

## Screening panoramic radiographs in a group of patients visiting a Health Promotion Center

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### ABSTRACT

**Purpose** : To report the incidence of radiological findings from screening panoramic radiographs and verify the validity of the panoramic radiography for screening purposes.

**Materials and Methods** : Six thousand one hundred and sixty panoramic radiographs taken from the patients visiting the Health Promotion Center of CNUH were selected for this retrospective study. Panoramic radiographs were examined into the following pathologic conditions : the presence of periodontal bone loss, dental caries, periapical radiolucencies, retained roots, impacted supernumerary teeth, impacted third molars, odontoma, cystic lesions other than radicular cyst, sialoliths, and mixed radiolucent-radiopaque lesions. Number of pathologic conditions and Prevalence values were recorded.

**Results** : The prevalences of pathologic conditions were 72.9% of periodontal bone loss, 32.2% of dental caries, 11.9% of periapical radiolucencies, 10.8% of retained roots, 0.4% of root fracture, 1.0% of impacted supernumerary teeth, 1.0% of impacted third molars, 0.06% of odontoma, 0.08% of cystic lesion other than radicular cyst, 0.2% of prolonged retention of deciduous tooth, 0.1% of sialolith, and 0.04% of mixed radiopaque and radiolucent lesion.

**Conclusion** : Although the panoramic radiograph should not be used to replace intraoral radiographic and clinical examinations, this study showed that many dental pathologic conditions could be detected on panoramic radiographs. The panoramic radiograph might serve as a diagnostic aid in dental health evaluation programs.

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**KEY WORDS** : Radiography, Panoramic

### Introduction

Panoramic radiography,<sup>1,2</sup> a simplified extraoral procedure which visualizes the entire maxillomandibular region on a single film, is a valuable adjunct to conventional diagnostic procedures.

Since its introduction into the general practice of dentistry in the early 1960s, panoramic radiography has gained considerable popularity as a diagnostic tool.<sup>3</sup>

These panoramic radiographs have been used in mass dental health screening programmes<sup>4-8</sup> as the technique allows examination of the entire dentition, alveolar bone, the temporomandibular joints and adjacent structures on a single film. In addition, the dental panoramic radiograph has been found the diagnosis of periodontal bone loss and of dental and osseous lesion.<sup>9,10</sup>

As a part of the health screening programs, a panoramic

radiograph was taken for each patient visiting the Health promotion center of Chonnam National University Hospital (CNUH).

The aim of study was to report the incidence of dental pathologic conditions on the panoramic radiographs in a group of patients visiting the Health Promotion Center of CNUH and verify the validity of the panoramic radiography for screening purposes.

### Materials and Methods

Panoramic radiographs were taken for all the patients visiting the Health Promotion Center of CNUH. Six thousand one hundred sixty panoramic radiographs taken during January 2, 2003 to september 9, 2004 were selected for this retrospective study.

The patients (3,213 males and 2,947 females) were between the ages of 15 and 86 years at the time of radiographic examinations (Table 1). All panoramic radiographs were exposed on a Cranex 3<sup>+</sup> Ceph (Soredex Co, Helsinki, Finland) unit. Exposed films were processed according to manufacture's rec-

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**Table 1.** Age distribution of 6,160 patients

Age	No. of patients (%)
15-19	32 (0.5)
20-29	289 (4.7)
30-39	1,067 (17.3)
40-49	1,580 (25.7)
50-59	1,745 (28.3)
60-69	1,286 (20.9)
70-79	140 (2.3)
80-89	21 (0.3)

**Table 2.** Pathologic findings from 6,160 panoramic radiographs

Pathologic findings	No. of patients (%)	No. of lesions
Periodontal bone loss	4,491 (72.9)	4,491
Dental caries	1,989 (32.2)	4,036
Periapical radiolucencies	736 (11.9)	1,086
Retained roots	667 (10.8)	1,210
Root fracture	23 (0.4)	27
Impacted supernumerary teeth	61 (1.0)	72
Impacted third molars	62 (1.0)	93
Odontoma	4 (0.06)	4
Cystic lesions other than radicular cyst	5 (0.08)	5
Prolonged retention of deciduous teeth	10 (0.2)	21
Sialoliths	8 (0.1)	8
Mixed radiopaque-radiolucent lesions	3 (0.04)	3

ommendations using automatic film processor, FPM 3500 (Fuji-x-ray, Tokyo, Japan). All the panoramic radiographs were examined by an oral and maxillofacial radiologist.

Radiographic pathologic conditions assessed were : the presence of periodontal bone loss, dental caries, periapical radiolucencies, retained roots, impacted supernumerary teeth, impacted third molars, odontoma, cystic lesions other than radicular cyst, sialoliths, and mixed radiolucent-radiopaque lesions.

