

## USE OF RADIOGRAPHS FOR PERIODONTAL DIAGNOSIS IN PRIVATE PRACTICE

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### ABSTRACT

The aim of the present study was to determine the percentage of dentists who use radiographic examination on the initial appointment, and establish the relation between the use of periodontal probe and graduation year. Dentists were interviewed in their private offices in three cities in Rio Grande do Sul. They were asked about the routine use of radiographic examination and, if applicable, what technique was applied and what clinical instrument was used at the first appointment. Opened and closed questions were included in the interview and for some of them more than one answer was possible.

A significant number of dentists (62.9%) reported some kind of radiographic examination at the initial appointment. Among the radiographic techniques, the periapical was the most cited (74.3%), followed by the panoramic (36.2%) and bite-wing

(32.9 %) techniques. There was an association between the use of periodontal probe and the use of radiographic examination at the initial appointment. Dentists who used periodontal probe used radiographic examination more frequently ( $p=0.010$ ). More recently graduated dentists (1991-2005) used radiographic examination more than the others ( $p=0.022$ ). In conclusion, a large number of dentists reported the use of radiographic examination at the initial appointment. There was an association between the use of this examination technique and the use of the periodontal probe; recently graduated dentists used radiographic examinations more frequently than the others.

**Key words:** Oral Diagnosis, radiographic diagnosis, periodontal diagnosis

## USO DE RADIOGRAFIAS PARA DIAGNÓSTICO PERIODONTAL NA PRÁTICA PRIVADA

### RESUMO

O objetivo do presente estudo foi determinar o percentual de cirurgiões dentistas (CDs) que utilizam o exame radiográfico para diagnóstico na consulta inicial, assim como realizar associações entre o uso de sonda periodontal, tempo de conclusão da graduação e uso de radiografias. Os CDs foram entrevistados em seus consultórios particulares em três cidades do Rio Grande do Sul. Foram questionados a respeito da utilização rotineira do exame radiográfico, e quando utilizado qual a técnica realizada e quais instrumentos clínicos utilizava na consulta inicial. Foram utilizadas perguntas abertas e fechadas nas entrevistas, sendo que para algumas delas mais de uma resposta era possível. Um alto percentual dos CDs entrevistados (62.9%) faz uso rotineiro de algum tipo de radiografia na consulta inicial. Entre as técnicas radiográficas, a periapical

foi a mais relatada (74,3%), seguidas pela panorâmica (36,2%) e interproximal (32,9%). Existe uma associação entre o uso de sonda periodontal e o uso de exame radiográfico na consulta inicial. CDs que utilizam a sonda periodontal também utilizam mais rotineiramente o exame radiográfico ( $p=0.010$ ). Percebe-se também que CDs formados recentemente (1991-2005) utilizam mais o exame radiográfico quando comparados aos demais ( $p=0,022$ ). Conclusões: Um elevado percentual de CDs utiliza exame radiográfico na consulta inicial. Existe uma associação entre a utilização deste exame e a utilização de sonda periodontal e CDs formados mais recentemente utilizam o exame radiográfico mais frequentemente.

**Palavras Chave:** Diagnóstico bucal, diagnóstico radiográfico, diagnóstico periodontal.

### INTRODUCTION

Diagnosis is a routine procedure for the dental professional. It aims at distinguishing states of health and disease as well as determining extension and severity of the condition, in order to provide an ade-

quate prognosis and institute the correct therapy. The need for low cost and effective treatment calls for early and accurate diagnostic procedures. A great number of tests, indexes and equipment can be used to carry out the diagnosis. However, none

of the methods alone can provide all the information needed to thoroughly describe the patient's clinical status (1, 2).

Periodontal diseases are a group of infectious-inflammatory diseases that affect the teeth's supportive tissue and share similar clinical manifestations. Gingivitis seems to be an omnipresent finding while periodontitis, although high in prevalence, affects only part of the population (3). The better understanding of the pathogenesis of periodontal diseases is modifying the interpretation of health and disease descriptors and, consequently, the way of diagnosing these diseases (4).

The clinical examination of the periodontium constitutes the basic procedure related to periodontal diagnosis. Amongst the clinical instruments used in periodontal examination, the periodontal probe is normally used to determine gingival/periodontal inflammation and severity (5). Gingivitis is mainly diagnosed by alterations on soft tissues. Various important features of periodontitis that involve the supporting tissues are also detected by clinical examination. However, in some situations a clinical diagnosis is insufficient and the dentist must use other techniques to establish an unequivocal diagnosis (6).

