



## Healing of Extraction Socket in Diabetic Patients- A Hospital based Retrospective Study

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### ABSTRACT

Diabetes is a common metabolic disorder which is an inability to regulate blood glucose due to insulin deficiency or resistance. During extraction, diabetic patients suffer various complications. One among them is most commonly seen delayed wound healing. The aim of this study is to evaluate the prevalence of delay in the healing process of extraction sockets in diabetic patients. This retrospective cross-sectional study was carried out in a hospital setting where all case sheets for six months were filtered from the patient management software. Samples of all patients with diabetes and the extraction treatment were filtered. Three hundred sixteen patients were used for this study. The data is collected and imported to SPSS for statistical analysis and results are obtained. Among 316 patients, 77 were diabetic and had undergone extraction treatment. Satisfactory healing was observed in diabetic patients undergoing normal extraction within the age group 60-70 years and with blood glucose level within normal range (54%). Unhealed sockets were observed in diabetic patients who underwent surgical extraction within the age group of 60-70 years and with high blood glucose level (10.2%). Majority of patients with normal blood glucose level have satisfactory healing and patients with high blood glucose level have unhealed sockets. Dentists should be aware that diabetic patients of poor glucose control undergoing traumatic extraction are prone to delayed healing processes which lead the patient to discomfort and infections. Patients should be advised to have a proper diet and controlled level of glucose to prevent oral complications.



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### INTRODUCTION

Diabetes mellitus is a common metabolic disorder which is characterised by an inability to regulate blood glucose due to insulin deficiency or resistance (Power *et al.*, 2019). Type 1 diabetes or insulin-dependent diabetes is characterised by low insulin production and Type 2 diabetes, or non-insulin-dependent diabetes is characterised by relative insulin deficiency and tissue resistance (Huang, 2013).

Systemic disorders of patients is an important factor affecting wound healing (Swathy *et al.*, 2015). The disorder of diabetes is considered to have increased

healing problems related to dental extractions and surgery. They are likely to have infections. In addition to high blood sugar, diabetes often occludes peripheral blood circulation. This reduced blood flow hinders the healing response of the wound likely by preventing the entry of cells like platelets and monocytes into the wound (Monroe and Hoffman, 2012).

Diabetes patients with chronic wounds face a significantly higher risk of infection, usually in the form of ulcers (Bryant and Nix, 2012). Medical history prior to surgery helps dentists deal with the complications that may arise. The healing process is the body's response to injury in an attempt to restore normal structure and function (Gheena and Ezhilarsan, 2019). After extraction bleeding occurs in the extraction socket and a clot is formed inside the socket (Moran, 2017). The clot functions by preventing debris, food and irritants from entering the extraction site. It is a supporting system in developing granulation tissue. There is increased blood supply to a socket which is associated with resorption of dense lamina dura by osteoclasts (Stockman, 2010). Due to reduced supply of blood in diabetic patients where the blood vessels are constricted there is a delay in the healing process of the extraction socket (Stockman, 2010).

The other factors affecting socket healing are habits such as smoking, alcohol consumption, the diet of general patient health, age, infection, medications and oral hygiene. The healing process is delayed when the diabetic level is high in surgical removal of the tooth. In India, the steady migration of people from rural to urban areas, the economic boom and the resulting lifestyle change are all influencing diabetes rates. Preliminary results from a large community study carried out by the Indian Council of Medical Research (ICMR) revealed that 4.8 million of the population of state Tamil Nadu is affected by diabetes mellitus (Kaveeshwar, 2014). The morbidity and mortality rates due to diabetes and their possible complications are high.

It is now apparent that diabetes is associated with a spectrum of complications and occurs within the country at a relatively young age. Not many studies are done on the south Indian population as an institutional experience. The need for the present study is to determine the frequency of distribution of delay in the healing process due to diabetes and to discuss the treatment and prognosis of the healing process in diabetic patients. With this background, the present study was conducted to assess the prevalence of delayed healing in diabetic patients and to correlate the relationship between

the post-extraction healing and diabetic levels in the south Indian Population.

## MATERIALS AND METHODS

It is a single centred retrospective study in a private dental institution, Chennai. The data from 86,000 patients visited Saveetha dental college during the time period of June 2019 to March 2020 were reviewed, and the data of all patients with diabetes who underwent extraction treatment were collected. The study was done in a hospital setting with predominantly a South Indians population. The approval for the study was given by IRB and the study included all the patients who reported to the dental hospital with diabetes and underwent extraction treatment.

Data of all patients with diabetes and the extraction treatment were filtered and entered in an excel sheet. Relevant data like age, gender, diabetic history, extraction intervention and post-extraction healing were recorded and tabulated. The incomplete data which have possibilities of bias were not included. The data was then transferred to SPSS software version 19 by IBM for further analysis. Chi-square test was done to compare the proportion between the variables and the p value for statistical significance was set at  $p < 0.05$

## RESULTS AND DISCUSSION

Out of 316 patients, 77 patients had diabetes and underwent extraction treatment. Among the 77 patients, 42% were male and 35% were female. 2% of the patients were from the age group 30-40 years, 16% were from the age group 40-50 years, 21% were from 50-60 years, 28% were from 60-70 years, and 10% were from 70-80 years. The age group 60-70 years had satisfactory healing wherein gender male showed satisfactory healing than females. As far as the surgical procedure was concerned, 69% of patients had normal extraction intervention, 5% had a traumatic intervention, 3% had surgical intervention (Table 1). 65% of the population had satisfactory healing, and 35% of the patients had a complication. The most commonly affected gender is male than females. According to the study of satisfactory healing is more in males than females.

