Frequency of Periapical Lesions Following Endodontic Treatment of Teeth

Dimitar L. Gospodinov, Petia F. Pechalova*

Department of Oral surgery, Faculty of dental medicine, Medical University, Plovdiv, Bulgaria

*Corresponding Author: Petia F. Pechalova, Department of Oral surgery, Faculty of dental medicine, Medical University, Plovdiv, Bulgaria. Email: pechalova@abv.bg

Abstract

Summary: Apical lesions following endodontic treatment are an important criterion for assessment of the success.

The purpose of this study is to determine the frequency of periapical lesions following endodontic treatment of teeth by x-rays and their interconnection to the level of root canal filling.

Material and Methodology: One hundred and twenty (120) dental x-rays of 120 teeth following endodontic treatment were examined. Teeth were divided into maxillary and mandibular teeth; single rooted and multirooted teeth. Four groups were differentiated according to the level of root filling, measured from cavum to apex: Group one – up to 25% of the root canal length, Group two – up to 50%; Group three – up to 75%; Group four – over 75% of the root canal length filled. Dimensions of apical lesions were determined by measurement of the vertical and horizontal diameter.

Results: By the examination of 120 teeth, apical lesions were observed in 33 of them. Root canals filled to at least 50% of the root length were 92% (110 teeth), those with root filling of less than 50% of the root length were 8% (10 teeth). In the largest group – with canal filling of up to 75% there was the greatest number of apical lesions 28, 57%. With the degree of filling of more than 75% the number of detected apical lesions was 17, 02%.

Conclusion: Filling of the root canal up to the x-ray apex leads to smaller number of apical changes.

Keywords: Filling of the root canal up to the x-ray apex leads to smaller number of apical changes.
In clinical practice, along with the conventional segment radiography, ortho pantomography and computed tomography and its subsection cone-beam computer tomography (CBCT) also play a role. CBCT has many advantages over the conventional radiography and may be used to diagnose periapical pathology, measurement of internal and external resorptive lesions, identification of perforations, fractures and traumas as well as for pre-operative planning of treatment.

The purpose of this study is to determine by x-rays the frequency of periapical lesions following endodontic treatment and their relation to the level of root filling.

2. MATERIALS AND METHODOLOGY

This study covers 120 conventional x-rays of patients who underwent endodontic treatment of teeth at least 12 months ago and have not had subjective complaints throughout that period. X-rays were taken by Planmeca ProXapparatus, which corresponds to the requirements of Regulation 93/42/EEC (exposure values 60 kv, 7 mA, time 0.080). The total number of visualized teeth was 285. Of the visualized teeth, 120 (42%) had prior endodontic treatment and were subject of this study. All teeth were divided into two groups according to the number of their roots and according to their allocation in the jaws. Subject of examination was the level of root filling along the canal – from cavum to apex by comparing the measured length of root canal and the length of root filling. For each tooth the x-ray image of the root canal was measured from cavum to apex and after that the length of root filling was measured in millimeters and the relevant calculations were performed. According to their root filling level, four groups were formed: Group one – up to 25% of the root canal length, Group two – up to 50% of the root canal length, Group three – up to 75% of the root canal length. Group four – over 75% of the root canal length. The horizontal and the vertical diameter of each lesion were measured in millimeters.

3. RESULTS

Out of the total of 120 teeth included in the study, 86 had one root (72%); 34 had multiple roots 28%. Ninety one of the studied teeth were maxillary (76%) and 28 teeth (24%) were of the mandible.

Canal filling agent was found in the root canals of all teeth included in the study.

The greatest number of teeth fell into the third group – 63 teeth (52, 5%). The group with completely obturated root canals (group IV) accounted to 47 teeth (39, 17%). Only 3 teeth (2, 5%) fell in to group one and 7 teeth (5, 83%) into group two (fig. 1).

![Figure 1. Distribution of teeth according to the level of endodontic filling](image)

Examination of x-rays determined 33 (27.5%) apical lesions out of the total of one hundred and twenty studied teeth (fig. 2).

