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Research Article

MANAGEMENT OF THE PATIENTS WITH OVERFILLED ROOT CANALS.

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Abstract:

The goal of the study was to evaluate the influences of overfilled root canal materials. The study shows a comparative evaluation of patients with extruded root material in bone. Patients required endodontic surgery were divided into groups: 1st group -patients with inadequately obturated and overfilled, 2nd group - patients with adequately obturated but overfilled, 3rd group patients with inadequately obturated and filled till the root apex. We checked the dates of previously done endodontic treatment, primary diagnosis, root canal obturation quality, which material had been used, localization of pathology, the presence of pain or discomfort, a need of taking painkillers. Results. Root canal obturation material was overfilled in maxilla in 66.2% cases in group 1 and in 69% in group 2. And in mandible in 33.8% cases in group 1 and 31% in group 2. No significant difference of overfilling material volumed showed in group 1 and group 2. More complains about painful sensations were seen in group 1 and 2, rather than in group 3. A need for painkillers in all groups was around the same: 35.3% for group 1, 33.3% for group 2, and 35.5% for group 3. 1-year post-treatment results showed favorable outcome in 75.2 % for group 1, 97.6 % for group 2, 88.7% for group 3.

Keywords: sealer, overfilling, endodontic surgery, pain, treatment outcome of endodontic surgery.

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INTRODUCTION:

Nowadays, it is well known that endodontic materials should be limited to root canals without extension into periapical tissues during root canal treatment. However, overextension of these materials may take place accidentally through over-instrumentation or perforation of the root canals, allowing passage of dressing agents, sealers, or filling materials to neighbouring structures. Careful attention is needed in such cases of overextension because the patient may experience complications such as pain or tissue necrosis. Dr. Schilder H. (2006) divided cases of overfilled root canals into 2 groups: with adequate obturation of root canals and with inadequate obturation of root canals. It is important to distinguish an adequately sealed root canal from an overfilled canal with under-obturation. In the latter case, it is difficult to judge about the only role of filling materials to affect the treatment outcome due to the presence of additional microbial factor [1]. Ran, J. et al. (2018) summed up the reasons of paraesthesia and painful events after root canals overfilling. Certain chemical mediators, including histamine and prostaglandins, free up into the tissues in the response of artificial substances invasion. The substances can cause painful reactions and hyperesthesia [2]. Ørstavik D. (2004) made a conclusion that the most of inflammatory reactions take up to 1 year, whereas tissue regeneration takes up to 4 years [3]. Kim J.L. (2006) in a clinical study stated that overfilling root canals with any material can cause neurological complications such as paraesthesia [4]. At the same time, Gomes-Filho J.E. (2011) notes that complications possibility from overfilling with biocompatible materials is little, from a histological point of view [5]. The goal of the study was to evaluate influences of overfilled root canal materials. The study shows a comparative evaluation of patients.

MATERIALS AND METHODS:

Treatment of the patients was performed in a state dental clinic in Moscow, Russia. Patients were indicated for endodontic surgery (apicoectomy and retrograde filling) due to having symptoms of

inflammation and lacking improvements after root canal treatment. There were 172 patients diagnosed who had undergone root canal treatment before. Overall, 62 males (36%) and 110 females (64%). Depending on root canal treatment quality and the level of obturation all patients were divided into 3 groups:

1st group included 68 patients with inadequately obturated and overfilled.

2nd group included 42 patients with adequately obturated but overfilled.

3rd group (control group) included 62 patients with inadequately obturated and filled till the root apex.

We gained medical history and performed x-ray diagnosis for each case before starting treatment. We also checked the dates of previously done endodontic treatment, primary diagnosis, root canal obturation quality, which material had been used, localization of pathology, the presence of pain or discomfort, a need of taking painkillers. We performed the second diagnosis in 1 year and checked the results of the treatment. Analysis data processing was made with standard methods of statistics in program SPSS 21.0.

RESULTS:

As our study showed group 1 patients showed the following: 41.2% of patients had pulpitis, 58.8% of patients had periodontitis. Localization of the pathological processes were in maxilla at 66.4% cases and in mandible at 33.8% cases. 39.7% of patients were diagnosed with a volume of overextended filling material equal or less than 2 mm. 60.1% were diagnosed with a volume of 2 mm and more. In average, the overextended material stayed in periapical tissue for 377 days, for at least 10 days and for at most 1258 days. Presence of pain and discomfort in a root canal area were diagnosed in 70.6% patients. No pain or discomfort - in 29.4%, respectively. A need for painkillers was in 35.3% patients. And 64.7% of them didn't require painkillers. Different filling materials were present in root canals: epoxy resin, zinc-oxide eugenol cement, calcium hydroxide, and others. Favorable treatment outcome was seen in 73,5 % of cases. Figure 1 shows data about treatment outcome.

