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A HOSPITAL BASED RETROSPECTIVE ANALYSIS OF MANAGEMENT OF FURCATION INVOLVED TEETH

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ABSTRACT:

Local Anatomic factors play a pivotal role in disease progression, macroscopic and microscopic features of furcation of multirooted teeth make treatment a challenge. There have been various advancements of regenerative procedures in the past few years for management of the same.Records of 86000 patients who visited a Private Dental College from June 2019 to April 2020 were reviewed and analysed. The aim of the present study is to evaluate various procedures for management of furcation involved teeth. 97 teeth that had furcation involvement were analysed and the data were collected. Statistical analysis was done using SPSS version 20 by IBM and results were obtained. The results showed that the most common tooth to have furcation involvement was upper right molar (16.4%). Open flap debridement alone was most commonly done for Grade I and Grade II furcation involvement.The most Common procedure that is performed is open flap debridement alone for all three grades of furcation. 13% of the teeth with grade III furcation involvement underwent open flap debridement with GTR. Bone graft was used most commonly for Grade III furcation involvement. Further research to be done to formulate a concrete clinical practice guideline.

INTRODUCTION

It is now well established that microbial plaque is the main cause of chronic inflammatory periodontal disease and this leads to various molecular changes (Varghese *et al.*, 2015; Khalid *et al.*, 2016; Mootha *et al.*, 2016; Khalid, 2017). Active disease, however, may depend on several host factors such as systemic health (Ramesh, S. S. Varghese, *et al.*, 2016; Priyanka *et al.*, 2017), the presence of certain periodontal pathogens, while suspected beneficial species are absent, as well as a conducive environment as may be defined eg., pocket temperature, iron concentration, pocket depth, inflammatory status (Socransky *et al.*, 2013) and probably other circumstances. Appropriate diagnosis (Avinash, Malaippan and Dooraiswamy, 2017) and treatment of all aspects of the same is to be addressed comprehensively (Ramesh, Ravi and Kaarthikeyan, 2017; Kavarthapu and Thamaraiselvan, 2018; Ramesh *et al.*, 2019). In recent years there has been an increase in herbal alternatives for the management as well (Ramesh, S. Varghese, *et al.*, 2016; Ramamurthy and Mg, 2018) Furthermore local anatomic factors may also play a pivotal role in the progression of periodontal disease. For example the palatal groove of maxillary incisors (Hou and Tsai, 1993) and furcation area at multirooted teeth (Schroeder and Scherle, 1987). Actually, treatment of furcation involved teeth is a considerable challenge in clinical periodontology (Wang *et al.*, 1994).

Different treatment modalities (i.e. mainly scaling and root planing, furcation plasty, root resection or tunnel preparation or regenerative therapy) (Panda *et al.*, 2014; Thamaraiselvan *et al.*, 2015; Ravi *et al.*, 2017) of furcation involved teeth and respective indications for the same have been described in the previous literatures. (Hamp and Nyman, 1989; Basaraba, 1990). Basic recommendation seems to depend on degree of furcation involvement and to a lesser extent on tooth type. However, in practice, decision for one or the other treatment modality may be governed by various other factors such as technical skill and experience of the practitioner, strategic importance of the tooth to be treated or patient's compliance. With the advent of time there have been advances in the field of clinical periodontology, specifically with respect to furcation management. In recent years, several new methods for treatment of furcation involved teeth have been developed, such as the use of guided tissue regeneration, (Pontoriero, Lindhe and Nyman, 1988) coronally positioned and fixed flaps (Martin *et al.*, 1988), or bone and synthetic grafts (Oreamuno *et al.*, 1990; Anderegg *et al.*, 1991). These recent developments in procedures called regenerative procedures are in wide clinical practice these days.The aim of the present study is to evaluate various procedures for management of furcation involved teeth.

MATERIALS AND METHODS:

This study was conducted as a single- centered retrospective study. Records of 86000 patients who visited a Private Dental College from June 2019 to April 2020 were reviewed and analysed. The ethical approval for the present study was obtained from the Instituitional Ethical Committee. A total of 97 teeth with furcation involvement and managed by different procedures were analysed. Age, gender, grade of furcation, tooth type and management were recorded.Once the data was obtained, the same was verified with the help of photographs by two external reviewers to limit and restrict any aspect of bias

towards the study. On segregation of all available samples, all non specific data entries, incomplete and other censored data were excluded from the present study. The collected data was statistically analysed using SPSS by IBM version 20. The frequencies and cross tabulations were performed followed by correlation and association test (Chi Square Test) to check correlation between different variables included in the study.

