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Rate of Incidental Findings of Pathology and Dental Anomalies in Paediatric Patients: A Radiographic Study

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ÖZET

Pediatrik hastalarda rastlantısal patolojik ve dental anomalilerin oranı: Radyografik bir çalışma

Amaç: Retrospektif bu çalışmanın amacı pediatrik hastalarda patolojik ve dental anomalilerin oranını ve panoramik radyografinin bu anomalileri belirlemede önemini değerlendirmektir.
Yöntem: 2008 ve 2009 yılları arasında Dişhekimliği Fakültesi Oral Diagnoz ve Radyoloji Anabilim Dalı'na başvuran ve panoramik röntgeni çekilen 500 çocuk hastayı retrospektif olarak incelendi. Hastaların cinsiyet, yaş ve lezyonun varlığı veya yokluğu kaydedildi. Panoramik röntgenler 4 radyolog tarafından incelenmiştir.
Bulgular: 500 panoramik röntgenin 72 (14.4%) sinde lezyon tespit edilmiştir. Lezyonlar, çoğunluğu 6-8 yaş olmak üzere, 2-14 yaşları arasındaki çocuklarda tespit edilmiştir. Bu 72 lezyonun arasında 27 apikal ostitis, 3 mesiodens, 9 eksik diş, 12 gömük, 3 supernumerer diş, 7 foliküler kist, 2 taurodontizm tespit edilmiştir.
Sonuçlar: Dişhekimleri pediatrik hastaların tedavisinde, panoramik radyografide gözlenebilecek patolojik ve dental anomali bulgularının değerlendirilmesinde dikkatli olmalıdır. Bu tip bulguların erken tanısı, ortaya çıkabilecek komplikasyonları engelleyebilir.
Anahtar sözcükler: Panoramik radyografi, dental anomaliler, yaygınlık, rastlantı bulgusu

ABSTRACT

Rate of incidental findings of pathology and dental anomalies in paediatric patients: a radiographic study

Objective: The goal of the present retrospective study to assess the rate of pathology and dental anomalies and to examine the value of panoramic radiographs in detecting these anomalies in paediatric patients.
Method: We retrospectively reviewed 500 pediatric patients who had visited the department of Oral Diagnosis and Radiology at Dentistry Faculty and had a panoramic radiograph taken between 2008 and 2009. The following information was obtained from the patients' files and panoramic radiographs: gender, age and the presence or absence of lesions. Panoramic radiographs were evaluated by four oral and maxillofacial radiologists.
Results: The lesions were observed in 72 (14.4%) of the 500 panoramic radiographs. The lesions were discovered in patients ranging from 2 years to 14 years old, with most of them in the 6- to 8-year–old range. Among the 72 radiographs with lesions, there were 27 apical ostitis, 12 impacted teeth, 9 missing teeth, 7 follicular cyst, 8 fractured tooth, 3 mesiodens, 3 supernumerary teeth, 2 taurodontism, 1 deformed tooth.
Conclusion: The dentists should be aware for pathology and dental anomalies in their paediatric's patients treatments on panoramic radiographs. Early treatment of this type of findings could help patients avoid subsequent complications.
Key words: Panoramic radiography, dental anomalies, prevalence, rate incidentally

INTRODUCTION

The factors leading to pathology and dental anomalies can be either genetic factors such as inheritance, metabolic and mutations or environmental factors including physical, chemical, environmental and biologic factors. It is also possible that some of these anomalies are caused by a combination of both genetics and environmental factors (1). Some of the pathology and dental anomalies are the following : Apical ostitis, follicular cyst, alteration in number of teeth, extra or supernumerary teeth, missing teeth, dens in dente, dilaceration, taurodontism, malformations and alterations in size of teeth (2). In order to diagnose these anomalies, in addition to clinical observations and examinations, paraclinical investigations such as radiography are essential and play an important role in the

differential diagnosis of these anomalies (3). Health care professionals, dentists in particular, rely on radiographic examinations to assess the pathology and dental anomalies of their patients and to refine their identification of the problems and the treatment plans (4).

Panoramic radiographs allow easy observation of pathology and dental anomalies and lesions in the oral and maxillofacial region and they have occasionally led to the discovery of incidental findings other than those involved in a patient's chief complaint at an initial visit. There have also been sporadic case reports of such incidental discovery of lesions (5-9). The expected frequency with which a dentist can make incidental findings of pathology or abnormality in a patient is of special interest to the clinician because in many cases such findings may require medical or odontological management (10). This is especially important in children, since it can be very difficult to treat lesions that are allowed to grow for a long period of time in younger patients, and maxillofacial deformities and their attendant psychological problems can result from such delayed treatment. Despite these facts, most clinics do not routinely take panoramic radiographs of children at their initial visit (3,5). The goal of the present retrospective study to assess the rate of pathology and dental anomalies and to examine the value of panoramic radiographs in detecting these anomalies in paediatric patients.

