Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/ijd

Original Article

Impact of the quality of coronal restoration and root canal filling on the periapical health in adult Syrian subpopulation

*Hisham Alafif**

Head of Endodontics Department, Faculty of Dentistry, Damascus University, Damascus, Syria

ARTICLE INFO

Article history:
Received 13 June 2013
Accepted 17 February 2014

Keywords:
Coronal restoration
Root canal filling
Periapical tissue

ABSTRACT

The purpose of this study was to determine the status of periapical tissues of endodontically treated teeth according to coronal restorations and root canal fillings separately and in concomitant in adult Syrian subpopulation.

Methods: 784 endodontically treated teeth from two hundred randomly selected Syrian adult patients were radiographically evaluated. According to predetermined criteria, the quality of coronal restorations and root canal filling of each tooth was scored as adequate or inadequate. The status of periapical tissues was also classified as healthy or diseased. Results were analyzed using Chi-squared test.

Results: Adequate coronal restorations were determined in 58.54% of cases which was accompanied with less periapical pathosis than that in teeth with inadequate restorations ($p < 0.01$). 14% of teeth were restored by posts which showed no significant impact on the periapical tissues health. 18.5% of endodontic treatments were evaluated as adequate with less number of periapical radiolucencies than that of inadequate root canal fillings ($p < 0.01$). Absence of periapical pathosis was 96.6% in cases with both adequate coronal restorations and root canals fillings. The rate was 88.5% in cases with only adequate root canals fillings, and about 70% in cases with only adequate coronal restorations. When the treatment was inadequate in both coronal and root canals fillings, success rate was only observed in 48.8%.

Conclusion: The most important factor with regard to the periradicular tissue health is the quality of root canal filling without neglecting the influence of coronal restoration (regardless of its type). There is a high prevalence rate of periapical pathosis in Syrian subpopulation due to poor dental practice.

1. Introduction

The main goal of endodontic treatment is the complete apical and coronal seal of root canal system to prevent the bacterial leakage and percolation.[1] Many studies have confirmed the importance of coronal leakage as a possible cause of failure of root canal treatment (RCT). Malone & Donelly[2] considered coronal restoration as it replaces missing tooth structure,

* Tel.: +963 988942322 (mobile).
E-mail address: Alafifhf63@hotmail.com.
http://dx.doi.org/10.1016/j.ijd.2014.02.004
0975-962X/

Please cite this article in press as: Alafif H, Impact of the quality of coronal restoration and root canal filling on the periapical health in adult Syrian subpopulation, Indian Journal of Dentistry (2014), http://dx.doi.org/10.1016/j.ijd.2014.02.004

protects remaining tooth from fracture, and prevents canals recontamination as the first protective barrier for the periapical tissues after RCT.

Torabinejad et al,[3] confirmed the results of Swanson & Madison 1978[4] that root canal treatment failure could be assumed to the delayed final restoration placement or when the temporary filling partially or completely loosed. Hence, a great attention should be paid for the immediate placement of coronal restoration. Some studies suggested the placement of a barrier made of different materials on the root canal orifices for complete coronal seal.[5,6] This barrier is indicated even in cases with post retained restorations.[7]

In 1995, Ray & Trope[8] published a radiographic study about the correlation between the periapical pathosis and endodontically treated teeth. Their results indicated that the adequacy of the coronal restoration is more important than the quality of the root canal filling. They also showed that the periapical pathosis related clearly to the quality of coronal restoration and not to the root canal filling. Kirkevang et al[9] gained similar results. On the contrary, many studies showed the adequacy of root canal filling is the most important preventive measure for the periapical tissues (although there was no negligence on the coronal restoration importance).[10,11] Moreover, Ricucci & Bergenholtz[12] reported that exposure of root canal fillings to the saliva (teeth with missing coronal restorations) was not necessarily associated with apical pathosis in cases with adequate endodontic treatment.

Many epidemiological studies from different countries: Brazil[11], France,[13] Turkey[14], Belgium[15], and Australia[16] gave conflicting results about the impact of the final coronal restoration on the status of periapical tissues. Gillen et al (2011)[17] & Pak et al (2012)[18] made a comprehensive review to studies related to this subject and couldn't resolve this controversy.

The aim of this study was to assess the influence of the quality of coronal restorations and root canal treatment (separately and in concomitant) on the periapical status of endodontically treated teeth from an adult Syrian subpopulation.

2. Materials and methods

We randomly selected panoramic X-rays for patients attended dental school of Damascus University who fulfill the selection criteria: patient's age was set to be minimum of 19-year-old, they had neither received any dental treatment for more than one year, nor had previously visited dental school clinics (selected patients are private clinic patients). Panoramic X-rays with any distortion especially in anterior region had been excluded. Our sample contained 200 high qualities panoramic X-rays which had been examined under good illumination and magnification by two endodontists with minimally 5 years experience individually. In cases when disagreement occurred, 25 years experience endodontist made the decision. The number of examines teeth in panoramic X-rays (except third molars) were 5331 teeth, 784 teeth (361 teeth for males & 423 teeth for females) received endodontic treatments (there was a radiopaque material in the root canals or pulp chambers).

We recorded the type of the final fillings as following:

Type of coronal restoration	(%) No.
No filling	(5%) 39
Filling	(42.1%) 320
Prefabricated post + filling	(3.3%) 26
Crown	(38.8%) 304
Post + crown	(10.8%) 85
Total	(100%) 784

The quality of the final restorations and root canal fillings had been classified as: adequate or inadequate according to Tronstad et al (2000)[10] as follows:

Adequate coronal restoration: restoration appears intact radiographically.

Inadequate coronal restoration: final restoration appears radiographically with overhang, open margin, recurrent caries, temporary filling or no filling.

Adequate root canal filling: all canals obturated with dense fillings ending about 2 mm shorter than the radiographic apex.

Inadequate root canal filling: Root canal fillings end more than 2 mm shorter than the radiographic apex or grossly overfilled. Root canal fillings with voids, unfilled canals, and/or poor condensation.

Periapical status was assessed by periapical index (PAI) proposed by Ørstavik et al (1986),[19] who scored the periapical area of the radiographic images as follows:

1. Normal periapical structures.
2. Small changes in bone structure.
3. Changes in the bone structure with little mineral loss.
4. Periodontitis with well-defined radiolucent area.
5. Severe periodontitis with exacerbating features.

According to this index we classified periapical tissue as:

Normal or healthy periapex: absence of radiographic evidence of diseased periapical tissues. This coincides with first and second scores.

Diseased periapex: radiographic evidence of diseased periapical tissues. This coincides with third, fourth and fifth score of Ørstavik et al index. The worst score of all canals was taken to represent the PAI score for multicanal teeth.

SPSS software was used for statistical analysis (SPSS Inc, Chicago, IL). Differences between groups were examined using Chi-square test.

3. Results

Out of 784 endodontically treated teeth, the Mandibular molars were the most frequent treated teeth. Mandibular anterior teeth were the least frequency. 459 cases (58.54%) had been classified as having adequate coronal restoration, and 325 (41.46%) cases as having inadequate one (Table 1).

In the 459 teeth with adequate final restoration, the status of periapical tissues was healthy in 353 teeth (76.9%) and diseased in 106 teeth (23.1%). In the 325 teeth with inadequate coronal restoration, the status of periapical tissues was

Please cite this article in press as: Alafif H, Impact of the quality of coronal restoration and root canal filling on the periapical health in adult Syrian subpopulation, Indian Journal of Dentistry (2014), http://dx.doi.org/10.1016/j.ijd.2014.02.004