USE OF ORTHOPANTOMOGRAM IN DENTAL PRACTICE - A STATISTICAL STUDY

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Abstract

The orthopantomogram is a very useful additional examination in dentistry, as a tool for the diagnosis and treatment plan, with medical-legal importance, assessing the health status of the dento-maxillary apparatus. As a long-time, non-degradable document, it shows the evolution of the therapy applied in various dental specialities, permitting checking of the prognosis of the detected disease. The present study aims at investigating the usability of this dental radiographic examination in the actual Romanian dental practice, based on an original questionnaire completed by 558 dentists, which gives a response rate of 3.9%. The collected data were loaded electronically and processed statistically using Excel and SPSS, the threshold limit of statistical significance used being p > 0.05.

Keywords: orthopantomogram, dental practice

INTRODUCTION

The orthopantomogram is a radiographic examination extremely useful in all dental specialities: carious lesions and endodontics, periodontology, prosthetics, maxillo-facial surgery, implantology, paediatric dentistry and orthodontics (1).

The panoramic radiograph is an important and complex factor in both diagnosis and prognosis, being often a surprise investigation of unexpected elements of dentomaxillary pathology (2). After radiological identification of the elements of dental pathology (presence or absence of teeth, cysts, foreign bodies, disgnation, systemic disease manifested at dentomaxillary level (3), calcified atheromatous plaques in the carotid artery region (4, 5), osteonecrosis of the jaw after treatment with bisphosphonates (6) etc.), the medical practitioner is obliged to inform the patient, to modify the first treatment plan established by clinical examination and to apply an appropriate dental treatment, in cooperation with other medical services, for possible therapeutic suggestions (2, 3).

The clinical situations in which orthopantomograms are recommended are the following (7-9):

- First examination of new patients (patients with multiple deep carious lesions, with orthodontic and periodontal problems)
- Early diagnosis of dental anomalies (recommended especially at ages of 10, 15 and 20 years), to check dentition and to provide a timely diagnosis of the odontogenic tumors or cysts
- Establishing the exact cause of missing teeth
- Radiographic examination of the teeth with endodontic treatment
- Odontogenic sinus disease suspicion
- Disorders of TMJ caused by malocclusion (in such cases, the orthopantomogram should be performed with the patient in habitual occlusion)
- Facial and maxillary asymmetry
- Painful or asymptomatic swelling
- Multiple dental extractions, with suspected osteomyelitis
- Examination of non-odontogenic cysts, tumors and tumor-like lesions of bone tumors
- Suspicion of invasive bone tumors or bone metastases
- Mandibular nerve paresthesia
- Unusual sensitivity of teeth, unusual eruption, spacing or migration of teeth
- Radiographic examination of the oromaxillo-facial area in systemic diseases and syndromes
- Maxillo-facial fractures and suspected post-traumatic fractures
• Before and after surgery in the oral-maxillo-facial surgery.

MATERIALS AND METHOD

The aim of this research was to establish the necessity of the orthopantomogram for the diagnosis of dental diseases, in various dental services, and to investigate whether the specialists used to take full advantage of these radiographs (if considering especially the complex imaging information they provide), and also whether practitioners had sufficient information on the usefulness of this investigation, developed mainly in the last 15-20 years.

Based on an original questionnaire, we investigated whether doctors who collaborated in this research, specialized in general dentistry and/or in other dental domains, have experienced years of practice dentistry, years of private dental practice, what additional tests they used, if they frequently recommend the orthopantomogram and which is their motivation for this, if this practice helped to establish a correct diagnosis and treatment plan; also, they were asked to mention the main evolution moments they experienced and their collaboration with other services.

RESULTS AND DISCUSSION

The response rate of dentists who participated in the questionnaire on the use of orthopantomogram in the private dental practice of today was of 3.9%. The questionnaires were voluntarily completed by 558 dentists of various specializations, under the protection of anonymity, the collected data being loaded electronically and processed statistically using Excel and SPSS, at a threshold limit of statistical significance of p> 0.05.

Most of the responses came from the doctors working in cities and from young dentists (up to 10 years of dental practice), a possible explanation being the reduced number of dentists in rural areas, their scarce scientific interest and the absence of inhibition in the young generation involved in the survey, compared with older practitioners. Almost 80% of the responding dentists worked in private practice offices, the general dentistry domains prevailing (the differences among them being given by the low number of specialists in orthodontics, dental and maxillary surgery, implantology, periodontology, compared with general dental practitioners).

* “What additional tests did you use for diagnosis and treatment plan?” shows that the additional tests used in current dental practice are (Figure 1): • Radiographic examination: 95.7% (N = 534) • Models casts: 59% (N = 329) • Facial photos: 20.5% (N = 114) • Intraoral photos: 22.4% (N = 125) • Laboratory tests: 19.2% (N = 107).

**Fig. 1. Percent distribution of complementary tests used for diagnosis and treatment plans**

* “What radiographic examinations do you recommend?” demonstrated the following situation in dental practice (Fig. 2): • Orthopantomograms: 80.7% (N = 450) • Apical and bite wing radiographs: 80.3% (N = 448) • X-ray with the occlusal film: 31.8% (N = 177) • Lateral

**Fig. 2. Percent distribution of the types of radiological examinations recommended by dentists**
cephalometric film: 16% (N = 89) • Radiography of lateral oblique projection of the mandible: 7.7% (N = 43) • Other s(axial cephalometric film, CT, CTCB): 4.2% (N = 23)

* “Did you recommend orthopantomograms in your dental private practice?” received 541 responses, according to which panoramic examination is recommended in private dental practice: • currently: 60% (N = 324); • occasionally, in certain situations (overall investigation, comprehensive treatment plan, comprehensive oral rehabilitation etc.): 37.2% (N = 201) • No, ever: 3% (N = 16). Since more than half of the physicians routinely recommended orthopantomogram investigation as complementary radiographic examination, it can be concluded that it is frequently used in the private dental practice of today.

