

Methods Of Achieving Haemostasis During Final Impression Making For Tooth Supported Full Mouth Rehabilitation Treatment: A Retrospective Study.

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Abstract

Background

Recording of final impression is one the most important procedures in tooth supported full mouth rehabilitation [FMR] treatment. Accurate impression ensures accurate fitting of prosthesis. Accurate fitting can be achieved only if tooth margins are clearly recorded. Retraction of the gingiva can cause the gingival tissues to bleed. Bleeding will in turn cause contamination of the tooth preparation zone and can lead to voids being incorporated into the impression. This study describes the various haemostatic agents that have been used while taking the final impression in FMR cases.

Aim: To evaluate the methods and techniques used to achieve haemostasis while recording final impression of tooth supported FMR cases.

Materials and Methods

This study was designed as a retrospective study. Data for the study was obtained by analysing the patient records of 86000 patients that have been treated from June 2019 to March 2020. Haemostatic techniques were used in 69 cases while recording the final impression. Descriptive statistics were used to get the frequency percentage of the different methods used for achieving haemostasis during impression making. SPSS version 20 was

used to carry out statistical analysis. Chi square test was used to find a correlation between age and type of haemostatic method used.

Results

In 27.5% of cases aluminium chloride was used whereas in 43% of cases ferric sulphate was used. In 68.8% cases no haemostatic agent was used. There was no significant correlation between age and the type of haemostatic method used, P value obtained was 0.069. There was no significant correlation between gender and type of haemostatic method used, P value obtained was 0.420.

Conclusion

Most of the FMR impressions cases did not involve the use of any haemostatic agents. Aluminium chloride was used in a few cases followed by ferric sulphate. There was no correlation found between age, gender and type of haemostatic method used.

Keywords Gingival retraction, Aluminium chloride, Ferric sulphate, Full mouth rehabilitation, electrocautery, Final impression.

1. INTRODUCTION

Impression procedures are one of the most important aspects of dental procedures. Accurate impression ensures a perfect fitting of future prosthesis [1], [2]. In the current scenario there are many advanced methods that are being used to record final impressions for fixed prosthesis. Intra oral scans are now being undertaken, this has eased the process of impression recording. These procedures have made impression recording much more convenient as easy.

An accurate impression recording requires the gingiva to be retracted so that the complete finish line can be recorded accurately. In most of the situations the gingival cord is soaked in a haemostatic agent in order to avoid contamination of tooth surface with saliva or blood [Tarighi and Khoroushi 2014], [3], [4]. There are multiple challenges that are faced during restorative and impression procedures [5], [6] Historically three main types of techniques were used in order to achieve moisture control and haemostasis. 1. Mechanical, 2. Chemical, 3. Surgical [6,7]

A variety of chemical methods can be used as astringents or haemostatic agents [8], [9], [10], [11]. Surgical methods such as electrocautery and laser are alternative methods when haemorrhage is more serious and additional soft tissue removal is required [12]. A combination of chemical and electrical methods is the most common technique for gingival retraction [13]:

In recent times some cordless retraction techniques are clubbed with chemical and mechanical methods. This helps in providing a non-invasive tissue management, like Expasyl [Kerr]. This is a paste-like material which involves dispensing aluminium chloride into gingival sulcus. This material provides excellent haemostasis but the amount of retraction is very minimal.

Astringents like aluminium sulphate, zinc chloride, aluminium chloride act by mechanism of protein precipitation on the surface layer of mucosa. Ferric chloride on the other hand causes superficial and local coagulation [14]. Previously our team had carried out many studies

which involved case reports [15] , surveys [16] , systematic reviews [17], [17,18], [19], literature reviews [20], [21], [21,22], [23], In Vivo studies, [24], [25], [26], In vitro studies [27], [28] and retrospective studies [29]. Currently we are focusing on epidemiological studies and retrospective studies. This study was designed to evaluate the various types of haemostatic agents/ techniques employed by the clinicians in a hospital setup.

2. MATERIALS AND METHODS

This study was designed as a retrospective study. It was done in a university setup in the southern part of India. The ethical approval was received from the Ethical Research Committee, SIMMTS, Chennai.

The data extraction was done by reviewing the patient data bases of 8600 cases performed between June 2019 to March 2020. Out of these 69 cases had undergone FMR treatment [tooth supported]. Among these cases the number of cases where haemostasis was observed were observed. Most commonly used haemostasis was found to be Aluminium Chloride and ferric sulphate.

The frequency tests were done using descriptive statistics. The correlation between age, gender, and type of haemostatic material used was done using Chi square test. The statistics were done using SPSS version 20 software. Independent variables included age, sex and gingival biotype of the patient.

