The purpose of this study is to determine the part played by the quality parameters of root canal filling on the prevalence and distribution of periapical lesions in endodontically treated teeth.

**Material and method.** The studied group comprised a number of 167 patients, with ages from 20 to 59, having a number of 596 root treated teeth. The quality of root canal filling (length, density) and the diagnosis of various forms of chronic apical periodontitis were evaluated by radiography. The data were registered in tables and presented as made under Microsoft Excel. **Results and discussions.** According to the quality standards determined for the length and density parameters, a percent of 38.9% of the studied teeth present correct root filling, 39.5% present root underfilling, 5.3% presents root overfilling, and a percent of 15.9% are teeth with root filling with a correct length and inadequate density. In case of tooth root filling where we diagnosed the presence of periapical lesions, the distribution of the types of chronic apical periodontitis was as follows: 33.7% fibrous PAC, 41% periapical granuloma, 9% root cyst, 26.3% periapical diffuse osteitis. Adequate root fillings are characterized by the lowest frequency of periapical lesions (17.6%), while underfillings were associated with the highest values (80.9%). **Conclusion.** The quality parameters of the root fillings influence significantly the success rate of the long-term endodontic treatments.

**Key words:** root filling, length, density, chronic apical periodontitis

**Introduction.** Further to the direct relation between the periapical status and the quality of root fillings, a proper endodontic therapy is one of the key objectives of dentistry (Friedman S., 1998) /1/. “Cross-sectional” studies collect information from a certain population in a systematic way at a certain time and are used to determine the prevalence of chronic apical periodontitis and the relationship between the disease and patient’s exposure to pathogenic and etiological factors. Furthermore, these studies are used to describe the association between chronic apical periodontitis and the quality of endodontic treatments.

**Scope.** This study attempts to determine the part played by the quality parameters of the root canal filling on the prevalence and distribution of chronic periapical lesions in endodontically treated teeth.

**Material and method**

The work protocol observed the techniques used by some “cross-sectional” epidemiological studies that evaluate the periapical status in endodontically treated teeth at least two years ago. This kind of research shows the evaluation of the periapical status at the time of the study and does not take into consideration the pre-operative diagnosis. The studied group comprised a number of 167 patients (58 males, 109 females).
females), with ages from 20 to 59 years, having a number of 596 root-canal filled teeth. The quality of root canal filling (length, density) and the diagnosis of various forms of chronic apical periodontitis were evaluated by radiography. For the accurate evaluation of the quality parameters (density, length), magnifiers (4x) were used. The distance to the apex was measured by an endodontic line. The studied chronic apical periodontitis were represented by fibrous chronic periodontitis, periapical granuloma, diffuse periapical osteitis, root cyst. The quality of root filling was evaluated by X-ray examination: adequate density – absence of lateral spaces and/or gaps in the root filling mass; adequate length for sealing at 0.2 mm from the radiologic apex; underfilling – sealing at a distance of over 2 mm from the radiologic apex; overfilling – exceeding the radiologic apex. The data were recorded in worksheets and presented in worksheets under Microsoft Excel and SPSS 16 trial.

Results

The evaluation of the status of root and periapical area by means of X-ray examination allowed for correlating the quality of root canal filling and the prevalence of various forms of chronic periapical lesions. Figures 1-3 illustrate teeth with incorrect root filling associated with periapical lesions. The results of the study are presented in charts 1-7.
Having evaluated the quality of root fillings via the orthopantomographic examination, we obtained the following results: 38.9% of the studied teeth got adequate root filling (adequate length, adequate density), 39.5% got root underfilling, 5.3% got root overfilling and 15.9% got root filling with adequate length and inadequate density. The quality of root fillings varies in relation to the dental group: maxilla frontal teeth have got adequate root fillings in 47% cases, maxilla premolars in 39% cases, maxilla molars in 36.5% cases, mandible frontal teeth in 40% cases, mandible premolars in...
cases. Relating the presence of periapical lesions to the dental group, the chronic periapical lesions showed the following prevalence: 47.7% maxilla frontal teeth, 51.5% maxilla premolars, 55.5% maxilla molars, 54.2% mandible frontal teeth, 56.6% mandible premolars, 77.2% mandible molars.

