

PREVALENCE OF USAGE OF DIFFERENT RETROGRADE FILLING MATERIALS DURING PERFORATION REPAIR

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ABSTRACT

Introduction

Perforations from the pulp to the surrounding periodontium may occur from resorptive defects, caries or iatrogenic events during endodontic treatment. Perforations create an artificial communication between the root canal system and the supporting tissues of the teeth. Factors that affect treatment prognosis of perforation repair include the level, location and size of the perforation, the time delay before perforation repair and the material used to seal the perforation. An insufficient access cavity reduces the quality of root canal debridement and may affect the final root canal preparation shape. The aim of the study is to determine the prevalence of usage of retrograde filling material in perforation repair.

Materials and methods

The study was done in an institutional setting. This is a retrospective study in which the case records of 70 patients were reviewed and details such as gender, age, type of materials used were collected. Details were tabulated in excel and results were obtained using SPSS. Chi square analysis was performed to find out the association between different variables.

Results

The age group of 36-50 years were high with perforation repair which is about 50%, people of 15-35 years age group were 27.94% and 50-80 years were about 22%. Female patient who have

perforation repair were high which is about 51.47% compared to males which is about 48.53%. Types of materials used during perforation repair were bio-aggregate material which is about 75%, RMGIC which is about 10.29%, GIC is about 10.29% and calcium hydroxide which is about 4.41%. Bio-aggregate material is most commonly used in 36-50 years which is about 38.4% where the $p > 0.05$ value is not significant.

Conclusion

Within the limits of the study, it was concluded that bio-aggregate material was the most common material used during perforation repair with female predilection.

KEYWORDS- Perforation repair, Female, Bio-aggregate material, Root canal treatment, Root perforation.

INTRODUCTION

Perforations from the pulp to the surrounding periodontium may occur from resorptive defects, caries or iatrogenic events during endodontic treatment. Perforations create an artificial communication between the root canal system and the supporting tissues of the teeth[1,2]. Factors that affect treatment prognosis of perforation repair include the level, location and size of the perforation, the time delay before perforation repair and the material used to seal the perforation. An insufficient access cavity reduces the quality of root canal debridement and may affect the final root canal preparation shape. An exaggerated or misdirected access cavity is also conducive to root perforation, and makes the tooth susceptible to coronal/radicular fracture[3,4,5]. Root perforation, overfilling, endodontic and periodontal lesions, root fracture, periapical biofilm, traumatic dental injury, instrument fracture, apical periodontitis, and root resorption characterize the complex challenge facing the endodontist, and these may contribute (alone or in association) to a doubtful or poor prognosis[6].

During the operative procedures, the endodontist must avoid and prevent these noxious events, since intra-operative accidents are risk factors that may result in failure of root canal treatment. Successful root canal treatment entails understanding the risk factors associated with root canal treatment failure[7]. Root perforation may occur in different clinical conditions, which the patient should be immediately informed of, together with the procedures to be followed, the treatment options and the prognosis[8][9]. Root perforation constitutes a serious complication which needs to be diagnosed early and treated immediately and appropriately. The consequences of root perforation may result in an inflammatory response associated with periodontal tissue and alveolar bone destruction[10]. Depending on the severity of the injury, and possible chronic inflammatory reaction, it may cause the development of granulomatous tissue, proliferation of the epithelium, and, eventually, the development of a periodontal pocket. Lack of understanding of root perforations and their consequences, to the extent that could delay diagnosis and treatment, may cause future problems leading to tooth loss[11].

Biocompatible materials with a short setting time and good sealability should be selected. The location of the perforation is of crucial importance. Close proximity to the gingival sulcus may

lead to endodontic-periodontal problems through contamination of the perforation with bacteria from the oral cavity through the sulcus[12].It is important that the level of crestal bone and epithelial attachment is taken into consideration.If the perforation lies coronal of the crestal bone it will be easy to treat and have a good prognosis. Perforations near the crestal bone are susceptible to epithelial migration and rapid pocket formation and treatment of these has a low success rate[13].

