) Careful observation of panoramic radiographs could reveal temporomandibular joint pathologies like aneurismal bone cyst, traumatic bone cyst, and synovial chondromatosis and TMJ arthrosis.(16)

**Conclusion**

Panoramic radiographs are indeed a valuable tool in early detection of lesions in the maxillofacial area. Considering the radiation dose involved in the panoramic radiograph, and its diagnostic yield, routine examination by panoramic...
radiograph on the initial clinical visit may be useful in early detection of various pathologic conditions.

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