

## ***Prevalence of supernumerary roots in lower premolars***

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### ***Abstract***

Supernumerary roots consist of a developmental disturbance which can occur to any teeth, and knowledge about its occurrence is particularly important for the conduction of surgical or endodontic treatment of the affected tooth. In view of this reality, an attempt was made to determine the prevalence of supernumerary roots in lower premolars. The study was carried out with 200 periapical radiographs of the whole mouth, which totaled 800 teeth. This methodology was selected due to the possibility of analyzing radiographs of canines, premolars and lower molars using different ranges of horizontal angles, which enabled the identification of overlapped roots in the orthoradial incidence. The radiographs were submitted to the evaluation by an expert radiologist and the data underwent statistical analysis by means of sector graphs. The results showed that 14% (112) of the evaluated teeth presented supernumerary roots, of which 56% occurred in males and 44% in females. Concerning the eruption level, 61% were at the medium, 38% at the apical and 1% at the cervical 1/3 of the root. The most frequently affected tooth was the 1<sup>st</sup> premolar, which comprised 70% of the cases in comparison to 30% cases affecting the 2<sup>nd</sup> premolars. With regard to the type of occurrence, 67% were unilateral and 33% were bilateral while, of the latter, 82% occurred in the 1<sup>st</sup> lower premolars and 18% in the 2<sup>nd</sup> lower premolars.

***Keywords:*** Bicuspid- Prevalence. Dental radiograph. Dental root.

### ***INTRODUCTION***

Supernumerary roots consist of a developmental disturbance that can affect any teeth and in which the disposition of the natural components of the affected teeth is normal (SHAFFER; HINE; LEVY, 1987; ZEGARELI; KUTSCHER; HYMAN, 1981). This type of disorder may result from a fold or invagination in Hertwig's epithelial root sheath, which is generally hereditary (SHAFFER; HINE; LEVY, 1987) or may stem from external factors during the dentition formation phase. Almost all the factors causing the occurrence of supernumerary roots act

and take place in the post-natal formation phase (ALCAGAYA; OLAZABAL, 1960).

According to radiographic evaluations, supernumerary roots can be either normally developed in relation to form and size or small and rudimentary. They may sometimes be fused to other roots or be bifid and broadly separated. Their presence is established by means of radiographic examination, although two radiographs at different horizontal angles frequently need to be taken in order to show the presence of overlapped roots. The roots

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which do not present overlapping can be easily identified and the presence of an additional root canal or double space of the periodontal ligament may represent important indications in the diagnosis of this disturbance (LANGLAIS; LANGLAND; NORTJÉ, 1995).

Awareness of the occurrence of supernumerary roots is particularly important when exodontics or endodontic treatment of the affected tooth is necessary (ZEGARELI; KUTSCHER; HYMAN, 1981; SHAFFER; HINE; LEVY, 1987; REGEZI; SCIUBBA, 1991; SANTANA et al., 1996/1997). Concerning endodontic treatment, it is doubtless that its success is closely related to the knowledge of not only the normal topographic anatomy of the pulp cavity, but also of its variations, or at least of the most frequent ones (LEÃO et al., 1968).

In case of exodontics, one of these roots may break during extraction and if left in the alveolus, it may become a source of infection (SHAFFER; HINE; LEVY, 1987). This way, the importance of a previous radiographic diagnosis in the exodontics of teeth with supernumerary roots is observed as it will enable the planning of adequate operating movements during the surgical procedure in addition to the selection of the appropriate technique (SANTANA et al., 1996/1997).

In a study conducted by Santana and others (1994/1995) on 20,257 teeth, 0.68% presented supernumerary roots. Lower canines proved to be the most frequently affected group (28.9%) and lower premolars comprised the second group with 21% of the total number of teeth exhibiting such developmental disturbance.

In spite of representing the second group with the highest prevalence of supernumerary roots, and although they present a higher incidence of endodontic treatments when compared to lower canines, scarce research has been observed on the occurrence of supernumerary roots in lower premolars. Moreover, certain discrepancy in the results of the few studies found has been acknowledged. In view of this reality, this investigation aimed

at determining the prevalence of supernumerary roots in lower premolars by means of a radiographic assessment.

