



Research Article

Pathological Findings on Dental Panoramic Tomograms of Edentulous Patients Seen at a University Hospital

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Abstract

Objective: To describe pathological findings on pre-treatment dental panoramic tomograms of edentulous jaws taken before complete denture treatment.

Design: Descriptive cross-sectional study.

Setting: Prosthetic division, Department of Conservative and Prosthetic Dentistry, School of Dental Sciences, University of Nairobi.

Results: Data was obtained from clinical records and OPGs of 163 edentulous patients seen at the prosthetic clinic between 2010 and 2016 for complete denture therapy. From history and examination alone, clinicians reported significant findings on 50.3% of records, while 43.6% had no such findings. Ten (10) (6.1%) records were unclear. Examination of OPGs revealed 79.1% of the films had no pathological findings while in 20.9% had. Most of the findings (70.0%) were retained roots, 6% were radio-lucencies, 12% were other radio-opacities, 9% were impacted teeth while 3% had both retained root and radio-opacity. Most pathologies (64%) were located in the posterior region of jaws while the other findings were evenly distributed in the anterior and posterior regions of the jaws. There was no predilection of pathological findings to any other factor other than gender. In 83.4% records, queries on clinical notes coincided with significant findings on OPGs; while 16.6% were either unclear or did not coincide. Most (71%) OPG findings led to modification of treatment plan.

Conclusion: Pathological findings are common on pre-treatment OPGs. It may be good practice to take an OPG for edentulous patients prior to complete denture therapy where such services are available, to prevent complications from intra-bony pathologies. However, Most of the findings are either detectable by clinical exam or may not be of major consequence to the health of patients. Complete denture may be done without OPGs for new and old denture wearers where the service is not available.

Introduction and Literature Review

For effective treatment planning, an edentulous person requires history, clinical examination and relevant radiological examination. The dental and medical history, extra-oral and intra-oral examination informs the investigation that the clinician may carry out. The purpose of investigation is to enable the clinician to acquire more information about conditions that may have arisen from the history and dental examination. The investigations may also enable the clinician to detect any other factors that may influence the treatment planning that may not have been detected during the history and examination. OPGs are cost effective and when performed properly, can provide valuable information about the jaws. Information that may be obtained from an OPG for edentulous persons include retained root stamps, embedded teeth,

size of the residual alveolar ridge, radio-lucent and radio-opaque lesions, the position of mental foramen, maxillary sinus and other vital structures on the alveolar ridge, among others. Consequently, taking an OPG before complete denture construction in edentulous patients has become routine in many clinical settings. However, radiographic examination of asymptomatic edentulous patients has come under criticism owing to the cumulative effects of radiation exposure with some arguments that only those patients with symptoms should undergo radiographic evaluation before fabrication of complete dentures [1,2]. The value of detected asymptomatic anomalies in patient management has also been questioned [3]. Studies conducted to see if any patient factors may predispose to occurrence of pathology in the jaws have hardly revealed much [2].

The proponents of routine radiographic evaluation before complete denture treatment base their argument on the high prevalence and variety of significant findings on healthy looking edentulous arches for new as well as old denture wearers, low radiation exposure due to fast films and digital radiography, and possible effects of undetected pathology both on the prosthetic future of the patient as well as the general health [4,5]. Prevalence of significant findings in a population is, therefore, critical in this decision making. In our setting OPG services are scarce, mainly limited to private entities in major towns. Affordability is also a common challenge even where such services are available due to low incomes. Investigations must, therefore, be thoroughly justified. The purpose of this study was to describe significant findings on preprosthetic OPGs and factors that may predispose to their occurrence among complete denture patients at the University of Nairobi (UoN) dental hospital with a view of establishing if routine pre-prosthetic radiographic investigation before complete denture fabrication is justifiable in the Kenyan setting.