MTA was originally designed for application in endodontic surgery as a root-end filling material, but, other indications for it will include direct and indirect pulp capping, pulpotomies, treatment of internal and external resorption and treatment of teeth with incomplete root formation[14][11].The purpose of the present clinical trial was to compare clinically and radiographically the success rate of two root end filling materials using pro root type MTA and zinc free amalgam in re-apicoectomies teeth.Glass ionomer cements are used in surgical endodontics and they have been advocated for use as a perforation repair material as well[15][16]. One advantage is its adhesiveness to dentine, and several studies demonstrate its good sealing ability both in vitro and in vivo. However, other studies have shown that resin modified glass ionomer cement showed more microleakage and less sealing ability compared to MTA cement[17].The aim of the study is to determine the prevalence of usage of retrograde filling material in perforation repair. Our team has extensive knowledge and research experience that has translate into high quality publications[18–27],[28–31],[32–36] [37]. The aim of this study is to analysis the prevalence of usage of different retrograde filling materials during perforation repair

MATERIALS AND METHODS

Study Setting

A retrospective study was carried out among patients in a University hospital setting. This is based on a university setting because data available was in the similar ethnicity with the particular geographic location. The trends in the other locations that were not assessed in the study setting. Ethical approval was taken from the universal ethical committee. In total, three reviewers were involved to cross verify data.

Sampling

The sample was collected from records with patients' data like : PID, Name, Age, Gender,treatment , Teeth number, and Materials used in treatment,Date of their first visit from June 2019 to June 2021

2021 and tabulation was done in a chronological order using Excel. Case sheet review was done under the examiner followed by cross verification.

The study sample size included patients who underwent perforation repair and data retrieved was n=70.Statistical method used in this study was the Chi-Square test and the software was SPSS by IBM. Patients who underwent Root canal treatment with perforation repair were

considered as dependent variables and their Age, Teeth number, Gender, Type of materials used were considered as a definite variable. The type of analysis used was Correlation and association which is a descriptive type of data analysis.

RESULTS

From the study, we have observed that the age group of 36-50 years were high with perforation repair which is about 50%, people of 15-35 years age group were 27.94% and 50-80 years were about 22% (Figure-1). Female patient who have perforation repair were high which is about 51.47% compared to males which is about 48.53% (Figure -2). Types of materials used during perforation repair were bio-aggregate material which is about 75%, RMGIC which is about 10.29%, GIC is about 10.29% and calcium hydroxide which is about 4.41% (Figure- 3). Bio-aggregate material is most commonly used in 36-50 years which is about 38.4% where the $p > 0.05$ value is not significant (Figure-4). Bio-aggregate is commonly used in the female population which is about 41.1% and the $p > 0.05$ value is found to be significant (Figure-5).

DISCUSSION

According to Santi vajja et al., [38] Apical leakage was seen in all groups with 1 mm depth root end cavities irrespective of the materials used. MTA with 2 mm thickness, RMGIC of 3 mm thickness and IRM with 4 mm thickness was effective to prevent apical microleakage. The apical leakage decreased with an increase in the thickness of root end filling materials. Our findings suggest MTA is a promising alternative in comparison with several existing materials as root end filling materials.

According to Carlos Estrela et al., [39] Root perforation during operative procedures should be prevented. Diagnosis and immediate sealing, intensity of aggression, control of contamination, relationship to crestal bone and epithelial attachment are factors that have an impact on the prognosis. Physicochemical, histological and clinical studies have indicated MTA as a good sealer for these situations, but one which lacks a good esthetic outcome.

According to Lodiene G et al., [40] The resin composite material leaked significantly more than the MTA and glass ionomer cements when used to repair large furcation perforations. Bacteria could penetrate into dentine even at a distance from the perforation filling.