PATIENTS & METHODS

Subjects for this retrospective study consist of all 500 paediatric patients who visited the department of Oral Diagnosis and Radiology at Dentistry Faculty and had a panoramic radiograph taken between 2008 and 2009. The patients were examined clinically followed by a panoramic radiograph which were taken by Morita Veraviewopcs model 550 (Kyoto-Japan) with the maximum KVP of 80, mA=12 in the Department of Oral Diagnosis and Radiology, Dentistry Faculty, Marmara University. The following information was obtained from the patients' medical and dental history and panoramic radiographs: gender, age, chief complaints and the presence or absence of lesions. Assessment of the digital panoramic radiographs was performed directly on monitor screen (Monitor 17 inch TFT-LCD, 100-240 VAC 60/50 Hz, Global Opportunities). The images were exported and saved in Joint Photographic Experts Group (JPEG) file and no adjustment of contrast, brightness and magnification was performed by the observers.

In order to reduce radiographic misinterpretation, four oral and maxillofacial radiologists carefully studied the findings and verified them. The diagnosis and inclusion criteria for the anomalies were made on the basis of descriptions presented by White and Pharoah (1). For example,; taurodontism was described as an extension of the rectangular pulp chamber into the elongated body of the tooth in the radiograph. For calibration, 20 patients were evaluated and not included in the main study. Inter-examiner agreement was measured by Cohen's Kappa statistic. The inter-examiner agreement scores gave Cohen's Kappa of 0.87 for pathologic findings and 0.86 for dental anomalies.

RESULTS

The mean ages of the patients were 8.01 (age ranged from 2 to 14) (SD 2.33) and of the 500 patients, 238 (47.6%) were female and 262 (52.4%) were male. The age distribution ranged from 2 year to14 years, and most of the patients who visited were between the ages of 5 years and 10 years (Table 1).

Table 1: Age distribution of patients and those with lesions discovered in the panoramic radiographs

Age	No of patients	No of patients with findings
2	5 (1%)	1
3	11(2.2%)	1
4	38(7.6%)	3
5	59(11.8%)	5
6	58(11.6%)	11
7	58(11.6%)	3
8	77(15.4%)	12
9	50(10%)	8
10	46(9.2%)	3
11	26(5.2%)	7
12	41(8.2%)	10
13	22(4.4%)	6
14	9(1.8%)	1

The lesions were discovered in patients ranging from 2 years to 14 years old, with most of them in the 6- to 8-year –old range (Table 1). The lesions were observed in 72(14.4%) of the 500 panoramic radiographs (Table 2). Among the 72

Table 2: Rate of pathology and dental anomalies in paediatric patients.

Lesions	No of findings (n=72)
Apical ostitis	27 (35.52%)
Impacted tooth	12 (15.78%)
Missing tooth	9 (11.82%)
Fractured tooth	8 (10.52%)
Follicular cyst	7 (9.21%)
Surnumerary tooth	3 (3.94%)
Mesiodens	3 (3.94%)
Taurodontism	2 (2.63%)
Deformed tooth	1 (1.31%)