![Figure 2. Ratio between all studied teeth and the teeth with periapical lesions according to the determined level of root canal filling](image)

Results of the exploration of size of lesions may be found on figure 3. The smallest apical lesion was with horizontal diameter of 0, 20 mm and vertical diameter of 0,10 mm. The biggest one – horizontal diameter 6,0 mm and vertical diameter – 5,00 mm. Average size of the examined thirty-three lesions was 1,38 mm horizontal and 1,34 mm vertical diameter.

![Figure 3. Distribution of average diameters of lesions according to the level of root canal filling](image)
In the first group the smallest lesion was with horizontal diameter of 0,5 mm and vertical diameter of 0,2 mm, the biggest one – horizontal diameter 1 mm and vertical diameter – 1 mm. Average size of the examined lesions was 0,75 mm horizontal and 0,6 mm vertical diameter.

In the second group the smallest lesion was with horizontal diameter of 0, 2 mm and vertical diameter of 0,1 mm, the biggest one – horizontal diameter 6 mm and vertical diameter – 5 mm. Average size of the examined lesions was 1.94 mm horizontal and 1,26 mm vertical diameter.

In the third group the smallest lesion was with horizontal diameter of 0,2 mm and vertical diameter of 0,2 mm, the biggest one – horizontal diameter 4 mm and vertical diameter – 4,5 mm. Average size of the examined lesions was 0,99 mm horizontal and 0,96 mm vertical diameter.

With all teeth the average horizontal diameter was bigger than the average vertical diameter. In the groups I, II and IV results were identical. In group III, on the contrary the average vertical diameter proved to be bigger than the average horizontal diameter.

4. DISCUSSION

In the dental practice application of conventional radiography and orthopantomography is wide spread. Prevailing opinion is that intra oral x-rays are more informative in respect to periapical lesions if compared to orthopantomography. Molander et al all (4) studied 200 panoramic and 200 intra oral x-rays of 400 patients for periapical pathology and found out that conventional intra oral x-rays register more osteolytic lesions (63%) compared to the lesions determined by orthopantomography (55%).

Peculiene et all (5) performed clinical and radiological monitoring of the dental status of 83 patients for a period of one year. They established that out of 2186 teeth, 283 undergo endodontic treatment; 122 teeth (43,1%) of those developed x-ray data for periapical lesions. Only 28,6 % of the prior endodontically treated teeth met the criteria for acceptable filling, according to the European Association of Endodontists – radiologically filling should be distanced from 0 to 3 mm from the tooth apex, whilst 58,3%(165 teeth) were with inadequate filling. Filled teeth without indications for apical periodontitis were 21% (25 teeth). The same study examined the occurrence of apical lesions with teeth with old endodontic treatment. Authors reported that out of 183 teeth with endodontic treatment provided long ago, 99 had apical lesions. In this study apical lesions prevailed with insufficient canal’s filling and bad adaptation to canal walls and are represented in 43% of the teeth with canal fillings.

Jersa et all (6) examined orthopantomographies in Latvia and established the frequency of periapical lesions of teeth following endodontic treatment of 72%. Data from Lithuania are similar – 70% (7) and Belorusia – 85% (8). The frequency of periapical lesions of teeth following endodontic treatment determined by our study is 27,5% and it is closer in value to the data of Marques et all (9) for Portugal – 27% and of Skudutyte-Rysstad et all (10) for Norway -16%.

Our study established that occurrence of apical lesions is in direct correlation with the quality of endodontic treatment. This conclusion was confirmed by other authors as well. Petersson (11) found out that teeth with partially obturated root canals will much more frequently develop apical period on it is if compared to teeth with completely obturated root canals. Jersaet all (6) found out that in teeth with partially obturated root canals the frequency of apical lesions is 35%, while in teeth with completely obturated root canals, apical lesions may be detected in 15% of them. This relation has been documented by other scientists as well. (12, 13)

5. CONCLUSION

Compromised endodontic treatment relates to higher risk of development of apical lesion. Intra oral x-rays are the optimal tools to monitor the apical zone following endodontic treatment.
REFERENCES