According to E.Ovasay et al., [41] MTA was determined as the most successful in terms of preventing microleakage when compared with IRM and Biodentine. The diameter of the perforation was found to have an impact on microleakage and the perforation which is 2 mm in diameter exhibited less leakage compared to a 4 mm perforation. The amount of microleakage increased by time in all materials.

CONCLUSION

Within the limits of the study, it was concluded that bio-aggregate material was the most common material used during perforation repair with female predilection. Furthermore studies to be done in a larger sample size for better results.

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CONFLICT OF INTEREST :Nil

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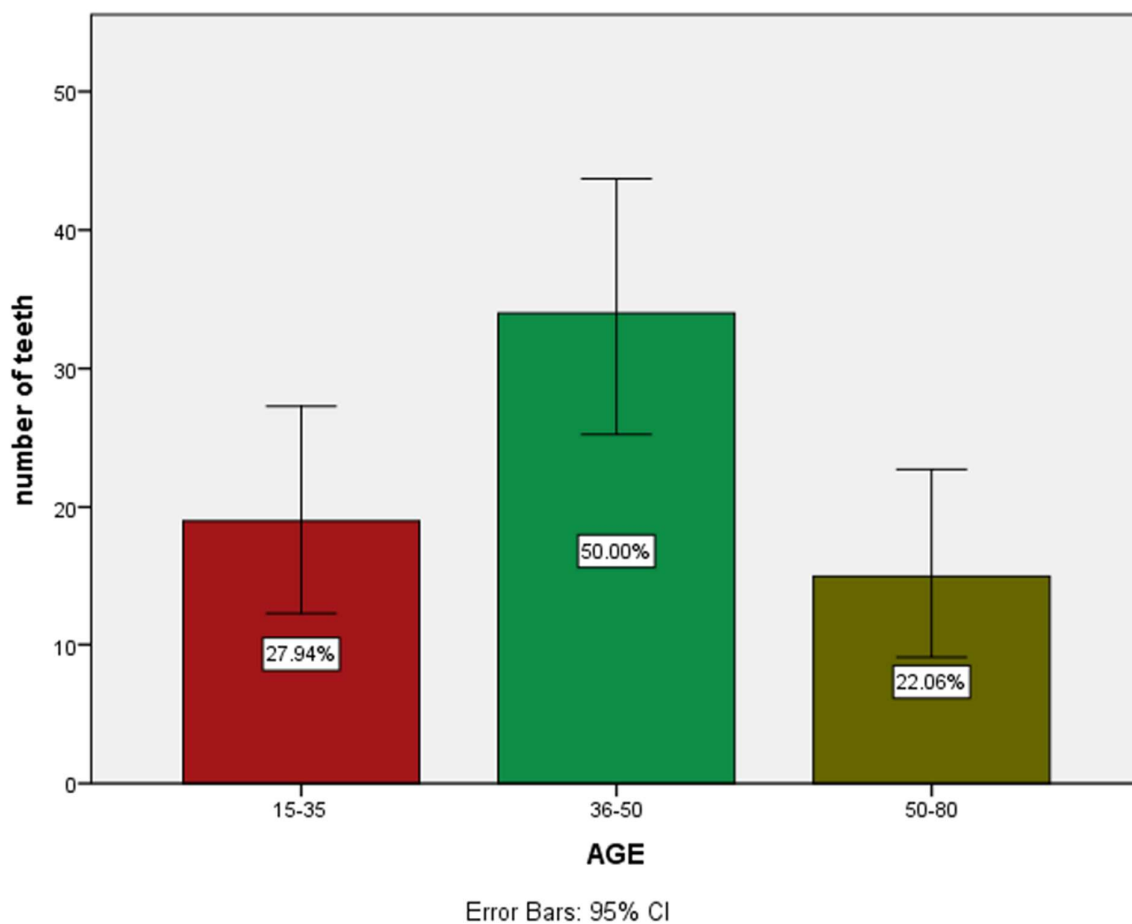


Figure-1 The bar graph of distribution of age among people who underwent Root canal treatment with perforation repair . The age group of patients were mentioned in X-axis which were categorized as 15-35 years, 36-50 years, 50-80 years and the percentage of patients who underwent Root canal treatment with perforation repair were mentioned in Y-axis. Of these, people of the age range 36-50 years who received Root Canal treatment with perforation repair were at a higher rate (50%),age group 15-35 years (27.94%) and 50-80 years (22.06%).