Dependent variables included Lack of knowledge of dental practitioners, unwilling patients and patients allergic to haemostatic agents etc.

3. RESULTS

Around 47% of the clinicians did not use any kind of haemostatic technique while recording final impressions for Tooth supported FMR cases. In 19% of the cases Aluminium chloride was used and only 3 % of cases Ferric sulphate was used.

Aluminium chloride was mainly used in a patient population between the age range of 40-50 years. Ferric sulphate was mainly used in the age range between 50-60 years [Figure 2]. 58% of the population were females while 42% were males. Aluminium chloride was used mainly in male population whereas ferric sulphate was used mainly in female population [Figure 3] 68.4% and 66.7% respectively.

There was no significant correlation between the age and the type of haemostatic agent or technique used. P value 0.069 [>0.05] [Figure 2]. Similarly, no significant correlation was observed between the gender and type of haemostatic agent or technique used. P value 0.420 [>0.05] [Figure 3]

4. DISCUSSION

Generally plain cords not moistened with suitable medicaments do not control haemorrhage satisfactorily [6]. Many practitioners prefer using epinephrine as a haemostatic agent. But there has been evidence of increased Blood pressure and heart rate due to its use [6,11]. Aluminium chloride is mainly used in the concentration between 5-25 %. It has shown to have minimal side effects³² and is the least irritating chemical [30]. It has shown disruption in

the setting of polyvinyl siloxane impression materials also. In most of the cases where a haemostatic agent was used, aluminium chloride was very commonly opted by the clinicians due to its advantages over other haemostatic agents.

Use of ferric sulphate is very technique sensitive and may cause severe gingival irritation and staining if not used properly. This explains the reduced use of its haemostatic agent in the current study. Other hemostats that can be used are zinc chloride [bitarbate], tannic acid [20 % and 100 %] [31] and Negatol solution. There have also been many studies where they have shown negative effects of the haemostatic agents of setting of impression materials whereas some studies show that they do not have polymerisation if they are properly washed away [32].

Limitations of the study is that the data set is very limited for patients undergoing tooth supported FMR treatment. This study is limited geographically as it is based on a university setup. Only tooth supported FMR cases were observed and no FPD or single crowns or tooth tissue supported FMR cases were observed. Only two types of haemostatic agents were used in the study, this is due to the reduced availability of the material and the increased cost of the material.

Many new techniques are being developed which will make impression making much more convenient and will reduce the technique sensitivity of the same [33]. It is necessary to encourage long term extensive research on the new and advanced types of haemostatic agents that can be used during recording of final impressions.

5. CONCLUSION

Within the limitations of the study it can be concluded that aluminium chloride was the most commonly used haemostatic astringent, used while taking final impressions for tooth supported full mouth cases. There was no significant correlation of age or gender with that of the type of haemostatic agent used. Future research should be encouraged and clinicians should be made aware of the different types of haemostatic agents used while recording impressions in tooth supported FMR cases.

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Author contributions

Author 1- Harsh Kasabwala carried out the study by collecting the raw data handwriting the manuscript with the necessary statistical analysis. Author 2 -Dr Kiran Kumar helped in guiding the study and supervised the statistics.

Conflict of interest

There was no conflict of interest among the authors

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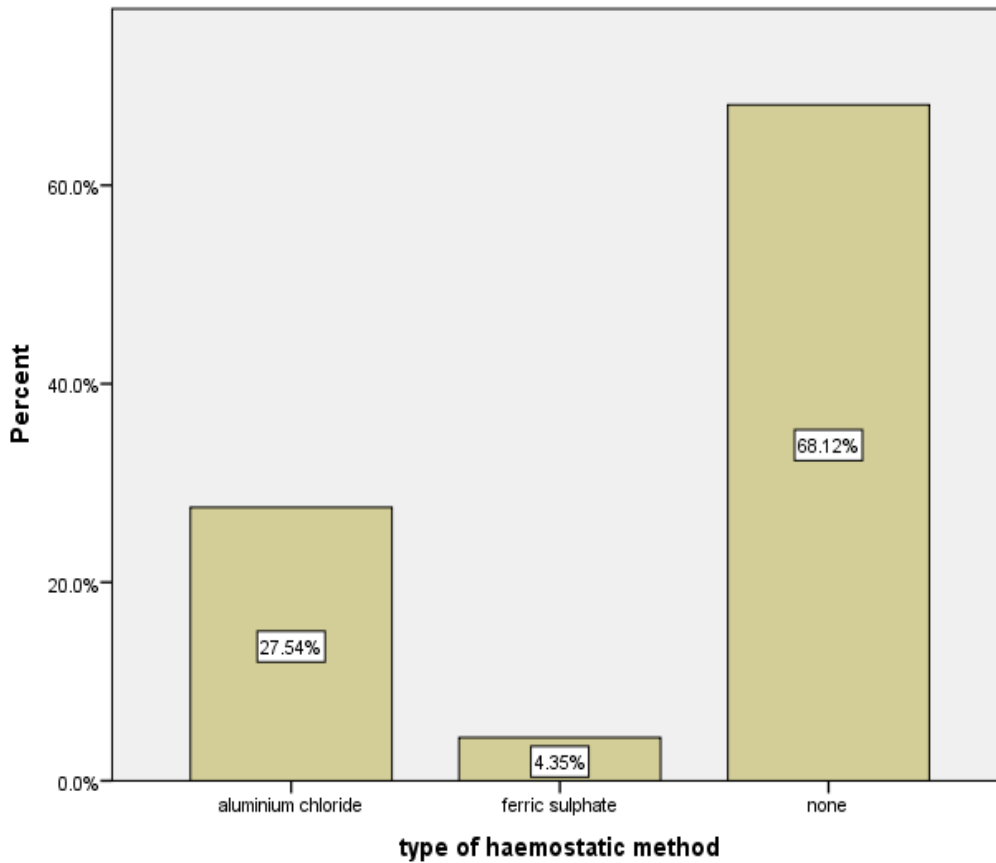


