ATTITUDE AND CURRENT EXPERIENCE OF DENTISTS ABOUT NON-SURGICAL RETREATMENT OF ENDODONTICALLY TREATED TEETH.

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Abstract

The main goal of endodontic treatment procedure is to preserve normal periradicular tissue against spreading of infection (1). This is usually achieved by root canal treatment. Unfortunately, failure may occur after root canal treatment. In this study, we focused on attitude and techniques used in re-treatment cases by dentists in Saudi Arabia, a cross-sectional study conducted by using an A questionnaire was designed on the basis of previously published surveys of endodontists and general practitioners (GPs). answered by approximately 236 dentists. The response to the questionnaire by internship students was highest (120), followed by general practitioner (83) and the least number of specialists (33) Results showed an agreement between the most of dentist’s answers about the factors makes them decide to re-treat the endodontically treated teeth, except in consensus most of the specialists (72.8%) that retreatment is mandatory when loss of coronal seal. More than 85% of practitioners are through with presence of some cases indicate referral to another dentist. Most of the specialists (55.2%) referred to the reason for the absence of required tools and equipment. In most responses, there was a total agreement between all practitioners in different scientific degrees. The success of non-surgical root canal retreatment depends on many factors, such as case selection, years of experience, techniques, and materials used during the procedure.

Introduction:

The main goal of endodontic treatment procedure is to preserve normal periradicular tissue against spreading of infection (1). This is usually achieved by root canal treatment. Unfortunately, failure may occur after root canal treatment (2,3). This failure after initial treatment caused by persistent of microorganisms in the root canal system (4). Streptococcus, Dialister, Fusobacterium, Filifactor have been detected in treated teeth. But the most frequently detected species in post-treatment diseases is Enterococcus faecalis according to several studies. So, the main aim of retreatment procedure is the removal of previous root filling material to allow for the disinfection and obturation of the root canal (5,6,7).

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Removal of root filling materials requires more mechanical manipulations when compared with initial endodontic treatment. Different techniques used in retreatment procedures include; hand files or rotary instruments with or without heat, solvent, and/or ultrasonic instruments (8).

In this study, we focused on attitude and techniques used in re-treatment cases by dentists in Saudi Arabia. Moreover, our survey based on collecting the information about the differences in treatment plan choices which may depend on educational background, years of clinical experiences, attitude of involved persons, and also clinical equipment.

Materials and Methods:
A questionnaire was designed on the basis of previously published surveys of endodontists and general practitioners (GPs) (9,10,11,12). It was submitted using a Google form and a hard copy to 236 active dentists and distributed to three categories of dentists (internship, GPs & specialist).

All survey participants were asked to provide demographic information about gender, practice years and scientific degree (13). The other questions addressed, the percentage of weekly root canal re-treatment cases, the factors makes some cases must be re-treated (14), causes of referral for some cases, techniques were mostly used during re-treatment procedure, most common errors that have been detected during procedures, the use of intra-canal medicaments between visits, convenient time for cases follow up and the prognosis of most re-treated cases (15).

Results:
In a three-month period, the survey was answered by approximately 236 dentists. The response to the questionnaire by internship students was highest (120), followed by a general practitioner (83) and the least number of specialists (33). The first table included the basal characteristics of participants such as (distribution of participants by scientific degree, gender and years of experience). Generally, the male participants were the highest ratio (60.6%) than female dentists (39.4%). 45.5% of specialists have experience years over 15 years and the highest percentage of all participants. In the other side, 51.8% of general practitioner and 100% of internship students have less than 5 years of clinical experience who are considered the majority of participants in this questionnaire. (Table1)

When asking the practitioners on an average number of retreatment cases coming to clinic per week, we found that the majority of answers were less than 25%. Results showed an agreement between the most of dentist’s answers about the factors makes them decide to re-treat the endodontically treated teeth, except in consensus most of the specialists (72.8%) that retreatment is mandatory when loss of coronal seal. More than 85% of practitioners are through with presence of some cases indicate referral to another dentist. Most of the specialists (55.2%) referred to the reason for the absence of required tools and equipment. But results revealed the cause of the general dentist’s referral was mainly when facing difficulties and complicated cases. (Table 2)

Table number three showed the results related to the behaviors and techniques used in retreatment procedure. Rotary files with solvent were the most used with specialists group (57.8%). 60% General practitioners and 59.1% internship adopted the manual files with a solvent in most cases. The usual errors that encountered during re-treatment procedures were ledge and blockage at an average rate of 30-45% with all practitioners. A high percentage of the responses (more than 65%) were supported the use of intra-canal medication between visits. (Table 3)