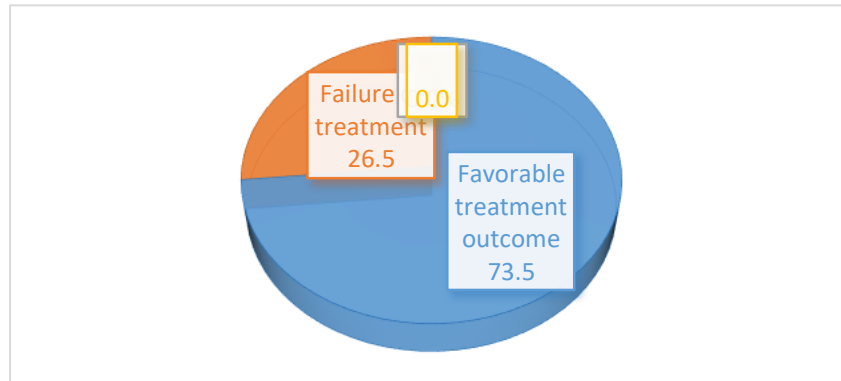


Figure 1. Treatment outcome in group 1

The most frequent material present in patients of group 1 was epoxy resin (36.8%) and zinc-eugenol cement (36.8%). More rarely than that we found other not listed materials (19%); very little of calcium hydroxide (7.4%).

Group 2 analysis

Clinical analysis of group 2 patients showed the following: 20% of patients had pulpitis, 80% of patients had periodontitis. Localization of the pathological processes was in maxilla at 69% cases and in mandible at 31% cases. 69% were diagnosed

with a volume of 2 mm and more. 31% of patients were diagnosed with a volume of overextended filling material equal or less than 2 mm. In average, the overextended material stayed in periapical tissue for 673 days, for at least 26 days and for at most 2940 days. Presence of pain and discomfort in a root canal area were diagnosed in 62% of the patients. No pain or discomfort - in 38%, respectively. A need for painkillers was in 33.3% patients. And 66.7% of them didn't require painkillers. Favorable treatment outcome was seen in 97.6% of cases (Figure 2.).

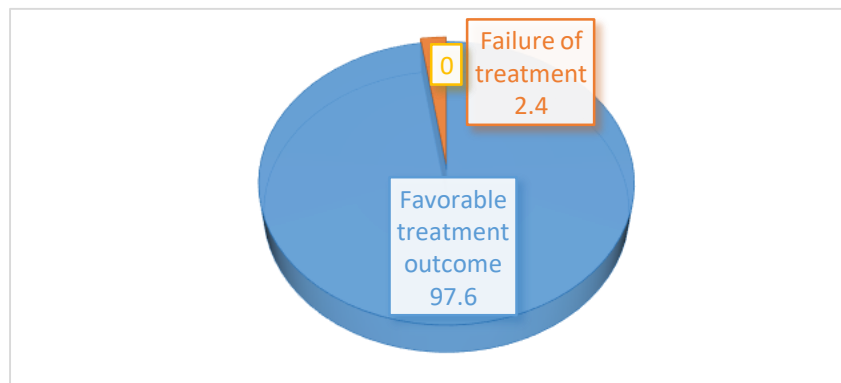


Figure 2. Treatment outcome in group 2

Different filling materials were present in root canals. The most frequent material present in patients of group 2 was zinc-eugenol cement (38%). More rarely than that we found epoxy resin based sealer (31%) and other not listed materials (31%). There were no found materials based on calcium hydroxide containing sealers in this group.

Group 3 analysis

Clinical analysis of group 3 patients showed the following: 42% of patients had pulpitis, 58% of the patients had periapical periodontitis. Localization of

the pathological processes was in maxilla at 54.8% cases and in mandible at 45.2% cases. In average, the overextended material stayed in periapical tissue for 782 days, for at least 31 days and for at most 1650 days. Presence of pain and discomfort in a root canal area were diagnosed in 48.4% of the patients. No pain or discomfort - in 51.6%, respectively. A need for painkillers was in 35.5% of the patients. And 64.5% of them didn't require painkillers. Favorable treatment outcome was seen in 88.7% of cases (Figure 3.).