* “Which is the purpose of orthopantomogram’s recommendation?” received 548 responses (Table I), as follows:

Table I. Indications of Orthopantomograms

<table>
<thead>
<tr>
<th>The purpose of orthopantomogram recommendation</th>
<th>Answers</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnosis</td>
<td>386</td>
<td>70.5%</td>
</tr>
<tr>
<td>Treatment planning</td>
<td>387</td>
<td>70.5%</td>
</tr>
<tr>
<td>Check the effectiveness of treatments performed</td>
<td>197</td>
<td>36%</td>
</tr>
<tr>
<td>Prognosis of identified disease</td>
<td>111</td>
<td>20.2%</td>
</tr>
<tr>
<td>Overall investigation information</td>
<td>277</td>
<td>50.6%</td>
</tr>
<tr>
<td>Collaboration with other medical services for a correct and comprehensive treatment</td>
<td>256</td>
<td>46.7%</td>
</tr>
<tr>
<td>Medico-legal document</td>
<td>214</td>
<td>39%</td>
</tr>
</tbody>
</table>

For diagnosis: 70.5% (N = 386) and treatment plan: 70.5% (N = 387) – This high percentage emphasizes orthopantomogram’s value of diagnosis and treatment, among the other complex complementary radiological examinations applied in private dental practice.

Overall investigation information: 50.6% (N = 277) – the orthopantomogram is the most complete method of recording data on the stomatognathic system.

To collaborate with other medical services for a correct and comprehensive treatment: 46.7% (N = 256) – as it provides important information, the orthopantomogram is an investigation calling for discussion and multidisciplinary approach, especially in cases requiring complex oral rehabilitation.

Medico-legal document: 39% (N = 214) – panoramic radiographs act as forensic matter in cases of medical negligence, being a complementary non-degradable exam, easily archived, undoubtedly very useful for experts.

To check the efficiency of treatments performed: 36% (N = 197) – more than one third of investigated physicians recommended the orthopantomogram as a control means for the treatments performed, evidencing their effectiveness over time.

Prognosis of identified disease: 20.2% (N = 111) – less than one third of the investigated physicians recommended panoramic examination in the prognosis of the detected diseases.

* “For what types of dental treatments do you recommend the orthopantomogram?” received 546 respondents said that the orthopantomogram is recommended, as useful for the following dental treatments: • Multiple carious lesions and endodontics: 78% (N = 426) • Restorative and prosthetic treatment: 71.3% (N = 389) • Orthodontics: 40% (N = 218) • Periodontology: 38.1% (N = 208) • Pre-and post-surgery: 32.1% (N = 175) • Paediatric dentistry: 28% (N = 153) • Pre-and post-dental implants: 23% (N = 127). These results proved the importance of orthopantomogram in all dental specialties, for complex treatments of oral rehabilitation.

* “Do you consider the orthopantomogram useful as a private dental practice?” received 524 investigated dentists considered that the orthopantomogram: • is useful in a private dental practice: 77% (N = 403); • It is not useful in a private dental practice: 2% (N = 9); • It is useful only in certain situations (for complex oral treatments, dental-maxillary overall investigation): 21.4% (N = 112).

* “We do not recommend the orthopantomogram” received 328 responses did not recommend it (Fig. 3): • for restorative and prosthetic treatments to which one or two apical X-ray films are sufficient: 78.7% (N = 258); • consider apical x-ray film sufficient in dental practice: 23.8% (N = 78); • the patients refuse it for financial reasons.
reasons: 16.8% (N = 55); • no panoramic machine in town or in the vicinity of the dental office: 14.3% (N = 47); • patients refuse it because of the radiation risk: 6.4% (N = 21); • they are poorly executed and do not help the diagnosis: 4.9% (N = 16); • it has a high radiation risk: 2.8% (N = 9).

Fig. 3. Percentage distribution of the motivations for which the investigated dentists do not recommend the orthopantomogram

These results show first the reserve of the investigated dentists in recommending the orthopantomogram (to be used only in cases requiring a complex treatment, for not exposing the patient to unnecessary radiation and to additional treatment costs); secondly, the information on the advantages offered by the orthopantomogram, in methodological and financial terms, is still scarce (the radiation dose and costs of a single orthopantomography exposure are similar to 3-4 periapical radiographs); finally, sometimes, this exam is not recommended, due to its poor execution and high costs of the orthopantomograph device.

CONCLUSIONS

The orthopantomograms are additional tests commonly used in private dental practice, their main objective being a correct diagnosis and treatment plan, efficiency of the treatments performed, collaboration with other medical services, the medical forensic domain included. They are recommended and considered useful in all dental specialties, for complex treatments in oral rehabilitation (involving carious lesions and endodontic, prosthetic treatment, periodontal, surgery), in paediatric dentistry and in orthodontic treatments, as well as in implantology, as a complete investigation of the stomatognatic system.

The research on the use of orthopantomograms in private dental practice would raise some questions: – are the panoramic radiographs fully exploited by specialists? – Are the complex imaging information they provide sufficiently well known and understood? – Do practitioners have sufficient information on the usefulness of such investigations, developed over the last 15-20 years? – Is it necessary to organize postgraduate courses to update knowledge of dentists on the orthopantomogram (indications, radiation doses and risks, advantages and disadvantages, value and utility of current dental practice)?

References