Prevalence values were calculated by dividing the number of patients with the condition of interest by the total number of patients.

## Results

Table 2 presents the radiographic findings of the pathologic conditions, their prevalences in percent, and number of pathologic lesions.

### 1. Periodontal bone loss

Periodontal bone loss was considered if the bone loss level was greater than 3 mm from the cemento-enamel junction.<sup>3</sup>

The pattern of bone loss was variable and was not quantified. The presence of periodontal bone loss was recorded only.

A total of 4491 patients showed the periodontal bone loss, which was 72.9% of the 6,160 patients examined.

### 2. Dental caries

A total of 4,036 dental caries were observed in 1,989 (32.2%) patients.

### 3. Periapical radiolucencies

A total of 1,086 periapical radiolucencies including periapical granuloma, abscess and cyst were examined in 736 (11.9%) patients.

### 4. Retained roots

A total of 1,210 retained roots were observed in 667 (10.8%) patients.

### 5. Root fracture

A total of 27 root fracture were observed in 23 (0.4%) patients.

### 6. Impacted supernumerary teeth

A total of 72 supernumerary teeth were detected in 61 (1.0%) patients. 1 patient had radiographic evidence of a cystic lesion associated with supernumerary tooth (dentigerous cyst).

### 7. Impacted third molars

A total of 93 impacted third molars was observed in 62 (1.0%) patients. 2 patients had radiographic evidence of a cystic lesion associated with #48 (dentigerous cyst).

### 8. Odontoma

Odontoma was observed in 4 (0.06%) patients.

### 9. Cystic lesions other than radicular cyst

A total of 5 radiographic evidence of cystic lesions were observed in 5 (0.08%) patients. 3 patients had a dentigerous cyst (probable) associated with impacted tooth. A dentigerous cyst was defined as a space of more than 3 mm around the impacted tooth visualized on the radiograph.<sup>11</sup> 2 patients had radiographic evidence of a cystic lesions in the maxillary midline which were suspected to be the nasopalatine duct cyst.

## 10. Sialoliths

A total of 8 sialoliths on the submandibular gland were observed in 8 (0.1%) patients.

## 11. Mixed radiolucent-radiopaque lesions

A total of 3 mixed radiolucent-radiopaque lesions were observed in 3 (0.04%) patients. These lesions might represent focal cementoosseous dysplasia or ossifying fibroma but definitive diagnosis of these findings was not available.

## Discussion

Panoramic images are most useful clinically for diagnostic problems requiring broad coverage of the jaws. Common examples include evaluation of trauma, location of third molars, extensive disease, known or suspected large lesions, tooth development (especially in the mixed dentition), retained teeth or root tips (in edentulous patients), and developmental anomalies. These tasks do not require the high resolution and sharp detail available on intraoral images.<sup>12</sup>

The majority of patients visiting the Health Promotion Center of CNUH from Gwangju city and Chonnam province, therefore this respective review study can be a kind of mass screening survey of people from these provinces.

Radiographic examinations could yield underlying pathological changes, and which might not have been detected during a visual clinical examination.<sup>13</sup> In panoramic examination, it was possible to detect the central lesions and dental anomalies of unerupted state which cannot be detected in clinical examination.<sup>14</sup> When the panoramic examination is taken for any specific indication, particularly when no other radiographs are obtained, the yield of positive findings is high.<sup>15</sup>

Ahlqwist et al.<sup>16</sup> were of the opinion that, except for carious lesion, the panoramic radiographs can be useful in epidemiological studies of oral health. The patients visiting the Health Promotion Center of CNUH were prescribed panoramic radiograph for evaluation of dental health, the panoramic examinations were a kind of a general screening examination.<sup>15</sup>

The dental panoramic radiograph is a valuable screening technique for clinical practice.<sup>3</sup> If the panoramic radiograph is to be used for screening large numbers of an asymptomatic population i.e. military recruits,<sup>8</sup> there must be a reasonable expectation that the screening process will identify enough hitherto undiagnosed pathology which requires treatment and which will benefit from early diagnosis; the cost of such a

policy should also be commensurate with the health gain anticipated.<sup>17</sup>

It is well known that panoramic radiography provides a view of the entire maxillomandibular region on a single film,<sup>1,2,18</sup> permits considerable reduction in time,<sup>2,19</sup> requires little expertise of oral and maxillofacial radiologist,<sup>19</sup> and does not require any inconvenience to the dental patient.<sup>2</sup> But in spite of the positive features enumerated, it must be remembered that, because of magnification, lack of definition, and superimposition of structures, panoramic radiographs may be diagnostically inferior to intraoral radiographs.<sup>2,20</sup>

In conclusion, although the panoramic radiograph should not be used to replace intraoral radiographic and clinical examinations, this study showed that many dental pathologic conditions could be detected on panoramic radiographs.

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