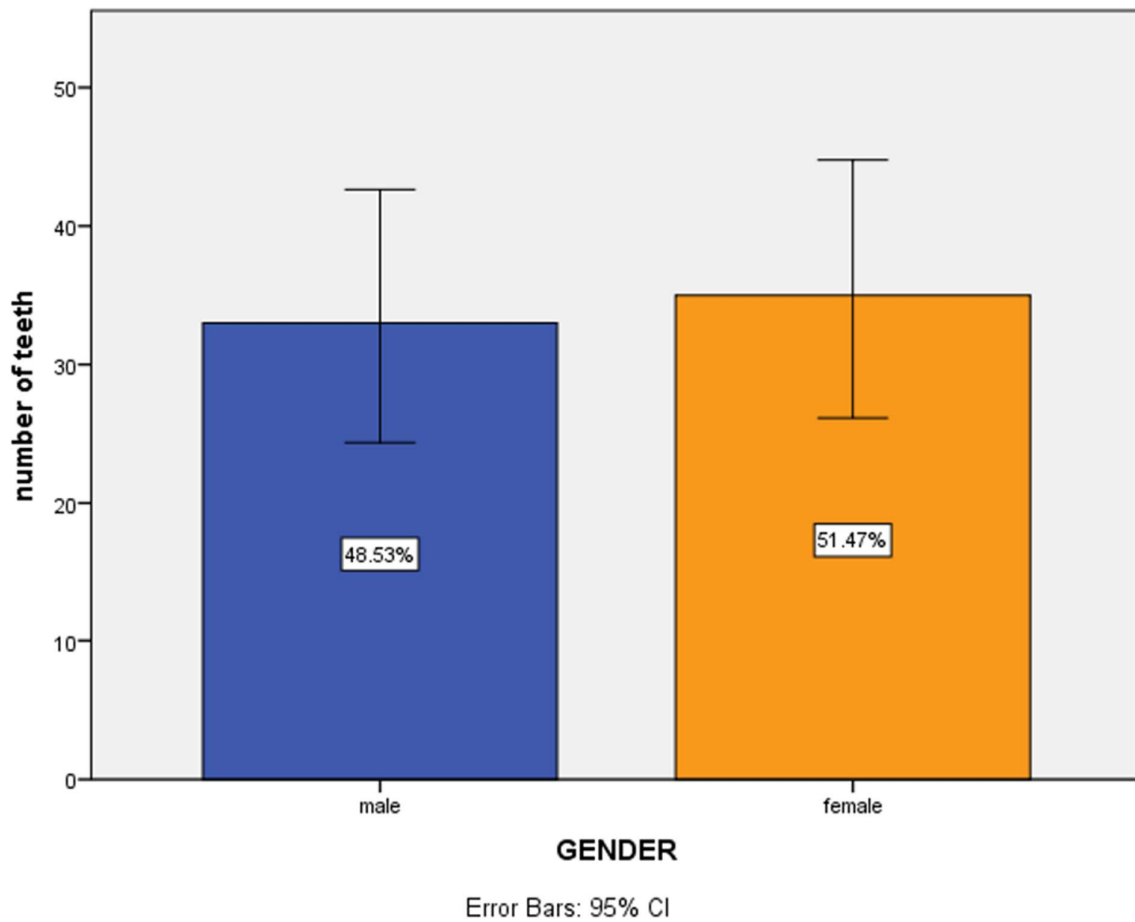


Figure-2 The bar graph of distribution of Gender among people who underwent Root Canal Treatment with perforation repair . The Gender of patients were mentioned in X-axis which were categorized as Female and Males and the percentage of patients who received Root Canal Treatment with perforation repair were mentioned in Y-axis. Of these, female patients were at a higher rate (51.47%) than males (48.53%%).