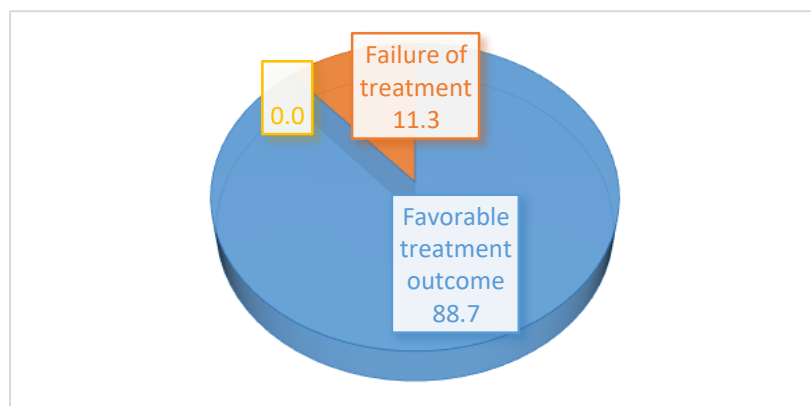


Figure 3. Treatment outcome in group 3.

The most frequent material present in patients of group 1 was zinc-eugenol cement (37.1%). More rarely, than that we found epoxy resin (32.3%) and other materials (30.6%). There were no found materials based on calcium hydroxide and silicone resin in this group.

Pathological characteristics	Group 1	Group 2	Group 3
Primary diagnosis			
pulpitis	41.2	20,0	42
periodontitis	58.8	80,0	58
Overfilled root canal material localization:			
maxilla	66.2	69.0	-
mandible	33.8	31.0	-
Overfilled root canal material volume			
less than 2 mm	39.7	31.0	
more than 2 mm	60.3	69.0	
present	70.6	62.0	48.4
absent	29.4	38.0	51.6
A need for painkillers use:			

present	35.3	33.3	35.5
absent	64.7	66.7	64.5
Average time between endodontic treatment and endodontic surgery (days)	377	673	782
Favorable treatment outcome	73,5	97,6	88,7

Also, clinical analysis of all three groups was performed. It is showed in Table 1.

Table 1. Comparison of root canal pathological characteristics in three study groups of patients (%).

CONCLUSION AND DISCUSSION:

Comparative analysis showed that patients with both under-filled root canals and over-filled beyond the root apex had primary diagnosis of pulpitis equally often - in 42% of cases. This is reliable ($t>2$), as Table 1 shows. At the same time, patients with adequately filled root canals had diagnosis of pulpitis less often, only in 20% of cases.

Primary diagnosis of periodontitis was seen equally often in both patients with under-filled root canals and patients with over-filled canals - in 58% of cases. This is less reliable ($t>2$) than in patients with adequately filled root canals - periodontitis in 80% of cases.

Localization of pathological processes was 66.2% and 69% in a maxilla in patients of group 1 and 2, respectively. In a mandible - in 33.8% and 31% of group 1 and 2 cases, respectively. Also, it is important to mention that the volume of over-filled material was more in a mandible than in a maxilla. At the same time, in group 3 the localization of it was in maxilla in 54.8%, and in mandible in 45.2%. That is not reliable ($t<2$), meaning that can be equally probable.

A volume of filling material beyond the apex, in group 1 and 2, was not different ($t<2$). However, in both group 1 and 2 there were more cases with >2 mm of material beyond the apex rather than cases with <2 mm of material beyond the apex. That is reliable ($t>2$). Painful symptoms correlate directly with a volume of over-filled material.

Patients of group 1 and 2 had more complains about painful feelings at filled teeth areas ($t>2$), 70.6% and 62%, respectively. Patients of group 3 had less complains of pain, 48.4%. Despite the data about different pain symptoms in all three groups given above, a need for painkillers in all groups was around the same: 35.3% for group 1, 33.3% for group 2, and 35.5% for group 3.

Epoxy resin based sealer and zinc-oxide eugenol cement are most frequently seen in all groups.

Moreover, these materials are present in around one-third of the cases (31-36.8%).

Group 1 patients required surgical root canal treatment earlier than patients of group 1 and group 2. The worst primary treatment outcomes were in group 1, as well. Better outcomes were in group 2 (97.6%) and group 3 (88.7%). According to De Moor R. J. G. et al. (2000), the success rate of overfilled root canals treatment is around 50-60% [6]. A significant factor in success is a level of root canal obturation. Treatment after root canal complications is a time-consuming task. Not treating root canals on time can cause an inflammatory process. Seltzer S. (1999) described the role of root canal filling materials and proved that in cases of over-filling it can cause an inflammatory reaction of surrounding periapical tissues [7]. Torabinejad M. et al. (2009) estimated the success rate of endodontic surgery in cases of overfilled root canals. According to his findings, the success rate is 77.8%, which correlates with the data of this study [4]. Pasqualini D. (2012) thought that filling material beyond the root apex is the reason of painful feelings in patients [9]. That also correlates with this study. Patients with the material beyond the apex felt discomfort twice as often as patients with not overfilled root canals.

Thereby, the findings give us a conclusion, that over-filling during root canal treatment is not desirable. Along with bad quality root canals obturation, it can increase the unfavorable outcome of treatment.

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