

## Evaluation Of Association between Ongoing Endodontic Treatment and Development Of Periodontal Diseases - A Retrospective Study

Research Article

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### Abstract

**Introduction:** It is a well established fact that in recent times the incidence of dental caries has increased in many folds. This can be attributed to the increased consumption of processed food, sugar based diets and also lifestyle changes. These lifestyle changes have also played a significant impact on an individuals general health. When carious lesions in the initial stages are neglected they often progress to become more Cavitated and deeper carious lesions involving the pulp that eventually need endodontic intervention. Periapical pathology in such cases is quite common. Patients undergoing endodontic treatment often have reported having disused the side of the mouth where the treatment is ongoing or required. This is often due to pain in the teeth involved, fear of disease progression or can be a combination of psychological factors. Such a habit often leads to plaque build up in the disused side leading to further periodontal problems, that might eventually impact the overall prognosis for the teeth involved. The present study aims to evaluate the impact of ongoing endodontic treatment on the periodontal Health and disease causation in a retrospective manner.

**Materials and Methods:** The study was conducted on 25 patients who visited the endodontic out patient department at Saveetha Dental College for routine endodontic treatment. Patients who were included for the study were habituated to using only one side of the mouth due to endodontic problems on the other side of the dental arch. Further the periodontal charts from the first visit of the patient was accessed to gather information such as presence of stains, pocket depths, plaque and calculus build up etc. On completion of endodontic treatment the same was re-recorded and then compared to see for progression or regression of the periodontal disease and establish an association. The results were correlated using SPSS student version 23.0 to establish statistical association between data collected.

**Results:** The study showed a positive association between the progression of periodontal disease and disuse of teeth undergoing endodontic treatment. The association was found to be statistically significant ( $P < 0.05$ )

**Inference:** Patients should be encouraged and counselled to not develop or continue with a habitual occlusion during endodontic treatment. This intern can improve the overall prognosis of the tooth.

**Keywords:** Endodontic Treatment; Masticatory Habits; Oral Health; Periodontal Health; Pulp Disease Progression.

### Introduction

It is a known fact that the mouth is the gateway to the digestive system and the maintenance of oral hygiene reflects the overall health status of an individual [1]. More than often any diseases associated with any system in the body shows its first signs and symptoms in the oral cavity. Hence good oral hygiene practices

and frequent visits to the dentist become of crucial importance. Poor oral hygiene practices such as infrequent brushing of teeth, consumption of sugars in an increased frequency, dietary habits like consumption of processed foods and other habits such as smoking, alcohol consumption etc can adversely affect the oral hygiene of a person [2]. Build up of calculus and tartar, staining of teeth, bad breath etc are most often seen in such patients. The

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presence of plaque in the oral cavity and build up of calculus can further cause diseases of the periodontium and also cause dental caries.[3]

Dental caries is a complex microbial pathology where the inorganic and the organic components of the tooth are affected due to organic acids produced by caries causing microorganisms in the presence of complex substrates, most often dietary sugars such as fructose and other carbohydrates [4]. These organisms are most often commensals in the oral cavity and become pathological when they achieve the right micro environment to cause the shift in the balance. Many theories such as Stephens curve [5, 6] have been previously studied to explain this phenomenon. Further, the caries causing organisms coexist in harmony with other microorganisms that can also play a role in causing periodontal pathology. This concept of co aggregation has been extensively studied. These coaggregations are often referred to as Biofilms and accommodate a large spectrum of micro organisms that include aerobic, anaerobic and facultative organisms.[7]

When the quality of oral hygiene depletes in an individual most often the development of dental caries and or white spot lesions is often seen [8, 9]. These carious lesions can then progress to become larger cavitated lesions that might involve the pulp and also cause peri apical pathologies. The development of deep caries with pulp involvement is conventionally treated by root canal treatment. Often patients report to the dentist only on development or exaggeration of symptoms in the associated symptoms. The most common chief complaint in such cases is pain. Once the dentist initiates the required endodontic treatment it is common for many patients to disuse that side of the dental arch fearing further exaggeration of the pain, or in some cases dislodgement of the temporary restoration and so on. Patients also have reported to have stopped brushing in the site of the tooth under endodontic treatment. Conventionally a multi visit endodontic treatment can extend upto two or three sittings spanning a few weeks time [10, 11]. In that duration of time the disease and the poor oral hygiene in the region of tooth under treatment has shown considerable plaque build up leading to further periodontal diseases such as acute gingivitis, development of pathological pockets, bleeding gums etc. Previously our team has a rich experience in working on various research projects across multiple disciplines [12-26]. Now the growing trend in this area motivated us to pursue this project.