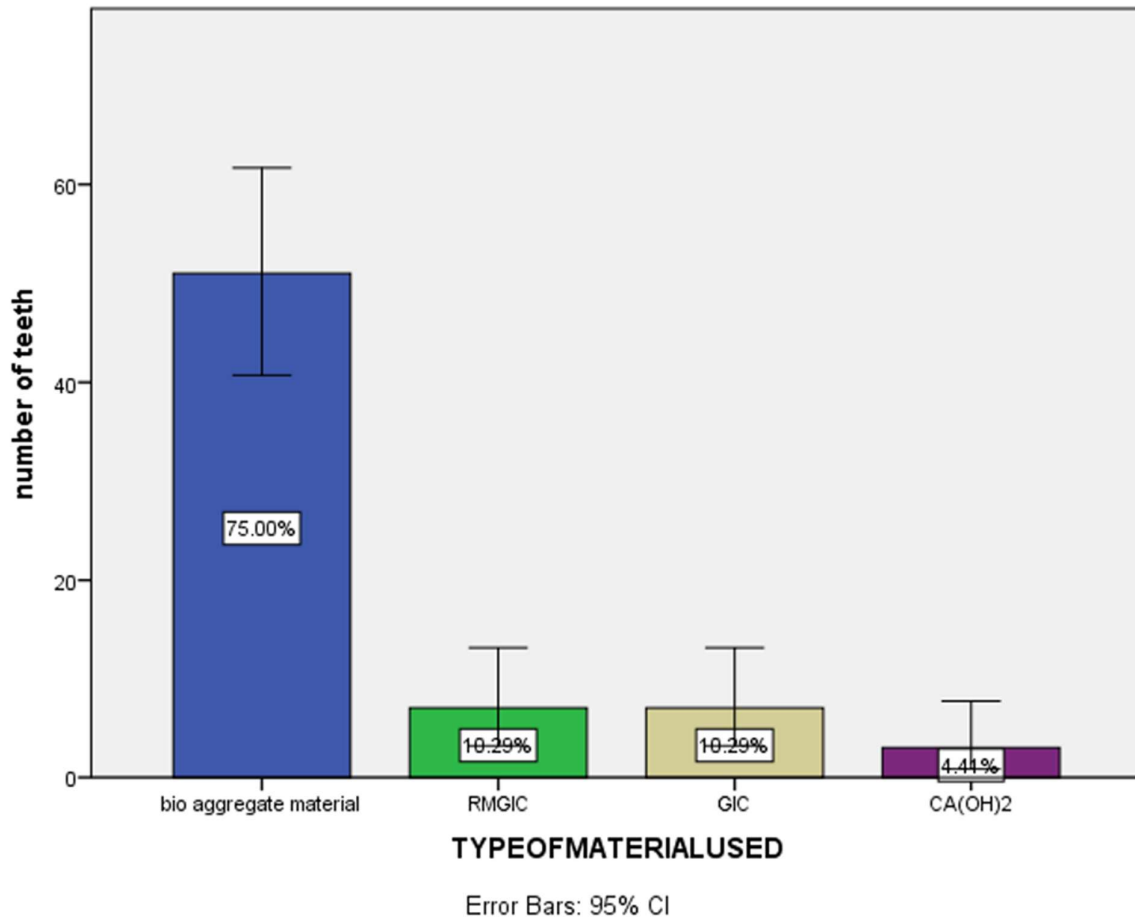


Figure-3 The bar graph of distribution of type of material used for perforation . The type of materials used were mentioned in X-axis which were categorized as bio-aggregate material, RMGIC,GIC,Calcium hydroxide and the percentage of patients who used the materials were mentioned in Y-axis. Of these,bio-aggregate materials were used commonly which is about 75%, RMGIC material was 10.29%, GaiC material was 10.29% and calcium hydroxide was 4.41%.