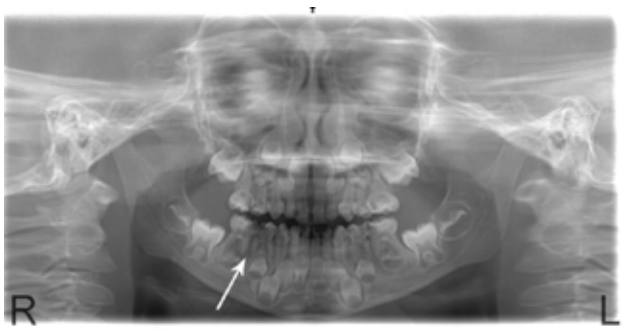

Figure 1: Apical ostitis on the apex of 85

Figure 2: Tooth no is impacted no 23

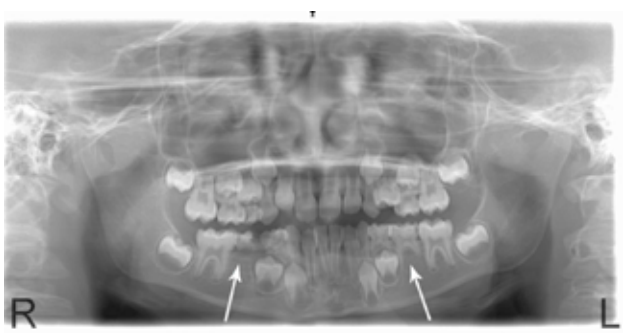

Figure 3: The germs of teeth 35 and 45 are missing

Figure 4: Fracture on tooth no 11

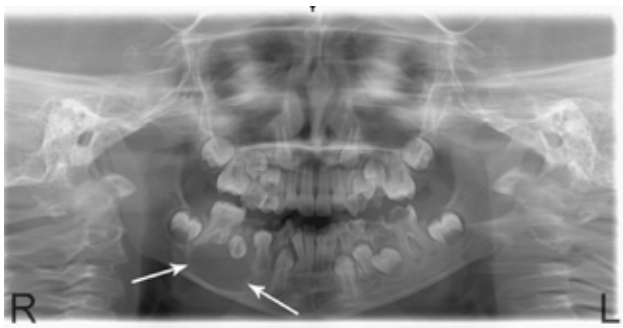

Figure 5: Follicular cyst on the left corpus of mandible

Figure 6: Surnumerer tooth between the apexes of 43 and 44

Figure 7: Mesiodens between incisors

Figure 8: Taourodontism on 36 and 46

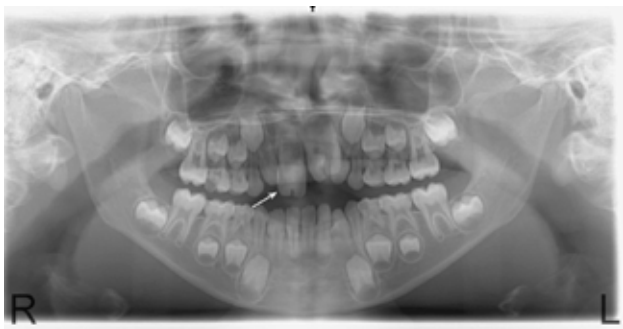

Figure 9: Deformed tooth no 11

radiographs with lesions, there were 27 apical ostitis (Figure 1), 12 impacted teeth (Figure 2), 9 missing teeth (Figure 3), 8 fractured teeth (Figure 4), 7 follicular cysts (Figure 5), 3 supernumerary teeth (Figure 6), 3 mesiodens (Figure 7), 2 taurodontism (Figure 8) and 1 deformed tooth (Figure 9).

DISCUSSION

The prevalence of anomalies in different populations were the subject of several studies. Bruce et al. (11) examined the panoramic radiographs of Black children and found that 4.4% had congenitally missing teeth and 1.5% had supernumerary teeth. Supernumerary teeth was significantly higher in Blacks than the Caucasians. OOshima et.al. (12) conducted a survey of 905 Japanese children and found that the deformed teeth and microdontia were more common. Thongodumporn and Freer (13) reported that 77.74% of their subjects had at least one anomaly. The most prevalent anomaly was invagination, while supernumerary teeth, root dilacerations were the least frequent anomalies. Cholitgul and Drummond (14) reported a 21% prevalence of jaw and dental anomalies in the panoramic radiographs of 1607 children and adolescents aged between 10 and 15 years in New Zealand. The most frequent findings were missing and deformed teeth. Backman and and Wahlin (15) detected one morphological anomaly in 18% and more than one anomaly in 8% of the Caucasian children aged 7 years in North Sweden by clinical and radiological examination. Their data indicated that prevalence of alteration in number of teeth, excluding the third molar was 1.9%.

In our study, the 72 incidental findings consist of 27 apical ostitis, 12 impacted teeth, 9 missing teeth, 7 follicular cyst, 8 fractured tooth, 3 mesiodens, 3 supernumerary teeth, 2 taurodontism, 1 deformed tooth.

A systematic approach for examining dental radiographs for pathology and dental anomalies has been suggested; it involves a methodical evaluation of all radiographs, looking at each anatomical region carefully (4,16). Finding pathology and dental anomalies on radiographic examinations requires the ability to discriminate the variants of normal from the abnormal and recognizing atypical patterns in the image to raise clinical diagnostic suspicions. The evaluation of a potential lesions requires describing the findings, including location, size, borders, opacity and texture, and its impact on local structures. Accurate radiographic interpretation and diagnosis from an image should follow consistent principles. Developing a complete differential diagnosis might be beyond a dental professional expertise and might be best for a radiologist (4). Especially, panoramic radiography is a radiological technique for producing a single image of the facial structure, including both the maxillary and mandibular dental arches and their supporting structures. It has many advantages such as; the broad coverage of teeth, low patient dose, and short development time (3).

The number of remarkable pathologic and dental anomalies findings in this survey on panoramic radiographs suggests that dentists should be aware of the potential for pathology in their treatments. Early treatment of this type of lesions could help patients avoid subsequent complications.

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