Figure 1 :This bar graph shows the frequency percentage of different types of hemostatic agents used while recording final impressions in tooth supported full mouth rehabilitation cases. The X axis shows the type of hemostatic agent or technique used. Y-axis shows the frequency percentage of the hemostatic technique used. In approximately 68.12 % of the cases hemostatic agents are not used. in 27.4 percent of the cases aluminium chloride was used as a hemostatic agent. Ferric sulphate was used in a very few cases.

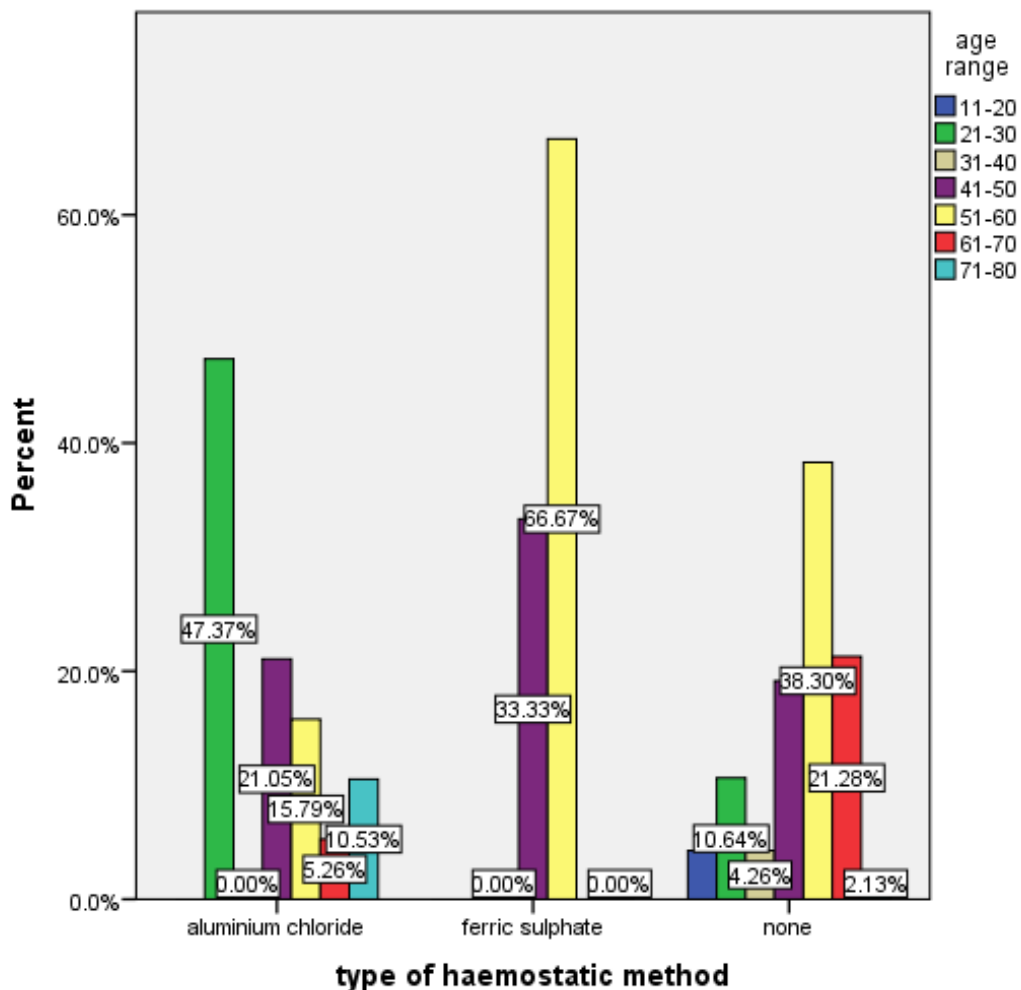


Figure 2: The bar graph represents the association of different types of hemostatic agents used with the different age groups. The x-axis shows the different types of hemostatic agents used. The y-axis shows the frequency percentage of the hemostatic agent or technique used. The dark blue colour depicts the age group from 11 to 20, green colour depicts the age group from 21 to 30, the beige colour depicts the age group from 31 to 40. The purple colour depicts the age group from 41 to 50. Yellow colour depicts the age group from 51 to 60. Red colour depicts the age group from 61 to 70. Light blue colour