



## Patient related compliance after different treatment techniques for endodontic - periodontal lesions - A single center retrospective study

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### ABSTRACT

Endo-perio lesions are one of the most common clinical presentations seen in dental clinical which are often misdiagnosed and treated purely endodontically or periodontally. The treatment for such lesions are primarily dependent on skill of dental operator based on adjunctive diagnostic aids such as radiographs, tooth vitality, clinical presentation of localised periodontal pockets. However patient compliance, comfort and chief complaint are often overlooked as the greater need of the individual is kept in mind ahead of his/her comfort levels. There is also a lack of evidence in literature relating patient compliance to treatment done for endo-perio lesions which is the rationale behind the present study. The aim of the present study was to evaluate the immediate postoperative response from clinicians notes after treatment and 1 week after treatment using (i) Primary endodontic management (ii) Primary periodontal management (iii) Combined endo-perio management (iv) extraction of the same tooth over a period 9 months in a single centered university setting. Patient records from a dental college in Chennai were used for the inclusion of patients from 1st June 2019 till 1st March 2020 into the study. Patients with localised chronic periodontitis with a CAL of 5mm or greater confirmed using adjunctive aids like standardised radiographs, cold vitality testing were included in the study. Patient postoperative comfort and compliance were assessed immediately after treatment and 1 week after treatment recorded from clinician's notes. It was found that within the limitation of this study, maximal patient compliance was seen when endo-perio lesions were treated using root canal treatment as well as flap surgery as per clinicians records which was clinically significant but statistically insignificant ( $p < 0.05$ ).

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### INTRODUCTION

One of the most extensively studied interdisciplinary dental treatments is the diagnosis and treatment planning of Endo-perio lesions. Common clinical findings associated with endo-perio lesions are narrow or deep localised pockets with pain on percussion, discomfort on chewing, bleeding on probing, recurrent periodontal abscess after root canal therapy which are often misdiagnosed as vertical root fractures apart from J shaped radiolucencies surrounding a single tooth (Khalid *et al.*, 2015; Kumar *et al.*, 2016). Endo perio lesions are defined as the pathological communication between pul-

pal and periodontal tissue at a given tooth that may occur in an acute or chronic form (Papapanou *et al.*, 2018). Conventional treatment for Endo-perio lesions revolves around endodontic management of involved teeth followed by periodontal therapy if communication between pulp and periodontium was established in the form of root planing/curettage or flap surgery (Kavarthapu and Malaiappan, 2019; Sureshbabu *et al.*, 2019). These lesions are further classified based on the signs and symptoms that have direct impact on their prognosis and treatment. It was first described by Simring and Goldberg in 1964 as the involvement of pulp and periodontal ligament of the same tooth making it difficult to diagnose and treat (Simring and Goldberg, 1964; Langeland *et al.*, 1974).

However one of the most commonly used classifications for endo-perio lesions was given by Simon *et al.* in 1972 into primary periodontal lesion with secondary endodontic involvement, primary endodontic lesion with secondary periodontal involvement and true combined lesions involving the pulp and the periodontium (Simon *et al.*, 2013). According to these classifications periodontal pocket maybe a source of bacteria for pulpal canal system or vice versa, and cross seeding of bacteria can occur in either direction through the anatomical connection between periodontal and pulpal tissue via apical foramen and accessory canals (Moore, 1987; Sundqvist *et al.*, 1989; Kobayashi *et al.*, 1990).

The current classification proposed by American Association of Periodontology in 2017 overcomes the flaws of Simon's classification where aetiology or origin of infection was used as a criteria to classify endodontic-periodontal lesions. The use of origin to classify a disease does not give any insight into the severity or nature of disease or treatment protocol required to appropriately treat the condition (Papapanou *et al.*, 2018). Periodontal disease has extensively changed over the last few decades with newer treatment plans targeting regeneration of lost tissue using newer materials even in cases of aggressive periodontitis using platelet concentrates, herbal alternatives, comprehensive implant based treatment plans (Panda *et al.*, 2014; Thamaraiselvan *et al.*, 2015; Ramesh *et al.*, 2016b), and a possible role of stem cells in the near future in clinical trials (Avinash *et al.*, 2017; Ramesh *et al.*, 2017; Ravi *et al.*, 2017; Kavarthapu and Thamaraiselvan, 2018). The current advancements have also affected periodontal medicine greatly with the association of chronic obstructive pulmonary disease and Epstein Barr virus related systemic conditions affecting the periodontium (Ramesh *et al.*, 2016a; Priyanka *et al.*, 2017). Patient compliance

of endodontic-periodontal lesions is a new avenue which has not been extensively assessed in the past creating a lacuna of evidence among dental practitioners as to patient centered outcome towards various treatments. Factors included are patient comfort, compliance, pain or swelling towards treatment provided as well as satisfactory management of the patient's chief complaint (Malay and Jacob, 2019). Modern day medicine with its electronic technological advances still revolves around the use of chief complaint as the prime point of interaction between the doctor and the patient, which also serves as a basis of medical history leading to possible diagnosis of diseases (Harnett, 2011). Literature has evidence of pain scores, visual analogue scores and salivary cortisol levels used to assess patient comfort and stress levels before and after flap surgery and root canal therapy employed individually (Miller *et al.*, 1995; Tan *et al.*, 2014; Garcia-Font *et al.*, 2017). The aim of the present study was to evaluate the immediate postoperative response after treatment and 1 week after treatment using (i) primary endodontic management (ii) primary periodontal management (iii) combined endo-perio management (iv) extraction of the same tooth over a period 9 months in a single centered university setting.

