

Evaluation Of Periodontal Flap Procedures Done Using Guided Tissue Regeneration (Gtr) Versus Guided Tissue Regeneration (Gtr) With Bone Graft

Research Article

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Abstract

The aim of the present study is to assess the prevalence of GTR and GTR with bone graft procedures for periodontal therapy at Saveetha Dental College. Retrospective data of 28 patients was obtained and segregated. The inclusion criteria included 21-65 years age group, patients who underwent frenectomy/frenotomy and visited between June 2019 to April 2020. Once the data was obtained it was statistically analyzed using SPSS by IBM version 20. In the present study out of the 28 patients that were assessed males were 64.3% and females were 35.7%. The patients were within the age group of 21-65 years with a mean age of 39.75 plus or minus 12.04 years. Maximum numbers of Regenerative Procedures are done in the ages of 38, 39 and 47 years each with 10.7% of the study population. Out of the total 28 Regenerative Procedures, a procedure using guided tissue regeneration alone constitutes about 39.3% whereas 60.7% of the regenerative Procedures were performed along with bone graft as an adjunct to guided tissue repair. Chi Square Test was performed between the different variables but there was no association. Although traditional non-surgical and surgical periodontal therapy can be predictably used to arrest the progression of the disease and in the treatment of mild defects, it might be inadequate for the treatment of moderate and severe defects.

Keywords: Gtr; Bone Graft; Periodontal Therapy; Xenograft Periodontitis.

Introduction

Periodontitis is a group of inflammatory diseases affecting the supporting structures of the tooth, i.e., is a serious infection that damages the soft tissue and destroys the underlying bone that supports the teeth. It is caused by a large group of microorganisms that adhere firmly to and grow on the tooth's surfaces, along with an aggressive cascade of immune response against these causative microorganisms [23, 24, 34, 64]. It results ultimately in the loss of the alveolar bone around the teeth, and if left untreated, can lead to abnormal loosening and subsequent loss of all affected teeth [2, 15]. Periodontitis can cause pathological loss of the tooth and various other systemic complications such as heart attack, stroke or even infective endocarditis. It is also aggravated and seen in association with various systemic complications like diabetes mellitus [45, 49, 50] etc. In light of various recent breakthroughs in

treatment planning and execution, for extensive and comprehensive treatment for periodontitis there are various approaches [21, 39, 49, 50, 52, 53, 62]. Periodontal therapy is aimed at arresting the progression of disease by controlling the infection, and regenerating the lost attachment apparatus of the tooth. The use of bone grafts and guided tissue regeneration (GTR) are among the techniques widely used to reach this therapeutic endpoint [47, 54].

Numerous studies have reported successful clinical results when employing collagen membranes for GTR therapy [7]. The rationale for selecting collagen as a barrier membrane was based on the fact that type-1 collagen is the main constituent of periodontal connective tissue. In addition, collagen materials also exhibit chemotactic function for fibroblasts, hemostatic property, weak immunogenicity and osteoblast adhesion activity. However, it is critical in GTR that the space underneath the barrier is main-

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tained for an adequate period of time during healing for complete periodontal regeneration to occur. In cases where the membrane collapsed into the defects or towards the roots, reduced amounts of bone were formed due to limited space available for periodontal ligament cells to repopulate [8, 56].

In order to compensate for the lack of space-maintaining effect of membranes available and/or to promote bone formation, various bone grafting materials were used as adjuncts to the GTR technique. However, the results obtained to date from controlled human studies investigating the benefit of combined use of a GTR barrier with grafting materials are contradictory [4-6, 10, 25, 26, 32, 33, 41, 59, 61, 63] and many of these studies used demineralized freeze dried bone allograft (DFDBA) as grafting material. Therefore, it is not completely clear whether combination therapy (GTR plus bone grafting) is more effective than GTR alone. Moreover, perusal of the available literature revealed no study comparing the treatment outcomes of GTR with and without autogenous bone. However there is no established clinical practice guideline for the usage of GTR and GTR with bone graft. The aim of the present study is to assess the Prevalence of GTR and GTR with bone graft procedures for periodontal Therapy. Previously our team has a rich experience in working on various research projects across multiple disciplines. [1, 11, 13, 22, 28, 35, 37, 38, 40, 42, 48, 58, 65]. Now the growing trend in this area motivated us to pursue this project.