RESULTS AND DISCUSSION:

A total of 97 teeth that had furcation involvement and underwent treatment for the same were included as part of the study. The most common tooth to have a furcation defect and to undergo treatment for the same was maxillary first molar (16.5%), followed by maxillary left molar (14.4%) which was then followed by mandibular left molar (10.3%) (Fig 1). Among the various grades of furcation, the most common grade of furcation treated was Grade 1 (51.5%) followed by Grade II (33%) followed by Grade III (15.5%) (Fig 2). Based on treatment modality, the most common procedure that was done for furcation management according to the present study was open flap debridement procedure (88.7%) followed by flap surgery with bone graft (6.2%) and the least used treatment modality for furcation management was flap surgery with guided tissue regeneration (GTR) (5.2%). (Fig 3). The mean age of the patients with furcation involved teeth was 40.72 ± 11.42 years. On correlating grade of furcation and treatment modality, it was observed that the most common procedure that was performed was open flap debridement alone for all three grades of furcation in which a statistically significant result was obtained (Chi Square test, p- value-0.03). (Fig 4)

The etiology of periodontal disease is complex and so is the management of the same (Carranza and Bernard, 2002).. One of the most compelling challenges faced in the management of periodontal disease in multirooted teeth is furcation involvement. Extension of the periodontal disease process between the roots of multirooted teeth is believed strongly to influence the prognosis of the involved teeth. Nevertheless conservation of natural dentition has been the aim of intervention in periodontics through ages.

Some authors recommend extraction of teeth with furcation invasions rather than trying to salvage them (Leonard, 1931). Nevertheless long term studies on treated periodontal patients have reported that molar teeth responded well to treatment Many molar teeth with furcation involvement have been retained for periods as long as 40-50 years (Caffesse *et al.*, 1990).

In the present study it was observed that the most common tooth to undergo furcation involved destruction is the maxillary right molar tooth. In a study conducted by Ira Franklin Ross et al (Ross and Thompson, 1980) where the furcation involvement is observed in different teeth in the oral cavity, it was observed that the most common tooth is the maxillary right molar. This is in accordance with the results that are obtained from the present study. This can be attributed to the density of the bone in the maxilla when compared to the density of bone in the mandible. However in the study conducted by Hirschfeld et al (Hirschfeld and Wasserman, 1978), mandibular molars were the most common tooth. This can be attributed to the differences in oral hygiene practices.

In the present study it was also observed that open flap debridement alone was the most common procedure that was performed in grade I and grade II furcation involved teeth. Muller et al (Müller, Eger and Lange, 1995) reported that the most prevalent procedure for grade I and grade II furcation involvement was scaling. In the present study the most common grade of furcation involvement is grade I. There is surprisingly very less available epidemiological information on furcation. However in a study conducted by Mutschelknauss et al (Bauriedl, 2006) it was reported that the most common grade of furcation that was observed was Grade III. This is proof that patients in the present study report in the initial stages of disease progression itself, thus adequate awareness about oral health care was evident.

In a study conducted by Sorem et al (Jepsen *et al.*, 2002) where the effects of guided tissue regeneration was compared with surgical debridement in the treatment of furcation defects it was observed that GTR was more effective than open flap debridement in grade III furcation involvement. In the present study it was observed that in grade II defects the most commonly performed is open flap debridement alone. This can be attributed to various other factors such as probing depth and pocket formation which are not considered as part of the present study.

In a study conducted by Gram Svardstrom (Svärdström and Wennström, 1996) it was observed that the mean age for furcation involvement in patients was around 40 years which is in accordance with the findings of the present study. This can be attributed to the fact that there was no wide ethnic or geographic variation in the prevalence and progression of periodontal destruction. The limitations of the present study include small sample size and geographical limitations. Various other factors that were involved in decision making for furcation treatment was not considered as part of the present study.