## METHODOLOGY

### Study design

The current study was performed as a single centered retrospective university based design, using patient records for the comparison of the entire patient outflow of Saveetha Dental College and Hospital, Chennai from June 2019 till March 2020. Considering University based setting treatments are relatively affordable across the larger Chennai population. The segregation of data was initiated after obtaining ethical approval from Saveetha university ethical and scientific review board.

### Inclusion criteria

The included patients were individuals with localised chronic periodontitis diagnosed with clinical attachment loss of 5mm or greater using William's Michigan level 0 periodontal probe (Hufriedy Williams Michigan level periodontal probe) confirmed with standardised radiographs using paralleling devices (AZDENT intraoral X-Ray positioning system FPS 3000) and tetrafluoroethane based cold vitality testing (Endo-frost Coltene by Waledent). Selected cases were not subdivided into primary endodontic or primary periodontal origin or vice versa. An assumption of failure of treatment was considered when extraction was

performed on a tooth priorly treated by periodontal therapy/endodontic therapy/ combination of both or extraction was seen as the only viable treatment modality. All individuals included in this study were screened by a single operator while treatment was done by multiple operators supervised by faculty from the Department of Endodontics and Periodontics, Saveetha dental college and hospital.

### Exclusion criteria

Individuals excluded from this study were based on (i) pregnancy or lactating mothers(ii) patients currently smoking (iii) patients with uncontrolled systemic disease (iv) patients under medication (v) patients under medication (vi) incomplete data collection or broken appointments (vii) A diagnosis of Endo Perio lesions made without standardised radiographic examination.

A total of 48 patients were assessed, out of which 43 were diagnosed as endo perio lesions and 5 root fractures. Patient postoperative comfort and compliance were assessed immediately after treatment and 1 week after treatment recorded from clinician's notes. These findings were then utilised to procure the data analysed in the present study (Table 1).

### Statistical analysis

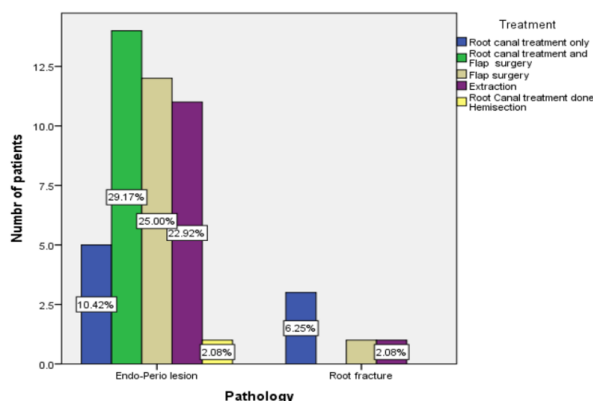
Statistical analysis was done with SPSS (version 23). Statistical significance was assessed using Chi-square test and  $p < 0.05$  was considered as significant.

## RESULTS AND DISCUSSION

Data collected from records of 9 months revealed 48 patients, with 43 endo perio cases and 5 diagnosed as tooth fractures. Most cases included were among an age group of above 40 years followed by the age group of 26-40 years with barely 4 cases seen between the age groups of 18 to 25 years. Among these cases 8 cases were treated using root canal therapy, 14 treated with flap surgery, 13 treated by root canal therapy along with flap surgery, 12 teeth were extracted en mass and 1 tooth was root canal treated, hemisection was done followed by prosthetic fixed partial denture along with adjacent teeth (Table 1).

In this study, we observed that maximal patient compliance was seen when endo perio lesions were treated using root canal treatment as well as flap surgery with a follow up of 1 week as per clinicians records which was clinically significant but statistically insignificant ( $p=0.085$ ) (Table 2).

Most cases included were among an age group of above 40 years followed by the age group of 26-



**Figure 1: Graphical illustration of number of endo-perio lesions and root fractures treated by different treatment modalities**

40 years with barely 4 cases seen between the age groups of 18 to 25 years (Table 1) which coincides with the chronic nature of endo-perio lesions and the frequency of tooth fracture more towards reference age groups of 15 to 30 years and 31 to 45 years (Ellis *et al.*, 1999). There is a lack of literature pertaining to patient comfort and compliance towards different treatment modalities of endo-perio lesions with all available evidence relating more towards the rationale for sequelae of treatment protocol to be followed. Studies assessing the anxiety levels of individuals undergoing dental treatment including root canal treatment as well as flap surgery are too subjective and results obtained from such studies are questionable to a certain extent (Akshaya *et al.*, 2020; Selvi *et al.*, 2020). A study conducted in 2018 reported findings of clinical similarity where immediate periodontal surgery was found to have no effect on treatment of combined endo-perio lesions with communications (Gupta *et al.*, 2015; Tewari *et al.*, 2018). Similar findings were also seen by Gupta *et al.* in 2015 where they tried to study the time lapse between endodontic and periodontal treatment in endo-perio lesions with and without communications (Gupta *et al.*, 2015).