60-67% of all practitioners preferred to follow up their cases from 3 to months to ensure the success of the re-treatment procedure. The prognosis was fair for the most participant (52-63%) and rated well in the range 30-33% for the retreated cases. (Table 4)

| Table1: Basic information of practitioners |
|------------------------------------------|
| Scientific degree | Internship | General practitioner | Specialist |
|--------------------|------------|----------------------|------------|
| Total number       | 120        | 83                   | 33         |
| Gender             |            |                      |            |
| Male               | 76         | 47                   | 20         |
| Female             | 44         | 36                   | 13         |
| Years of Experience |           |                      |            |
| 0-5                | 120        | 100%                 | 43         | 51.8%      | 3          | 9%         |
| 6-10               | 0          | 0                    | 22         | 26.5%      | 8          | 24.3%      |
| 11-15              | 0          | 0                    | 10         | 12%        | 7          | 21.2%      |
### Table 2: Experience in case selection

| Percentage of cases coming to the clinic weekly and require root canal re-treatment: | Internship | General practitioner | Specialist |
|---------------------------------|-------------|---------------------|-------------|
| 1-25%                           | 80 66.7%   | 43 51.8%            | 14 42.4%   |
| 26-50%                          | 36 30%     | 26 31.3%            | 9 27.3%    |
| 51-75%                          | 4 3.3%     | 14 16.9%            | 3 9.1%     |
| More than 75%                   | 0 0%       | 0 0%                | 7 21.2%    |

| Factors make/s you decide to re-treat the endodontically treated teeth? (you can select more than one) | Internship | General practitioner | Specialist |
|-------------------------------------------------------------------------------------------------|-------------|---------------------|-------------|
| When replacing fillings, posts, and crowns with symptomless teeth.                             | 24 20%     | 14 11.6%            | 12 36.4%   |
| Presence of symptomatic periapical lesion.                                                     | 97 80.1%   | 64 77.1%            | 33 100%    |
| Presence of asymptomatic periapical lesion.                                                    | 56 46.6%   | 38 45.8%            | 21 63.6%   |
| Poor quality of obturation without periapical lesion.                                           | 55 45.8%   | 36 43.4%            | 18 54.5%   |
| All old obturations should be re-treated.                                                       | 5 4.1%     | 6 7.2%              | 5 15.1%    |
| Presence of broken files.                                                                      | 15 12.5%   | 10 12%              | 7 21.2%    |
| Loss of coronal seal.                                                                           | 47 39.2%   | 25 30.2%            | 24 72.8%   |
| Probability of presence missing canals.                                                         | 75 62.5%   | 48 57.8%            | 23 69.7%   |

| If any retreatment cases indicated for a referral?                                               | Internship | General practitioner | Specialist |
|-------------------------------------------------------------------------------------------------|-------------|---------------------|-------------|
| Yes                                                                                             | 117 97.5%  | 71 85.5%            | 29 87.9%   |
| No                                                                                              | 3 2.5%     | 12 14.5%            | 4 12.1%    |

| The cause of the referral? (if answer YES to the previous question)                              | Internship | General practitioner | Specialist |
|-------------------------------------------------------------------------------------------------|-------------|---------------------|-------------|
| Absence of required tools and equipment.                                                        | 33 28.2%   | 16 22.5%            | 16 55.2%   |
| Lack of skills.                                                                                 | 39 33.3%   | 10 14%              | 5 17.3%    |
| Complicated cases.                                                                              | 40 34.2%   | 45 63.5%            | 8 27.5%    |
| Knowledge                                                                                       | 5 4.3%     | 0 0%                | 0 0%       |

### Table 3: Behaviors and techniques during retreatment procedure

| Scientific degree | Internship | General practitioner | Specialist |
|-------------------|-------------|----------------------|-------------|
| The most common techniques or tools used in retreatment cases? | Numb. % | Numb. % | Numb. % |
| Manual files (H-files, K-files) with solvent. | 72 60% | 49 59.1% | 6 18.2% |
| Manual files (H-files, K-files) without solvent. | 37 30.8% | 7 8.4% | 2 6% |
| Rotary files with solvent. | 8 6.7% | 20 24.1% | 19 57.6% |
| Rotary files without solvent. | 3 2.5% | 7 8.4% | 6 18.2% |

| A most common problem encountered during retreatment procedures. | Numb. % | Numb. % | Numb. % |
|----------------------------------------------------------------|----------|---------|---------|
| Apical transportation | 8 6.7% | 8 9.6% | 3 9.1% |
| Broken instruments | 8 6.7% | 16 19.3% | 3 9.1% |
| Ledge formation | 41 34.2% | 21 25.3% | 10 30.3% |
| Perforation | 19 15.8% | 7 8.4% | 2 6% |
| Blockage | 44 36.6% | 31 37.4% | 15 45.5% |

| If prefer to use intra | Numb. % | Numb. % | Numb. % |
|-----------------------|---------|---------|---------|
Discussion:-
Post-treatment disease may persist our emerge because of persistent bacteria in the root canal system as a consequence of insufficient cleaning, untreated canals, inadequate filling or coronal leakage. Non-surgical root canal retreatment is often indicated as a first choice to eliminate or reduce the microbial infection (16,17).