## **MATERIAL AND METHODS**

This study was conducted with file radiographs of 200 patients assisted in the radiology clinic of *Faculdade de Odontologia da Universidade Federal da Bahia* (Faculty of Dentistry of Bahia Federal University). One hundred and twenty patients were females and eighty were males and all of them had the 4 lower premolars; therefore, a total number of 800 teeth were evaluated.

The sample was selected among the patients who had been submitted to periapical radiographic examination of the whole mouth; they were chosen if, after analysing the radiographs of canines, premolars and molars, there was a variation in the horizontal angle range which enabled the identification of supernumerary roots that were overlapped in the orthoradial incidence.

The radiographs were selected according to the quality excellence standard: minimum distortion, average level of density and contrast and maximum sharpness and detail.

Under ideal conditions of luminance and illuminance, the radiographs were submitted to the appraisal of an expert radiologist who attempted to identify:

- The presence of supernumerary roots;
- Affected tooth: first and/or second premolar;
- Eruption root third of the supernumerary root: cervical, medium or apical;
- Type of occurrence: unilateral or bilateral.

## **RESULTS**

The data found were submitted to statistical analyses by means of sector graphs. Of the 800 evaluated premolars, 112 presented super-

numerary roots, which corresponded to a prevalence of 14% (FIGURE 1). Concerning distribution according to sex, a slight preference for males was observed, with 56% of the cases (FIGURE 2). Concerning the eruption level of the supernumerary root according to the root third, 61% occurred at the medium third, which was followed by the apical third with 38% and the cervical with only 1% of the cases (FIGURE 3).

The occurrence distribution according to the premolar involved showed that 70% of the cases affected first premolars (FIGURE 4). In relation to the total number of teeth evaluated, this represents a prevalence of 10% of