Materials and Methods

The present study involved a total of 28 patients that underwent frenectomy procedures. These included all treatment modalities of GTR. The study was performed in a university setting at Saveetha Dental College and Hospitals. Thus the data obtained from the patients is of the same geographic location and ethnicity. The ethical approval for collection of retrospective data from the dental patient management archives was obtained from

the Institutional Ethics Board.(IRB Approval No: SIHEC/2020/DIASDATA/0619-0320). The period of the study was between June 2019 to April 2020. Once the data was collected the same was verified by using photographs by two external reviewers who were blinded on the hypothesis from the present study. This was done to eliminate the chances of sampling bias. Before the commencement of the study a clear well defined inclusion criteria was defined. The inclusion criteria included that: Patients should have visited Saveetha Dental College during the study period. Patients should have been treated by a resident of Saveetha Dental College, either an undergraduate or postgraduate student. They should have undergone GTR or GBR procedure and have been within the age group of 21-65 years.

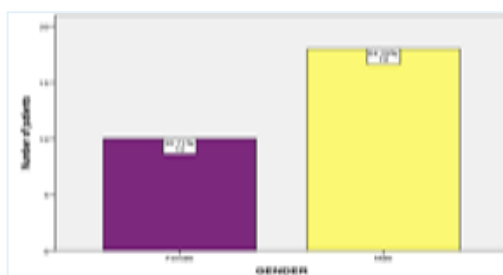
Out of the study population that was chosen for the study there was no segregation process, as this would result in sampling bias. The data segregation was done according to various parameter such as speciality of clinic in which patient was treated, age of the patient, gender of the patient etc.

The data that was then tabulated was reviewed by an external reviewer and screened for internal validity of the study. The data was then exported to SPSS Software by IBM Version 20 for Statistical Analysis. Descriptive statistics was performed followed by Correlation tests to see any kind of correlation or Association between the different variables taken in the present study.

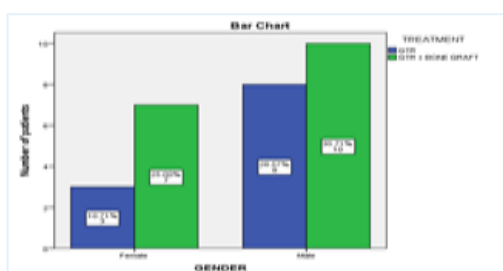
Results & Discussion

In the present study out of the 28 patients that were assessed males were 64.3% and females were 35.7% (Graph 1, Graph 2). The patients were within the age group of 21-65 years with a mean age of 39.75 plus or minus 12.04 years. Maximum numbers of Regenerative Procedures are done in the ages of 38, 39 and 47 years each with 10.7% of the study population. Out of the total 28 Regenerative Procedures, procedures using guided tissue

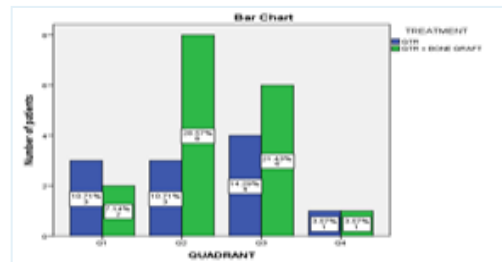
Graph 1: Bar Graph shows Distribution of gender of patients undergoing regenerative periodontal procedures with gender on the x axis and number of patients on the y axis. Males reported more commonly for regenerative periodontal therapy.



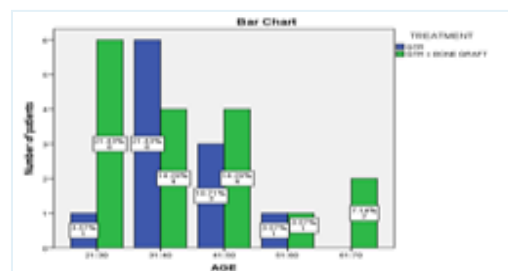
Graph 2: Bar Graph shows association between technique used for regenerative procedures and gender of the patient, with gender of patient plotted on the x axis and number of patients on the y axis. GTR is represented by blue and GTR with bone Graft is represented by green. Both treatment modalities are done more commonly in males than in females. However there was no Statistically significant correlation using Chi Square Test (Value= 0.562, df=1, p=0.4)p>0.05-Infers no Statistically Significant association between gender and technique for Regenerative procedure.



Graph 3: Bar Graph shows association between different techniques used for regenerative procedures and different quadrants. The quadrant is given on the X axis and the number of patients is represented on the y axis. Regenerative periodontal therapy is more commonly performed using only GTR (blue) in quadrant 1 whereas GTR with bone graft (green) is the more commonly used technique in quadrant 2 and 3, both are used equally in quadrant 4. However the correlation was statistically not significant (Chi Square Test, Value= 1.663, df=3, p=0.6) p>0.05-Infers no Statistically Significant association between quadrant and technique for Regenerative procedure.