The aim of the present study is to evaluate association between ongoing endodontic treatment and development of periodontal disease in a retrospective manner.

## Materials And Methods

The study was conducted in the Endodontic postgraduate OPD in Saveetha Dental College Chennai. The study was conducted on the prior clearance by the institutional ethics committee. A total of 25 patients were included in the study. These patients had presented to the clinic with Deep dental caries that needed endodontic intervention ie. caries involving the enamel, dentin and the pulp. All the patients included in the study were informed about the study and due written and video consents were obtained. All the included patients satisfied the inclusion criteria that was previously decided for the study.

## Inclusion Criteria

1. All the patients should have visited the dental clinic at least 3 months earlier for any other treatment or for a routine checkup.
2. The patients should not have any pre existing periodontal diseases or be under treatment for the same.
3. Patients should be of age group 18-60.
4. Patients should not have any pre existing habitual occlusion, that might cause bias to observations of the present study.
5. Patients who report use only one side of the mouth for chewing and avoid brushing in the side of the dental arch with the tooth in question.

## Exclusion criteria

1. Patients who visited the clinic first time and there is no baseline case data available.
2. History of periodontal disease that is pre existing.
3. Patients below age of 18
4. Patients who are not capable of taking care of their oral hygiene due to certain disorders or conditions (eg. Patients with special needs) and patients who have habitual malocclusion etc.

When the patients reported to the clinic it was first seen that they satisfy all the inclusion criteria. The tooth in complaint was then accessed and radiographically by IOPAR (Kodak RVG 5200) for endodontic pathology. The presence of stains, plaque, calculus build up and pocket depths in relation to the tooth in complaint was noted. The presence of stains and calculus was detected by simple visual examination and use of plaque detecting dyes. Whereas the pockets were measured using a CPITN Probe (Eufriedy CPITN). These details were considered as baseline data for analysis. The patients case sheets were now assessed and the same information was retrieved for a time duration that is at least 3 months older. Additionally the same details were also recorded at the end of the treatment. Thus three sets of data from three time intervals were obtained for analysis. The obtained data was then statistically analysed using the SPSS. 23.0 Student version for statistical significance. Data was interpreted and conclusions were drawn.

## Results

It was observed that 8 patients had clinical findings of stain and plaque at pre-appointment that increased to 23 [8 (stains + plaque) and 15 (stain + plaque + gingivitis)] during the first appointment with no further increase in the clinical finding at the final appointment. (Table 1) Overall there was a statistically significant increase in the number of patients with clinical findings at different duration of treatment ( $P = 0.001$ ). There was a significant increase in the number of patients with respect to clinical finding from pre-appointment to the first appointment ( $P = 0.001$ ). However, there was no significant increase in the number of patients with clinical finding from first appointment to final appointment ( $P = 0.98$ ). There was a statistically significant increase in the frequency of clinical findings from pre-appointment to first appointment ( $P = 0.001$ ). There was no significant increase in the frequency of clinical findings from first appointment to final appointment ( $P = 0.98$ )

**Table 1. Distribution of clinical findings at pre-treatment, during treatment and at the end of treatment. The clinical parameters ie. Stains, calculus and gingival pockets were assessed for first appointment, inter appointment and final appointments.**

Clinical Findings	Pre appointment	First appointment	Final appointment
Yes	8	23	23
Stains	3	-	-
Plaque	5	20a	20a
Gingivitis	-	3b	3b
No	17	2	2

a-stain and plaque; b-stain and plaque and gingivitis

**Table 2. Frequency of clinical findings among study participants at different time intervals.**

	No	Yes
Pre-appointment	17	8
First-appointment	2	23
Final-appointment	2	23
Cochran's Q	30	
P value	P = 0.001*	