depicts the age group from 71 to 80. Maximum number of times aluminium chloride was used for patients lying in the age group of 21 to 30 years [47.37%]. Ferric sulphate was mainly used between the age group of 51 to 60 years. The association between age of the patient and the type of haemostatic method used was not statistically significant (Chi square association value - 0.687)

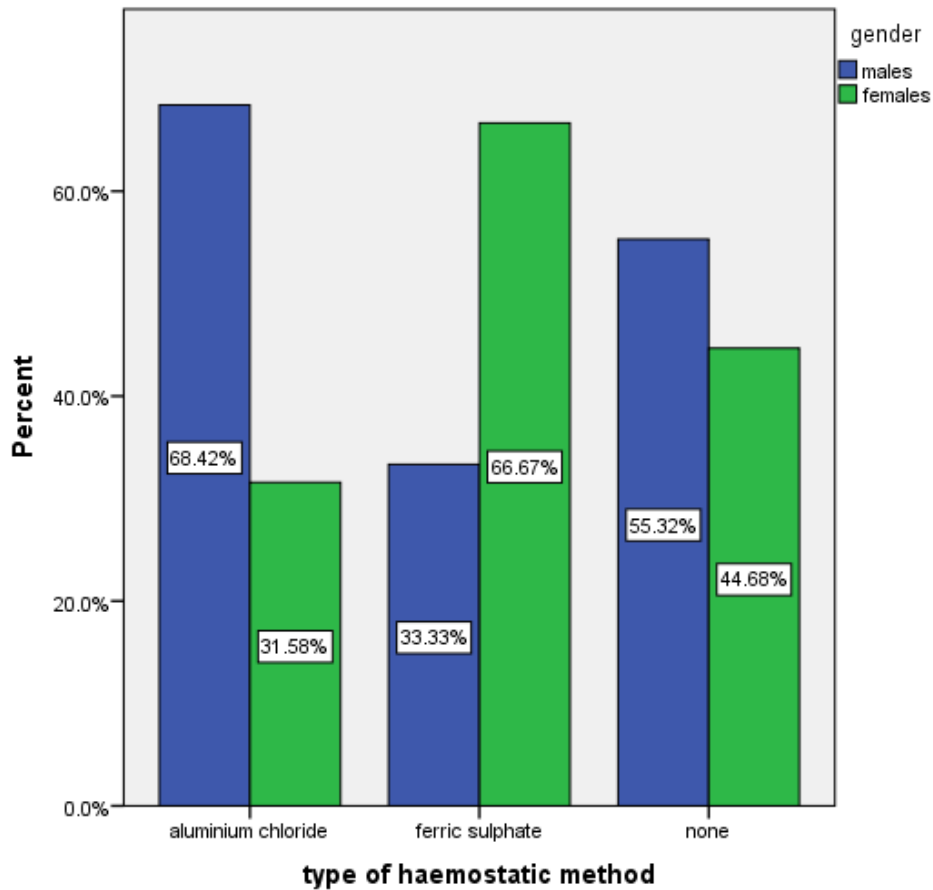


Figure 3- The bar chart depicts the association between gender and the different types of haemostatic methods used..The X axis represents the various haemostatic agents used while recording final impression, the Y axis represents the percentage of occurrence. Blue colour depicts male patients and green depicts female patients. It was seen that aluminium chloride was used in approximately 68.42% of the males. Ferric sulphate was majorly used in females [66.67%]. This signifies that aluminium chloride was majorly used in males whereas ferric sulphate was majorly used in females. The association between gender of the patient and the type of haemostatic method used was not statistically significant. (Chi square association value - 0.42)