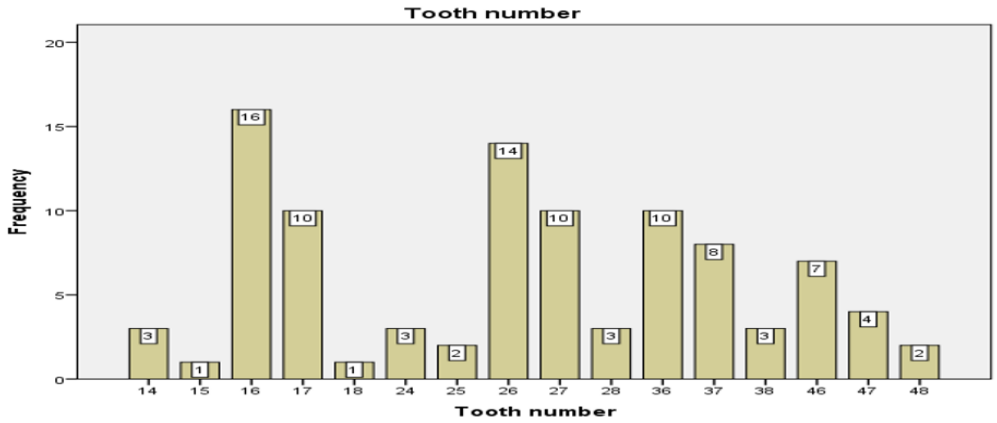

Figure 1: Bar chart representing frequency distribution of furcation treated tooth type in which
X-axis denotes the tooth type and Y-axis denotes the number of teeth that are affected. The most commonly affected tooth was Maxillary right first molar and the least commonly affected tooth was maxillary right second premolar

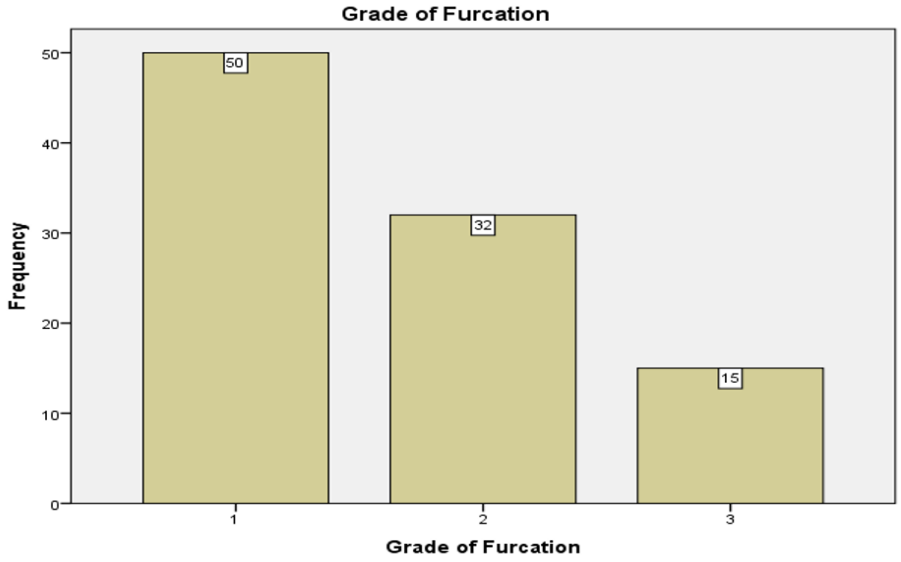

Figure 2: Bar chart representing the frequency distribution of number of teeth with different grades of furcation involvement. X-axis represents different grades of furcation and Y-axis represents the number of teeth. The most commonly involved grade of furcation was Grade I