Materials and Methods

Ethical approval was obtained from the Kenyatta National Hospital/UoN Ethics and Research Review Committee. Records of 163 edentulous patients seen at UoN dental hospital between 2010 and 2016 were randomly selected. Socio-demographic data was obtained from the records. The sampled OPGs were examined on an x-ray viewer, in a poorly lit room, to identify pathological conditions on the radiographs. The findings were categorized as retained roots, radio-opacities, radio-lucencies and impacted teeth. The location of the pathology was noted in terms of the jaw, the part of the jaw and depth from the cortex. The location of the mental foramen was categorized as less than 1mm, 1-3mm, and more than 3mm from the cortex. Observation was made from the patient records whether the clinician identified the pathology during examination. The impact of the radiographic findings on the treatment plan was assessed from the notes. The authors gauged the likely effect of the findings on the patient's future health. The data was recorded on a data collection sheet, coded and analyzed using statistical package for social sciences (SPSS) version 20.

Results

The mean age was 60.10 (range 23-106), most (59.5%) seeking dentures for the first time.

Examination of OPGs revealed 47 pathologies in 34 OPGs (20.9%) distributed as shown in table 1.

Most (70%) of the findings were radio-opacities suggestive of retained roots, 6% were radiolucencies, 12% were other radio-opacities, 9% were suggestive of impacted teeth while 3% had both a retained root and radio-opacity. Majority of the records (83.4%) had the location of the pathology coincide with query on the clinical notes while in 16.6%, the location of the pathology did not match the query on the clinical notes. Most pathologies (64%) were located in the posterior region of jaws while the

other findings were evenly distributed in anterior and posterior regions of the jaws. Most (81%) of OPGs had mental foramen more than 3mm from the cortex, 17.2% had mental foramen between 1-3mm while in 1.8% it was located on the cortex. There was no predilection of pathological findings to age, residence, history of denture wearing or place of extraction. Pathological radiographic findings were more among females ($p=0.04$).

Majority (71%) of the OPG findings led to a modification of the treatment plan.

Discussion

The incidence of significant findings on OPGs was relatively lower compared to previous studies as summarized in table 2.

This could be explained by the fact that most patients who present at the prosthetic clinic are referred from the minor oral surgery clinic where most pathologies might have been treated. This is supported by the high coincidence between clinician queries and occurrence of radiological findings in the study, meaning clinicians are able to detect and manage most of the pathologies without radiographic investigations. The minor oral surgery clinic is usually manned by trained oral surgeons which may explain the accuracy of detection of pathologies in the jaws by clinical examination. Pathological findings were more common among females, consistent with previous findings from other populations [2]. The most common finding from the OPGs were retained roots, which was consistent with most similar studies [3,4]. However, one study found radio-opacities to be the most prevalent finding [2]. In this study, radio-opacities were second in prevalence to retained roots. Like in most of these studies, most retained roots were found in the posterior regions of the jaws [2,3]. Radiolucencies, impacted teeth and location of the mental foramen at the crest of the alveolar ridge were rare with prevalence of less than 10%. This finding was consistent with most similar studies [5,6]. Like most earlier studies, this study failed to establish any factors other than gender that may be predictive for the occurrence of pathological findings on OPGs of otherwise healthy ridges. Most OPG findings necessitated surgical intervention before construction of conventional complete dentures, similar to a recent study [7]. However, most of the interventions were extractions of retained roots. Extraction of retained roots and impacted teeth before complete denture construction is controversial. Retained roots and impacted teeth may help in the preservation of alveolar which is important for complete denture support, retention and stability.

Conclusion

Pathological findings are common on pre-treatment OPGs. It may be good practice to take an OPG for edentulous patients prior to complete denture therapy where

Table 1: Distribution of significant findings by part of the jaws

	Anterior		Posterior		n	%
	No. of findings	%	No. of findings	%		
Maxillary	5	11%	8	17%	13	28%
Mandibular	12	25%	22	47%	34	72%
n	17	36%	30	64%	47	100%

Table 2:

Author(s)	Year of publication	Incidence (%)
Present study	2017	20.9%
Edgerton M. and Clark P [2]	1991	23%
Jindal S et al [4]	2011	32%
Spyropoulos N.D, Patsakas A. J. and Angelopoulos A.P [5]	1981	37%
Jones J.D, Seals R.R and Schelb E [6]	1985	34.4%
Kose T.E et al [7]	2015	34



such services are available, to prevent complications from intra-bony pathologies. However, Most of the findings are either detectable by clinical exam or may not be of major consequence to the health of patients. Complete denture may be done without OPGs for new and old denture wearers where the service is not available.

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