According to the collected information from the practitioners about the cases coming to the clinic per week and require root canal retreatment, the answers revealed only 1-25% overall the endodontic cases. Therefore this is referred to as the generally good quality of root canal treatment (18). Many factors were reported by internship, general practitioners and specialists that should be considered before making their decisions to retreat endodontically treated teeth (19). Presence of symptomatic periapical lesion may be associated with poor quality of obturation or probability of presence missed canals, so this is represented an indication for root canal retreatment depending on our results and previously studied intention to avoid the progression of the lesion and to lower the possibility of future complications (20,21). In addition, the specialists were agreed with many researchers who concluded that "the quality of the coronal restoration is significantly more important than the quality of the endodontic treatment for periapical health.". Moreover, the post-endodontic restoration was considered as a requirement only for restoring the tooth to function. The fact that it could affect the outcome of endodontic treatment (22,23).

The results showed that more than 85% of all participants preferred to refer the retreatment cases for different reasons. The reasons were evenly distributed between complicated cases, lack of skills and absence of required tools and equipment regarding internship, while the general practitioner prioritizes to refer the complicated cases. Lack of tools and equipment was the main issue for specialists.

The degree of root canal cleanliness and hence the amount of remaining filling material after gutta-percha removal might be affected by several factors; including the technique and instruments used for removal, the adjunctive use of a solvent, type of filling material and the root canal anatomy (24). In the current study, most of the specialists preferred to use rotary files in combination with a solvent (57.6%), this may be to benefit from its features such as preserve the working time and its effectiveness in the retreatment cases (25,26). On the other hand, most of the internship and general practitioner dentist used manual files (H-files, K-files) with solvent.

Failure to understand the rationale behind cleaning and shaping concepts can increase the occurrence of needless complications such as blockages, ledge formation, apical transportation, and perforations (27). The presence of a ledge, blockage, broken instruments and perforation may result in incomplete instrumentation and disinfection of the root canal system as well as the incomplete filling of the canal. Consequently, there might be a causal relationship between this errors formation and unfavorable endodontic treatment outcomes (28,29,30). Ledges and blockage were the highly rated procedural accident had been encountered during endodontic retreatment for most of the practitioners. Apical transportation, broken instrument, and perforation can happen also, but at a very low rate as the resulting score (31).

| Table 4: Follow up and the Expected prognosis after retreatment procedure |
|-----------------------------------------------|---------------|----------------|---------------|
| **Scientific degree** | **Internship** | **General practitioner** | **Specialist** |
| **Question** | **Options** | Numb. | % | Numb. | % | Numb. | % |
| After finishing of retreatment, what is the proper time to follow up the retreated tooth? | From 1 week to 1 month | 37 | 30.8% | 16 | 19.4% | 8 | 24.2% |
| | 3 months to 6 months | 72 | 60% | 56 | 67.6% | 22 | 66.7% |
| | More than 6 months | 11 | 9.2% | 9 | 10.5% | 3 | 9.1% |
| | No need for follow up | 0 | 0% | 2 | 2.5% | 0 | 0% |
| What is the prognosis of most retreatment cases? | Poor | 18 | 15% | 11 | 13.3% | 2 | 6% |
| | Fair | 63 | 52.5% | 44 | 53% | 21 | 63.7% |
| | Good | 39 | 32.5% | 28 | 33.7% | 10 | 30.3% |
Many studies suggested the use of intra-canal medication between visits to exert their effects as a disinfectant and to promote healing to the periapical area \(^{(32,33)}\). Gomes et al. \(^{(34)}\) observed that 2% of chlorhexidine (CHX) showed the maximum zone of inhibition against Porphyromonas gingivalis, Enterococcus faecalis, Actinomyces viscosus, and Candida albicans followed by a combination of calcium hydroxide (Ca(OH)2) and CHX and the least with Ca(OH)2 alone. It is generally accepted by most participants to use intra-canal medicaments (more than 60%) to achieve better prognosis after finishing the procedure \(^{(35)}\).

The majority of studies noted the presence of apical periodontitis as an indication for retreatment; most reported a negative influence of apical periodontitis on the success of nonsurgical retreatment. These studies demonstrated a reduction in the success of 13%–36% \(^{(36,37,38)}\). The size of the apical lesion might also have a deleterious effect on outcomes for endodontic surgery, with larger lesions being related to less favorable healing. Preexisting procedural accidents also have a negative effect on healing. Gorni and Gagliani \(^{(39)}\) examined the influence of alterations in the root canal morphology during previous treatment such as transportation and lodging. They found a 40% drop in nonsurgical retreatment success when there was a preexisting alteration in the morphology compared with teeth in which the canal morphology was respected. The presence of perforation results in a 31% decrease in success. Therefore, due to the presence of these factors, most of all participants found the prognosis of retreated cases is fair.

The main goal of retreatment procedures is to eliminate inflammation or infection from and maintain tooth ends. Ca(OH)\(_2\) promotes healing to the periapical area \(^{(31)}\). Many studies suggested the use of Ca(OH)\(_2\) to reestablish procedural reasons insufficient to allow endodontic retreatment success when there was a preexisting alteration in the morphology compared with teeth in which the canal morphology was respected. The presence of perforation results in a 31% decrease in success. Therefore, due to the presence of these factors, most of all participants found the prognosis of retreated cases is fair.

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**Conclusion:**

In most responses, there was a total agreement between all practitioners in different scientific degrees. The success of non-surgical root canal retreatment depends on many factors, such as case selection, years of experience, techniques, and materials used during the procedure.

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