Level of significance at  $P \leq 0.05$  \*statistically significant

**Table 3. Frequency of clinical findings among study participants between pre-appointment and first appointment.**

Pre-appointment	first-appointment		Total	P value
	No	yes		
No	2	15	17	P = 0.001*
yes	0	8	8	

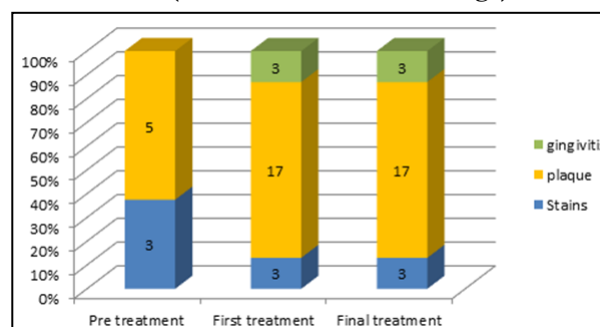
Level of significance at  $P \leq 0.05$  \*statistically significant using McNemar's test

**Table 4. Frequency of clinical findings among study participants between first-appointment and final-appointment.**

First appointment	Final appointment		Total	P value
	No	yes		
No	2	0	2	P = 0.98
yes	0	23	23	NS

Level of significance at  $P \leq 0.05$  NS- Not significant using McNemar's test

**Figure 1. Distribution of study participants according to clinical findings at pre-treatment during treatment and final treatment (N = 23 with clinical findings).**



## Discussion

Our institution is passionate about high quality evidence based research and has excelled in various fields [27-37].

It is a well established fact that the development of plaque on tooth surfaces can set off a cascade of pathological processes [38, 39]. This can affect the tooth and the periodontium and in most cases both. While plaque serves as a substrate for caries causing organisms to produce organic acids and cause dissolution of the inorganic component of the tooth, it can also cause localised inflammation of the tissue surrounding the tooth and cause periodontal pathology. Hence it is safe to say that a set of good oral hygiene can be beneficial to both the tooth and the surrounding tissues.[40]

Several patients undergoing endodontic treatment have been observed to have a habit of abstaining from using the side of the dental arch where the tooth is being treated. Further it is also common for patients to mention that they have stopped brushing on that side of the dental arch. A common explanation for this practice patients often give is that they are scared of the pain that might be inflicted if the tooth under treatment is used. While it is evident that teeth under treatment or teeth that are tender on percussion will most often have pain on biting, it is the dentist's duty to educate the patients on the consequences of misusing a dental arch for a longer duration.

Rather patients must be given a time frame for which they may disuse that particular region of the dental arch and then return back to usage with a softer diet [41], preferably vegetarian. At the same time patients must be educated that it is very important to maintain the oral hygiene well in the entire mouth and they should also be educated on methods other than routine brushing. The use of chlorhexidine mouth, warm water saline gargle etc should be reinforced. Patients should be educated on the consequences of not following these instructions and must be taught how to weigh the pros and cons of their practices.[42, 43]

In the current study it was observed that the only significant change associated with disuse of an arch and cessation of brushing on that side of the arch was the accumulation of plaque. This is because the side of the arch would have no cleansing mechanisms natural or stimulated and hence there is progressive plaque accumulation. Further diet and other habits could lead to exaggeration of the plaque build up and the signs and symptoms in development. Generally, most multi visit root canal treatments would complete within a 2-3 week duration and perhaps due to this short duration of time, no other signs like presence of calculus or stains or pocket development was seen. However, more acute stages of periodontal disease such as chronic marginal gingivitis were seen. Patients need to be educated on how to self diagnose simple signs such as bleeding gums, so that they can avail required treatment in a timely manner.

Further, if the endodontic treatment spans over a longer period of time the involvement of periodontists might be necessary to yield a better clinical outcome [44]. Timely appointments and good patient compliance might serve to be a huge factor in this scenario [45, 46]. Required pharmacological intervention such as use of medicated tooth pastes, mouthwashes, analgesic etc might

alter the outcome in a positive manner. Overall a multidisciplinary approach might be beneficial in patients who find it hard to maintain good oral hygiene during their endodontic treatment.

## Conclusions

Patients should be encouraged and counselled to not develop or continue with a habitual occlusion during endodontic treatment. This intern can improve the overall prognosis of the tooth.

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