Graph 4: Graph shows association between the technique used for regenerative procedures and age of the patient, with age group on the x axis and the number of patients on the y axis. Regenerative procedures are most commonly performed between the age group of 21-40 years. A regenerative procedure between 21-30 years was mostly done using only GTR (Blue) where as in 31-40 years it was using GTR along with bone graft (Green). However there was no statistically significant correlation (Chi Square Test, Value=5.061, df=4, p=0.281) p>0.05-Infers no Statistically Significant association between age and technique for Regenerative procedure.



regeneration alone constitute about 39.3% whereas 60.7% of the regenerative Procedures were performed along with bone graft as an adjunct to guided tissue repair.

When considering the quadrant in which the regenerative procedure is most commonly done, quadrant 2 is the most common quadrant at 39.3% followed by quadrant 3, quadrant 1 and the least is in quadrant 4 at 7.1% (Graph 3). However When there was a chi square test performed, no statistically significant correlation ($p>0.05$) was seen between treatment modality and the age of the patient undergoing treatment. It was inferred that the patients who underwent regenerative periodontal therapy more commonly along with GTR and bone graft were in the age group of 21-30 years, 41-50 years and 61-70 years whereas those who underwent the procedure with only GTR were in the age group of 31-40 years.(Graph 4) When considered about the type of GTR procedure that is performed, 90.9% of the procedures were done using resorbable membranes and only 9.1% of the procedures are done using non resorbable membranes. 87.5% of the procedures using bone graft were done using xenografts, 12.7% of cases with allograft and 5% of the grafts that were used were autograft.

Out of the total study population that was included as part of the study the majority of the people that reported were males rather than females. It is a well-established fact that habit history such as smoking plays a major role in the progression of periodontitis. [27] When the gender Prevalence for smoking in the particular geographic location is observed, Males have a greater predominance [3]. Thus, the increased Male population can be attributed to this factor. In a study conducted by Yadav et al., [70] it is observed that more number of regenerative procedures are performed for posterior teeth than for anterior teeth which is in contradiction to the results from the present study where maxillary anterior teeth are

the most common teeth to undergo regenerative periodontal procedures. This can be associated to the fact that the most common sextant to undergo any kind of trauma would be traumatic injury as reported by a study conducted by Hecova H et al., [18]. Thus when the tooth undergoes traumatic injury, and is being replaced by an implant the usage of bone grafts along with GTR can be performed to correct the defect that has developed. Thus, this could be a possible reason as to the Prevalence of regenerative procedures more in sextant two when compared with the other sextants. In the present study it is observed that there is a statistically significant positive correlation that is observed between age and the type of regenerative procedure that is performed. When we analyse with literature it is observed that healing is better at a young age [29] than at an older age and thus it is essential to consider the same during therapy. This may be the fact associated with the correlation between age and the decision of treatment to be performed.

There are various materials that are available that can be used for the purpose of grafting. Although autogenous grafts are still considered to be the gold standard as they are the most predictable material [44], only a limited amount of autogenous bone can be procured from intraoral sites which may not be sufficient for complete fill of defects. Meanwhile, alloplastic materials, particularly bioactive glass, may represent a possible alternative to be mixed with autogenous bone for the treatment of intrabony defects. Since bioactive glass is reported to promote adsorption and the concentration of proteins utilized by osteoblasts to form mineralized extracellular matrix, it thus promotes osteogenesis by allowing rapid formation of new bone [19]. Some histological studies have shown that the use of bioactive glass induces a significant increase in newly formed cementum and attachment and that apical downgrowth of the junctional epithelium can be pre-

vented [14, 20, 69]. Results from clinical and histological studies also indicate that bioactive glass is easy to handle, biocompatible, has haemostatic properties, and osteoconductive as well as potentially osteoinductive effects [30, 36]. The limitations of the present study include that all the samples that were included as part of the study had similar ethnicity and it was geographically isolated. The sample size was small and various other factors such as reason for regenerative procedures, pocket formation etc were not included as part of the present study. Our institution is passionate about high quality evidence based research and has excelled in various fields [9, 12, 31, 43, 46, 51, 55, 57]. We hope this study adds to this rich legacy.

Conclusion

Although traditional non-surgical and surgical periodontal therapy can be predictably used to arrest the progression of disease and in the treatment of mild defects, it might be inadequate for the treatment of moderate and severe defects. Further studies and awareness programs are to be conducted to bring about more knowledge about regenerative procedures and to also formulate clinical practice guidelines for the same. Further development and use of these procedures can be used to treat patients efficiently to bring about an improvement in the periodontal health of the society.

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