There are however some studies supporting the need for endodontic treatment prior to periodontal treatments based on microbial load at the involved sites and the need to contain such infections by placement of intracanal medicaments like calcium hydroxide within the canals making it unfavourable for bacterial colonization (Tronstad *et al.*, 1990).

Studies with contrary findings include animal study models where it was observed that lesser periodontal healing was seen when endodontic treatment was done before flap surgery (Lima *et al.*, 1997). Deepa and Saras Mediratta conducted a randomised

**Table 1: Demographic distribution based on age groups and treatment modalities to treat the pathology for all included cases**

Age Groups	Frequency (percentage)	X <sup>2</sup> Value
18-25 years	4 (8.3%)	Comparing age with pathology 1.212
26-40 years	16 (33.3%)	
Above 41 years	28 (58.2%)	
Total	n= 48	
<b>Treatment done</b>		
Root canal treatment	8 (16.7%)	Comparing treatment done with pathology 9.075
Root canal and flap surgery	14 (29.2%)	
Root canal and Hemisection	1 (2.1%)	
Flap surgery	13 (27.1%)	
Extraction	12 (25%)	
Total	n=48	

Treatment done for teeth with endo-perio lesions include root canal therapy or flap surgery or root canal therapy combined with flap surgery or extraction of the same. Chi-square test was done ( $p=0.546$ ). Hence, statistically not significant.

**Table 2: Diagnosis and treatment modalities followed**

Pathology	Treatment done				Total	X <sup>2</sup> Value
	Root Canal treatment	Root canal treatment and flap surgery	Flap surgery	Extraction		
Endo-perio lesions	5 +1 (13.9%)	14 (32.5)	12 (27.9%)	11 (25.5%)	43	8.192
Root fractures	3(60%)	0	1 (20%)	1 (20%)	5	-NA-

Treatment done for teeth with endo-perio lesions include root canal therapy or flap surgery or root canal therapy combined with flap surgery or extraction of the same. Chi-square test was done ( $p=0.085$ ). Hence, statistically not significant.

clinical trial which showed when root canal therapy was done followed by periodontal surgery, a significant reduction in probing depth, clinical attachment loss was seen as compared to groups where only root canal therapy was done among primary endodontic secondary periodontal lesions over a 1 month review (Deepa *et al.*, 2017).

Since this study is primarily patient compliance centered, a possible explanation for these findings could be postoperative discomfort or pain experienced at a surgical site when priorly isolated and sealed by root canal therapy might be subjective and acceptable to patients with no available communication pathway for remnant inflammation from the pulp to periodontal tissue. Another relevant patient related finding is the aesthetic concern of the patient undergoing treatment which must be taken into consideration while address the final restorative outcome (Ramesh *et al.*, 2019). However, the only available evidence of such findings are apparent improvements in periodontal clinical parameters such as probing depth, clinical attachment gain

or postoperative regeneration seen radiographically after 3 -6 months.

The limitations of this study include single operator screening with multiple operators involved in treatment executed, as skill of the operator could play an essential role in treatment outcome. The sample size of the study was however too small to generalise these findings to the entire population. No periodontal biomarkers for healing (Varghese *et al.*, 2015; Khalid *et al.*, 2016, 2017) or inflammation were assessed to assess chronic inflammatory nature of lesion relating to patient compliance on elimination after treatment was done (Mootha *et al.*, 2016; Ramamurthy and Mg, 2018). Another possible drawback could be lack of diagnosis of subtype of endo perio lesions as per Simon's classification or American association of periodontology's 2017 classification which does not give any insight towards comparison of type of endo-perio lesion seen and level of patient compliance postoperatively.

In Figure 1, X-axis-depicts the diagnosis of patients included in the present study (n= 48 patients). Y-

axis depicts the number of patients treated by various treatment modalities with maximal treatment done using root canal treatment along with flap surgery (clinically significant, statistically insignificant  $p>0.05$ ). Legend encloses colour coded treatments.

## CONCLUSION

In conclusion patient compliance in the form of reduction in clinical symptoms of pain, swelling and discomfort were seen maximally when endodontic treatment including root canal treatment with a permanent sealer was combined with periodontal therapy including flap surgery which was clinically significant and statistically insignificant ( $p<0.05$ ). These cases produced better results as compared to individual treatment modalities among endo-perio lesions based on patient centered compliance and comfort deduced from clinicians review notes.

## Conflict of Interest

The authors declare that there is no conflict of interest for this study.

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