Comparing the post-extraction healing in the extraction intervention the healing of the socket is highly achieved in the normal extraction intervention where according to the study of Gupta (2017) healing is satisfactory in old age of normal extraction intervention with low diabetic level and delayed healing in high diabetic level and underwent surgic-

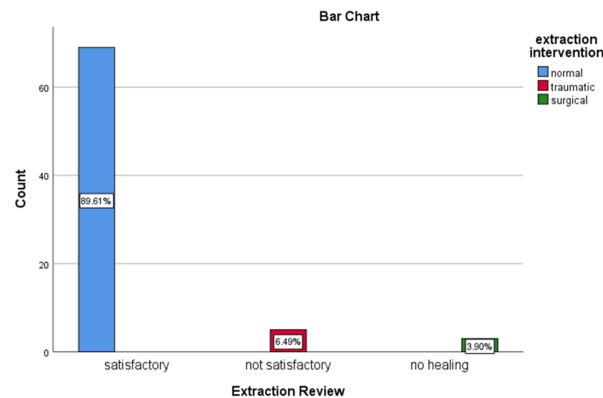
**Table 1: Table depicts the frequency of post-extraction wound healing of patients based on the type of extraction**

Post extraction healing	Normal extraction	Traumatic extraction	Surgical extraction	Total
Satisfactory	69	0	0	69
Not satisfactory	0	5	0	5
No healing	0	0	3	3
Total	69	5	3	77

**Table 2: Table depicts the frequency of post-extraction healing based on blood glucose levels**

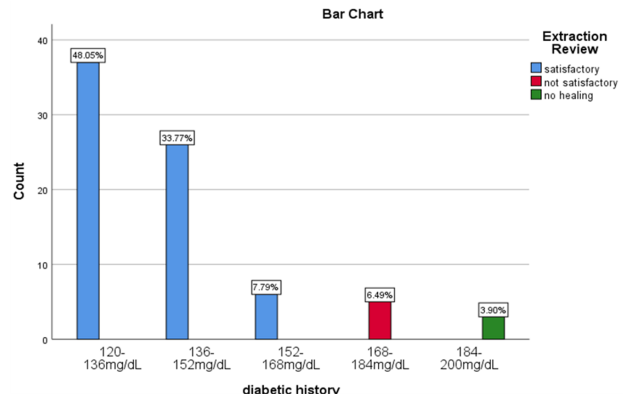
Post extraction healing	120-136 mg/dL	136-152 mg/dL	152-168 mg/dL	168-184 mg/dL	184-200 mg/dL	Total
Satisfactory	37	26	6	0	0	69
Not satisfactory	0	0	0	5	0	5
No healing	0	0	0	0	3	3
Total	37	26	6	5	3	77

al extraction have reduced vascularity which causes delayed socket healing. Correlation between the post-extraction healing and extraction intervention the p value is 0.000 is obtained in the chi-square test, which is statistically significant. (Table 1 and Figure 1).



**Figure 1: Bar graph representing association between type of extraction and wound healing in diabetics.**

Comparing the post-extraction healing and the diabetic level, healing of socket is normal in the low diabetic level where the patients with a diabetic range of 120-136mg/dL were 37%, 136-152mg/dL were 26%, 152-168mg/dL were 6%. The socket is unhealed in patients with a high diabetic range where patients with 168-184mg/dL were 5%, and 184-200mg/dL was 3%. The age group of 60-70 years showed satisfactory healing in a normal extraction intervention with low diabetic level and unhealed socket in surgical extraction intervention with high diabetic level.



**Figure 2: Bar graph showing association between blood glucose levels and extraction wound healing in diabetic patients**

Correlation between the post-extraction healing and the diabetic level the p value = 0.000 is obtained in chi square test, which is statistically significant. (Table 2 and Figure 2) The healing of extraction socket is highly achieved in diabetic level 124-136 mg/dL where the diabetic patient underwent standard extraction and the diabetic patient with high diabetic level who underwent surgical extraction has an unhealed socket. According to the study of (Cabralles, 2008), satisfactory healing of sockets is appreciated in low diabetic levels in patients. According to the study of (Gupta, 2017), healing is not satisfactory in patients with a high diabetic level. The previous literature consensus with this parameter. The surgical extraction done in high diabetic level patients causes reduced circulation and constricts the blood vessels leading to the unhealed socket.

Thus, this study serves as evidence and adds to a consensus as there is a simpler ethnicity with other articles. This study can be utilised for further studies for a larger population and clinical studies correlating HbA1c levels and other dental treatment outcomes. The limitations are the study were less sample size single centred study not correlated with HbA1c levels.

## CONCLUSION

Satisfactory healing is achieved in most diabetic patients in the age group 60-70 years with average diabetic level and normal extraction intervention, old age patients undergoing surgical extraction with high glycemic levels are still at a risk factor for the unhealed socket.

## Conflict of Interest

The authors declare that they have no conflict of interest for this study.

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