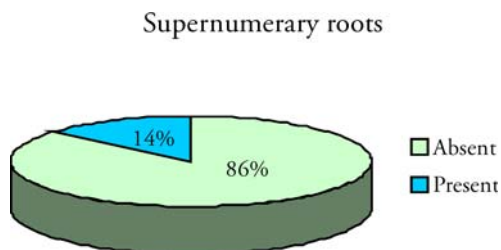


Figure 1 - Frequency of supernumerary roots in lower premolars

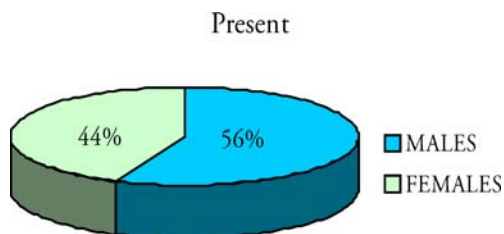


Figure 2 - Occurrence, according to sex, of supernumerary roots in premolars

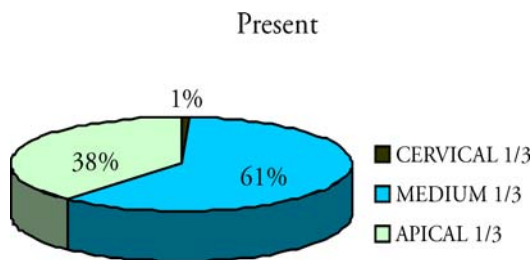


Figure 3 - Eruption root third of supernumerary roots in lower premolars

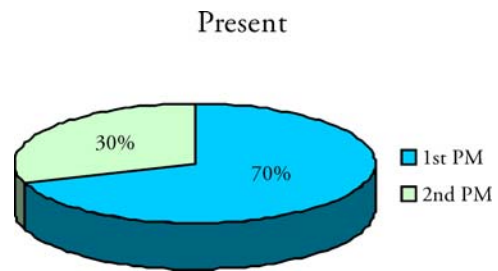


Figure 4 - Premolar involved for supernumerary roots

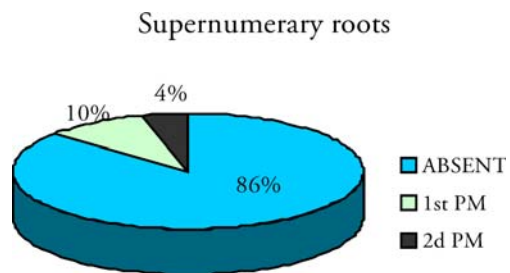


Figure 5 - Premolar involved for total number of teeth

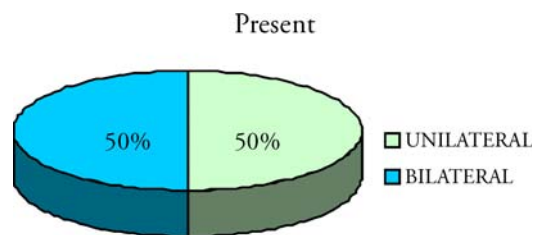


Figure 6 - Type of occurrence of supernumerary roots in lower premolars

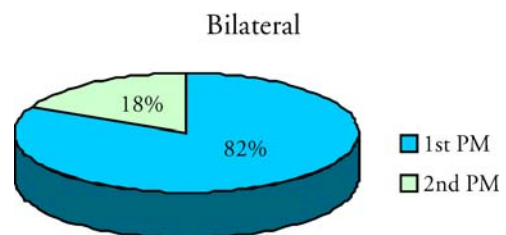


Figure 7 - Type of occurrence observing the involved premolar

supernumerary roots in first premolars and of 4% for second premolars (FIGURE 5).

Regarding the distribution of the disturbance according to the type of occurrence, there was a similar number of unilateral and bila-

teral occurrences (FIGURE 6). Concerning bilateral occurrences, 82% affected first premolars and 18% affected second premolars (FIGURE 7).

### DISCUSSION

Concerning the data obtained with regard to the anatomy of the root duct and periapex of lower premolars, in 1962, Ferenczy (apud LANGLAIS; LANGLAND; NORTJÉ, 1995) reported a bifurcation of the root canal in 13% of first premolars and in only 1% of second premolars. However, De Deus (1992) considered that 1% of first premolars presented two partially differentiated roots at the apical third and the incidence for second premolars was of 4%.

Also, in relation to root anatomy, Ingle and Taintor (1989) recorded that 19.5% of first premolars and 11.5% of lower second premolars presented two canals with two apical foramina. According to Walton and Torabeniadjad (1997), 25% of lower first premolars exhibited two apical foramina, whereas such anatomical variation was observed in only 3% of lower second premolars. Bramante and others (2000) reported that 2.8% of lower first premolars presented bifurcations in the root apical third. As to second premolars, such incidence was smaller and corresponded to 1.4% of the cases.

By analyzing the results obtained, certain similarity between some data in our study and

the findings in the literature was observed, considering that there was a higher prevalence of supernumerary roots in lower first premolars than in second premolars. However, a difference was noticed concerning the percentages found. Although not concerned with duplicated roots, Ingle and Taintor (1989) reported a higher incidence of this condition for lower first premolars in two distinct apical foramina. Walton and Torabeniadjad (1997) also observed a higher occurrence of a double foramen in first premolars. We believe that the duplicity of canals and/or apical foramina shows a tendency to the manifestation of root duplicity and that is the reason why we compare such results to ours.

Deus (1992), on the other hand, reports a higher occurrence of supernumerary roots for lower second premolars. Such results were found to be strange when it was observed that the percentage of completely fused roots for first premolars (17%) was much higher than that for second premolars (4%). Nevertheless, in spite of reporting lower percentages than those in this study, Bramante and others (2000) showed a proportional involvement for a higher occurrence of supernumerary roots in first premolars (2:1 against 2,3:1, respectively) that was very close to ours (TABLE 1).

Without defining which premolar was most frequently involved, Pucci and Reig (1945) investigated 141 lower premolars and divided them, in relation to the number of roots, into

Table 1 - Summary of the literature review concerning the anatomy of the pulpal cavity and duplicity of the apical foramen in lower premolars

	1st premolar	2nd premolar
FERENCZY (1962 apud LANGLAIS et al., 1995)	13	1
INGLE; TAINTOR (1989)	19,5 2 canals / 2 foramina 6,5 2 canals / 1 foramina	11,5 2 canals / 2 foramina 1,5 2 canals / 1 foramina
DE DEUS (1992)	17 completely fused roots 1 partially fused roots	4 completely fused roots 4 partially fused roots
WALTON; TORABENIJAD (1997)	25	3
BRAMANTE et al. (2000)	2.8	1.4
DANTAS et al. (2004)	9.75*	4.25*

† Percent values.

\* Percentage in relation to the total number of evaluated teeth.

four groups: one root (84.4%), two completely fused roots (2.2%), two partially differentiated roots (2.8%) and three non-differentiated roots (10,6%). Later, Leão and others (1968) conducted a radiographic study on the prevalence of supernumerary roots in lower first premolars and found the occurrence of duplicated roots in 5.3% of the cases, which involved mostly males.