Radiographic examination is an important method available for oral diagnosis. It provides some important information that cannot easily be obtained by clinical examination, i.e. it evidences carious lesions and root fractures, periapical lesions, crown-root ratio, as well as bone crest level and intrabony defects. Radiographs can be used to establish diagnosis, during treatment and control of the periodontal patient, and in longitudinal follow-ups of the individual. Radiographs provide records that can be used in future comparisons of different conditions at different time points (7).

The information obtained and recorded at diagnosis may be insufficient to determine the periodontal situation of the patients (8). Conversely, in some cases, the radiographic examination was carried out unnecessarily and with no prior standardization (9). In a study of the prevalence of diagnosis of periodontal disease in private dental practice, Ramos Cury et al. (5) found that the radiographic examination is used more frequently by clinicians than periodontal probing itself.

There is scarce data (only three studies to our best knowledge (5, 6, 9), two of which are by the same

group) on the way that dentists perform the diagnosis and what instruments and techniques are routinely used in clinical practice. Thus, evaluating how the dentist applies the radiographic examination during the diagnosis process is of great importance. We consider that knowledge of the kind of diagnostic approach used by dentists is of utmost importance, since it is part of the guidelines for clinical management. Within this context, we designed the present study.

The aim of the present study was to determine the percentage of dentists that use radiographic examination for diagnostic purposes at the first appointment, examine the potential association between the use of radiographic examination and the use of periodontal probing, and between time after graduation and the use of radiographs.

## MATERIALS AND METHODS

The data were collected by interviews with a sample of dentists from the cities of Santa Maria, Cruz Alta and Rosário do Sul, all situated in the Brazilian State of Rio Grande do Sul. Lists from the Regional Council of Dentistry (RCD) were used to obtain data concerning the professionals. Interviews were performed with 108 (18.24%) of the total of 592 dentists of Santa Maria, 29 (42.64%) of 68 of Cruz Alta and 15 (68.18%) of 22 of the city of Rosário do Sul. The time after graduation varied between 2 and 45 years. To stratify the interviews in Santa Maria, strata by graduation year and localization of the clinic were created. Based on the RCD stratified data, dentists were randomly selected to be interviewed. If after three attempts to contact the professional it was not possible to arrange the interview, the next dentist with the same characteristics on the list was considered eligible. In the other cities (Cruz Alta and Rosário do Sul), because of the reduced number of professionals, an attempt to contact all of them was made. All of the interviews were made with the dentists in their private clinics. Prior to the actual interview, the dentists were informed of the aims of the research project. The anonymous nature of the interview was guaranteed. The dentists who agreed to take part in the study signed an informed consent. This study was approved by the Ethics Committee of the Federal University of Santa Maria.

A pilot study with ten dentists was carried out to evaluate the adequacy of the questions in the sur-

**TABLE 1. Radiographic technique used by dentists at the initial appointment**

	Periapical	Bitewing	Panoramic
Yes	113 (74.3%)	50 (32.9%)	55 (36.2%)
No	39 (25.7%)	102 (67.1%)	97 (63.8%)
<b>Total</b>	<b>152 (100%)</b>	<b>152 (100%)</b>	<b>152 (100%)</b>

vey and the time needed to answer them. The information obtained in these interviews was used to improve the questionnaire. Open and closed questions were used in the interview. The dentists were interviewed concerning routine use of radiographs and, if applicable, what technique was chosen as well as what clinical instruments were used at the first appointment. The techniques included in the questionnaire were: periapical, bite-wing, panoramic, and others. More than one alternative was accepted for this question.

### ANALYSIS OF THE RESULTS

Frequency distribution of the dentists regarding use of radiographs and the techniques used at the first appointment was evaluated. The association between the reported use of periodontal probe and radiographic examination at the first appointment was tested by the chi-square test. The dentists were stratified by year of graduation. The potential association of graduation year with the use of radiographic examination at the first appointment was assessed by the chi-square test. The level of significance was set at 5%.

### RESULTS

A high percentage of dentists routinely used some type of radiograph at the first appointment, although 37.1% did not report the use of this diagnostic aid on a regular basis. Table 1 shows the radiographic techniques that are routinely used by dentists. Regarding the technique employed, the periapical technique was the most frequently reported (74.3%),

followed by panoramic (36.2%) and bite-wing (32.9%) techniques, which were used with similar frequencies.