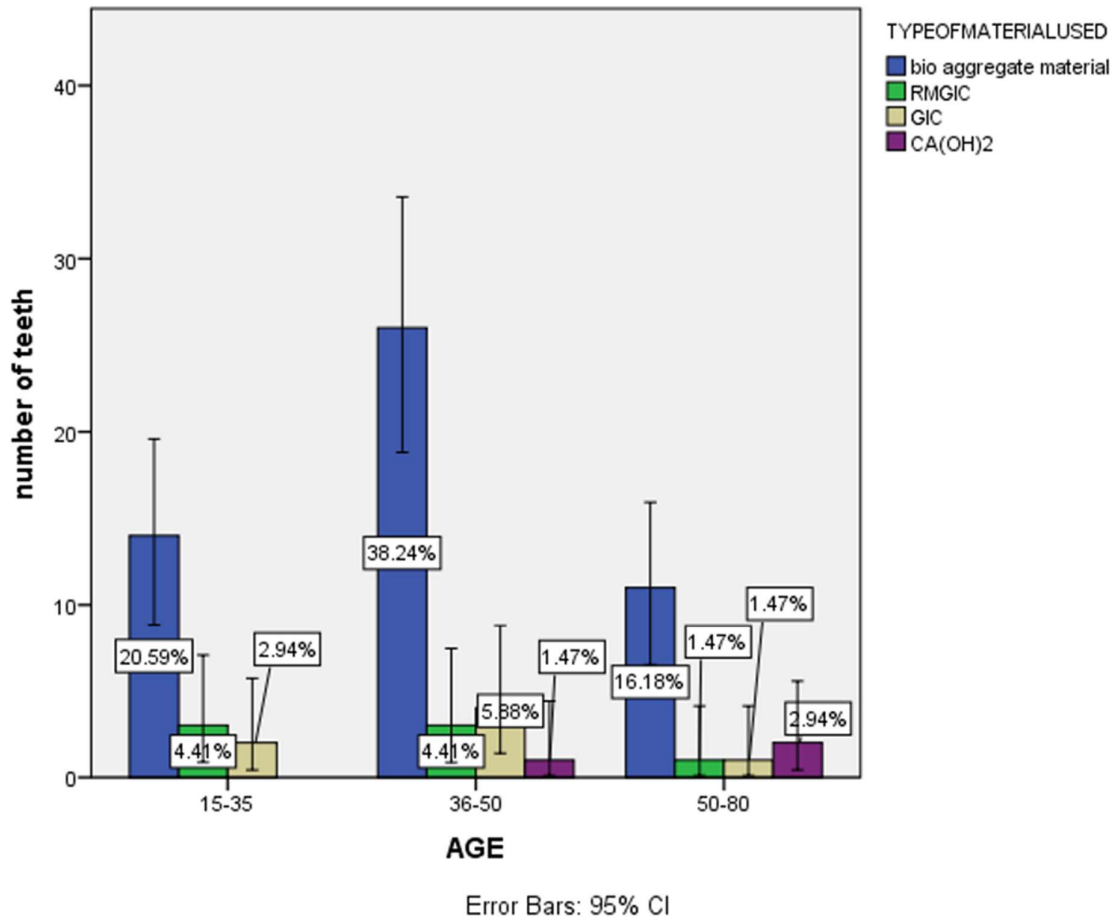


Figure 4 - The bar graph represents the association between type of materials used and age of patients who received Root Canal Treatment with perforation repair where X-axis represents age with types of material used and Y-axis represents the percentage of patients who received Root canal treatment with perforation repair . Bio-aggregate material was used in a higher incidence among 36-50 years of age group people in association with the type of materials used . p-value >0.05 (Chi-square value -4.816a; P-value : 0.568). Hence, statistically not significant.