In a study carried out by Santana and others (1994/1995) a prevalence of 0.80% of supernumerary roots was observed in relation to the total number of premolars evaluated. The continuation of this study in 1997 showed, among other aspects, the distribution of the eruption root third of supernumerary roots and the results found showed a percentage of 3.4% for eruption at the root cervical third, 65.5% at the medium third and 31% at the apical third.

Therefore, it is observed that there was a higher incidence of supernumerary roots in this study when compared to previous investigations on prevalence. Concerning distribution according

to sex, our results were similar to those by Leão and others (1968), who reported a slight predominance of males. With regard to the eruption level of supernumerary roots, our studies converge to the findings by Santana and others (1996/1997) with the recording of a higher frequency of eruptions at the medium third, followed by the apical and cervical thirds, respectively (TABLE 2).

Data were not observed in the literature which would enable the comparison of our findings concerning the type of occurrence of supernumerary roots, whether unilateral or bilateral, or the distribution of bilateral occurrence according to the premolar involved (TABLE 2).

Therefore, it was noticed that this study, in addition to determining the prevalence of supernumerary roots in lower premolars, also addressed other aspects of interest related to their occurrence which were not observed in previous studies. This broader characterization can be extremely useful for the diagnosis of this

Table 2 - Summary of the literature review concerning studies on the prevalence of supernumerary roots in lower premolars

Studies	Total number of cases	Prevalence	Sex		Eruption 1/3			PM		Occurrence	
			F	M	C	M	A	1st	2nd	Unilateral	Bilateral
PUCCI; REIG (1945)	141	2.8	-	-	-	-	-	-	-	-	-
LEÃO et al. (1968)	1058	5.3	4.2*	7.6*	-	-	-	-	-	-	-
SANTANA et al. (1994/1995; 1996/1997)	3614	0.80	-	-	3.4	65.5	31	-	-	-	-
DANTAS et al. (2004)	800	14	6.2*	7.8*	1	68	43	78	34	67	33

† Percent values.

\* Percentages in relation to the total number of evaluated teeth.

disturbance and for the planning of the surgical or endodontic treatment of affected teeth in particular.

## CONCLUSIONS

The results obtained showed that, in the evaluated sample, there was a significant prevalence of supernumerary roots in lower

premolars (14%). Their occurrence was slightly higher in males; the involved tooth was the first premolar and, concerning eruption level, it occurred at the root medium third in most cases, which was followed by the apical and cervical thirds. Regarding the type of occurrence, the results were similar for unilateral and bilateral occurrences. Of these, the majority affected lower first premolars.

## **Prevalência de raízes supranumerárias em pré-molares inferiores**

### **Resumo**

**As raízes supranumerárias são uma alteração de desenvolvimento que pode envolver qualquer dente, e o conhecimento de sua ocorrência é particularmente importante para a realização de tratamento cirúrgico ou endodôntico da unidade afetada. Diante dessa realidade, procuramos determinar a prevalência de raízes supranumerárias em pré-molares inferiores. O estudo foi realizado com 200 exames radiográficos periapicais de toda a boca, perfazendo um total de 800 dentes. Optamos por essa metodologia devido à possibilidade de analisar radiografias de caninos, pré-molares e molares inferiores, tendo-se uma variação na angulação horizontal que permitiu a identificação de raízes sobrepostas na incidência ortorrádial. As radiografias foram submetidas à avaliação de um radiologista experientado e os dados levantados foram submetidos a tratamento estatístico através de gráfico de setores. Os resultados encontrados demonstram que 14% (112) dos dentes avaliados apresentaram raízes supranumerárias, nos quais 56% ocorreram no sexo masculino e 44% no feminino. Quanto ao nível de emergência, 61% foram no terço médio, 38% no apical e 1% no terço cervical da raiz. O dente mais envolvido foi o primeiro pré-molar, num total de 70% dos casos, contra 30% de segundos pré-molares. Em relação ao tipo de ocorrência, 67% foram unilaterais e 33% bilaterais, sendo que, desses últimos, 82% ocorreram em primeiros pré-molares e 18% nos segundos pré-molares inferiores.**

**Palavras-chave:** *Bicúspide-Prevalência. Radiografia dentária. Raiz dentária.*

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