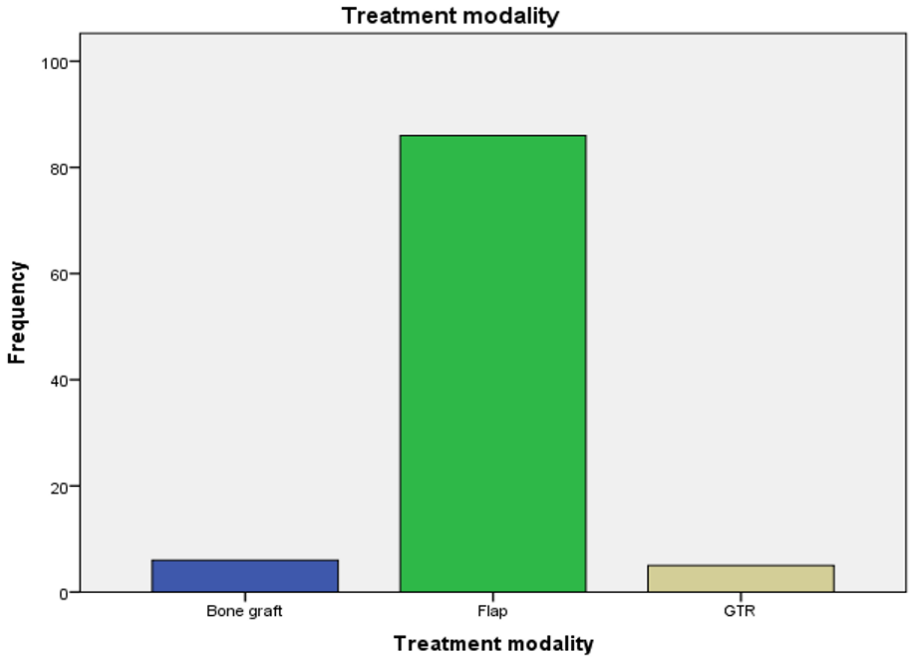

Figure 3: Bar chart representing the different furcation treatment modalities. X-axis represents different furcation treatment modalities and Y-axis represents the number of teeth.. The most commonly performed treatment modality in management of furcation was open flap debridement alone.

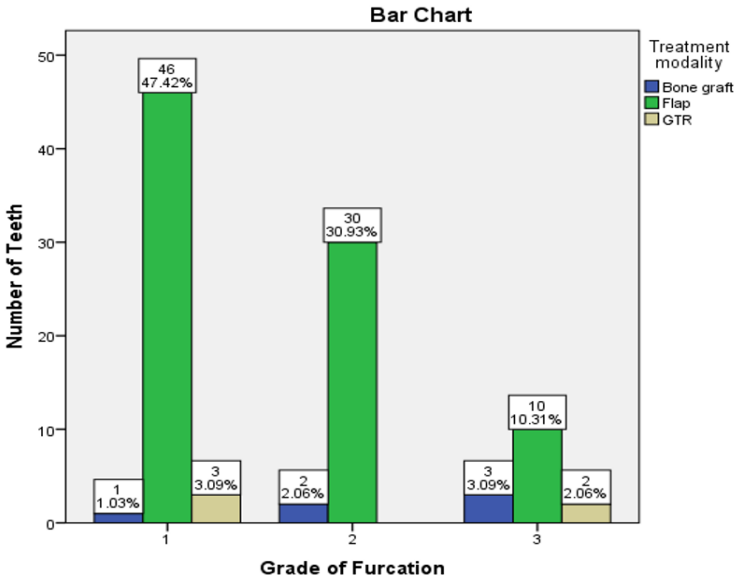

Figure 4: Bar graph showing correlation between grade of furcation and various treatment modalities. X axis represents different grades of furcation and Y axis represents number of teeth treated. Blue represents bone graft, green represents open flap debridement alone and beige represents GTR. Open flap debridement alone was more commonly performed in all the three grades of furcation than any other treatment modalities and there is statistically significant difference. Chi-Square test, pearson chi-square value: 10.587, p-value-0.03 ($p<0.05$- proving it is statistically significant)

CONCLUSION

Although traditional non surgical periodontal therapy can be predictably used to arrest mild defects, it might be inadequate for the treatment of moderate and severe furcation involved teeth. Further studies and awareness programs are to be conducted to formulate clinical practice guidelines in management of furcation defects and thereby improving the periodontal health of the society.

AUTHOR CONTRIBUTION

P. Keshaav Krishnaa carried out the retrospective study, planning the study design, collection and analysis of data and drafted the manuscript. M. Jeevitha and A. Hima Sandeep aided in conception of the topic, supervision and appraisal of the manuscript.

CONFLICT OF INTEREST

Nil

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