In case of root-filled teeth where periapical lesions were diagnosed, the distribution of chronic apical periodontitis is as follows: 33.7% fibrous PAC, 41% periapical granuloma, 9% root cyst, 26.3% periapical diffuse osteitis. Adequate root fillings have the lowest periapical lesion prevalence (17.6%); underfillings were associated to the highest values (80.9%), while root fillings with adequate length and inadequate density were associated to periapical lesions in 63.1% cases.

Fibrous chronic apical periodontitis accounts for a large part of the periapical pathology root-filled teeth with adequate length associated to periapical changes (75.5%). Root-fillet teeth with adequate length and inadequate density were associated to fibrous periapical lesions (48.3%) and periapical granuloma (33.3%). The periapical granuloma was highly met in underfilled canals (48.1%) and overfilled canals (38.2%), and periapical diffuse osteitis was highly diagnosed in overfilled canal roots.

**Discussions**

Our study assessed a batch of 596 teeth with root canal filling by means of an X-ray exam. The study was performed in compliance with the protocol of similar “cross-sectional” studies (Pettersson&col. 1991, de Cleen &col. 1993, Eriksen&col. 1995, Saunders&col. 1997, Marques&col. 1998, de Moor&col. 2000, Kirkevang&col. 2000) /2,3,4,5,6,7,8/. Despite the limitations of these studies, their findings are deemed to be significant from a statistical perspective (Altman 1991) /9/. The analyzed quality parameters were the length and density of the root canal fillings. Numerous non-homogenous root canal fillings, with side spaces at the filling material/root walls, have been identified in our study. The emphasis of the peripheral gaps and spaces reflects the risk of multiplication bacteria in these gaps which thus constitute a development and preservation factor of peri-root inflammations /10/. Moreover, root canal underfilling represents a major risk for the appearance of the periapical pathology as a result of the creation of an environment and space which favors the development of a pathogenic endodontic flora /10/. Overfillings with non-resorbable material in excess in the periapical region have negative long-term effects on the healing processes in the periapical region /11/. We have analyzed the influence of the topography of the teeth that received endodontic treatment and of the root canal anatomy on the possibility to perform a root canal filling that ensures the best quality parameters (length, density). There is an obvious difference between the rate of inadequate root canal fillings met in mandible molars (77.7%) and the percentage of inadequate root canal fillings met in maxilla frontal teeth (47%). As concerns the prevalence of chronic periapical lesions and their relevance in relation to the quality of root canal fillings, the findings of our study can be correlated with the data presented by other similar studies. The rate of 55.4% chronic periapical lesions that we found at teeth with endodontic treatment can be compared to the findings of Sidaravicius&col. (1999) /11/ with 39.4%, De Moor&col. (2000) /7/ with 40.4% and Kirkevang&col. (2002) /10/ with 52.5% teeth with root canal fillings, associated with the periapical pathology.

Our study has shown that there is an 80.9% predominance of chronic periapical lesions in teeth with root canal underfilling. For the same category of root-filled teeth, Dugas NN.&col. (2003) presented values of approximately 60% in relation to the PAC prevalence, values that are similar to those in the studies performed by Cleen&col. (1993), Eriksen&col. 1995, Saunders&col. (1997) /12,2,4,5/. The specialized literature data, as well as the data we collected, stress the part of non-filling in the apical root area played on the failure of endodontic treatments. We can interpret the highest values of the chronic apical periodontitis prevalence as being the result of a bacterial contamination present in the apical third of the root canal, as the dental procedures were deficient and the dental environment got contaminated. As concerns the density of the
root canal fillings, we have noticed a 63.1% prevalence of chronic periapical lesions in root canal fillings of inadequate density. For this parameter, our data are similar to those in specialized literature, of which we mention the findings of Dugas NN.&col.(2003), with 60%, respectively Eriksson&col.(1988) with 70% /12,4/.

Conclusions

Our study shows an increasing frequency of incorrect root canal fillings caused by underfillings and an inappropriate filling density. The quality parameters of root canal fillings significantly influence the success rate of long-term endodontic treatments.

References