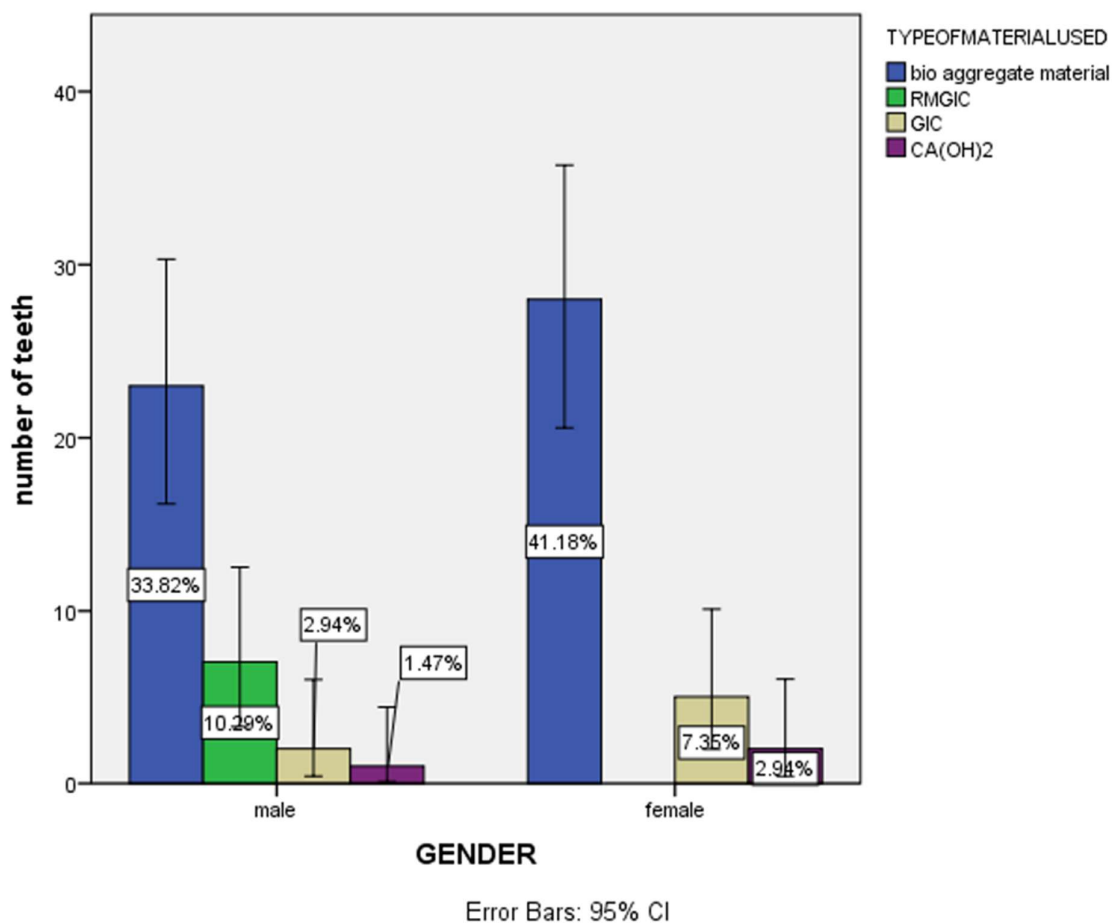


Figure 5 - The bar graph represents the association between type of materials used and gender of patients who received Root Canal Treatment with perforation repair where X-axis represents gender with types of material used and Y-axis represents the percentage of patients who received Root canal treatment with perforation repair . Bio-aggregate material was used in a higher incidence among females in association with the type of materials used . p-value >0.05(Chi-square value -9.058; P-value : 0.029). Hence, it is statistically significant.