An association was found between use of periodontal probe and the use of radiographic examination at the first appointment in this sample, as shown in Table 2. Dentists that used the probe more frequently used radiographic exams ( $p=0.010$ ).

Table 3 stratifies the dentists by year of graduation. More recently graduated dentists (1991-2005) used the radiographic examination more frequently when compared to the dentists in the other graduation strata. Dentists that had graduated earlier, used significantly less radiographs than the dentists in the other 2 strata.

### DISCUSSION

The results of the present study demonstrate that a high percentage of the dentists reported the use of some kind of radiographic examination at the first appointment. A relation between periodontal probing and use of radiographs was demonstrated.

**TABLE 2. Association between use of periodontal probe and radiographic examinations at initial appointment**

		Periodontal probe		Total
		Yes	No	
Radiographic exam	Yes	48	47	95
	No	16	40	56
Total		64	87	151
p=0.010				

**TABLE 3. Reported use of radiographic examination stratified by graduation year**

	Yes	No	P*
1960-1975	21 (45.7)	25 (54.3)	0.006
1976-1990	34 (64.5)	18 (34.6)	0.724
1991-2005	40 (74.1)	13 (24.1)	0.022
<b>TOTAL</b>	<b>95</b>	<b>56</b>	
* $\chi^2$			

Additionally, recent graduates were shown to use radiographs more frequently.

This high percentage of dentists that use radiographic examination at the first consultation seems to reflect the importance that dentists give to additional tests to establish an accurate diagnosis. Ramos Cury et al. (5) reported a similar percentage of use of radiographic examination by dentists (59.3%), i.e. 23.1% used it always and 36.2% used it only occasionally. Tugnait et al. (9), evaluating the use of radiographs in periodontal diagnosis, also found a high percentage of utilization of this diagnostic resource as reported by dentists. The periapical technique (76%) was also the most frequently reported by dentists in the study performed by Tugnait et al. (9), followed by the bite-wing technique. Bone crest is best visualized in periapical and bite-wing radiographs. It is not visualized at the same level of detail in orthopantomograms, especially in cases of severe bone loss. This limitation applies mostly to the canine and bicuspid regions, where these radiographs frequently fail to provide sufficient detail for adequate analysis (10). In incipient lesions, a similarity between the techniques regarding the detection and quantification of bone loss has been reported (11, 12). Radiographic examination must always complement the clinical examination. Attempts have been made to try to establish criteria for the use of radiographic examination in the case of clinical periodontal conditions (13). On the other hand, the routine use of radiographic examination may be unnecessary and harmful in terms of health and costs to the patients. Therefore, the evaluation of the clinical status should precede radiograph indication. An association between dentists that routinely use radiographs and periodontal probing on the first appointment was found. It was not in the scope of this study to determine if the use of radiographic examination was only to complement the periodontal clinical examination. Dentists were allowed to report the use of this test on the first consultation as an aid in establishing the health/disease status of their patients. Thus, in some cases, radiographic exami-

nation may have been performed with other purposes than to establish periodontal conditions. Furthermore, when the association was tested, it became evident that the dentists that reported the use of periodontal probe also reported a more regular use of radiographic examination. These data suggest that these dentists take greater care in diagnosing the presence or absence of disease in periodontal tissues. The information obtained by the clinical and radiographic examinations is different and complementary. Periodontal probing allows the assessment of inflammatory processes and disease severity. The radiographic examination is unique in assessing bone levels and the amount of remaining bone. It also allows the evaluation of furcation lesions, as well as other conditions related to teeth and periapical tissues. Moreover, the radiograph provides a record for future longitudinal analysis of the individual. For these reasons, it is a method of absolute importance to determine diagnosis, treatment plan and periodontal prognosis. Dentists who had graduated more recently (1991-2005) reported more frequent use of radiographs than earlier graduates (1960-1975). Another study with the same sample demonstrated that recently graduated dentists also used the periodontal probe more often than the others (14). The group of dentists who did not use the periodontal probe or the radiographic examination has probably failed to give enough importance to the diagnosis of a highly prevalent disease among the population like periodontitis (15). The change in paradigms of periodontal diseases and the way their treatment is performed seems to reflect an academic formation with greater emphasis on periodontal diagnosis (and its complementation with a radiographic examination).

It can be concluded that a high proportion of dentists use radiographic examinations at the first appointment and that there is an association between the use of this tool and of a periodontal probe. Additionally, we can conclude that more recently graduated dentists use radiographs more frequently.

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