Time Required for Haemostasis under Pressure from Dental Extraction Socket

Abstract

Introduction: It is generally expected that the time required for a clot to form in an extraction socket must be similar to that of the average physiological bleeding time (2-9 minutes). However, in dental practice does hemostasis require the full clot to form or does it occur earlier? Conventionally there is no accepted average time range for socket hemostasis with estimates ranging from 20 minutes to 40 minutes. This study is an attempt to quantify the average time period required for hemostasis to occur in an extraction socket. Methodology: 1205 consecutive patients attending the dental clinic and requiring dental extractions were evaluated for the average duration of hemostasis after extraction. Exclusion criteria were children (<15 years), pregnant mothers and patients who had a systemic bleeding disorder or were on anticoagulants. The socket was inspected first after five minutes after an extraction and later at 10 minutes and 15 minutes if bleeding continued. Results: Bleeding from an extraction socket settled in less than five minutes in about 83% of individuals and in 10 minutes in 96.5% of cases. Hence it is expected that in an otherwise normal healthy individual socket compression by biting over gauze for around 10 minutes will produce adequate haemostasis. Prolonged bleeding beyond 10 minutes was rare and was controlled with suturing and pressure applied with a gauze pack in healthy individuals. Conclusion: Checking for hemostasis after placing a pressure pack for 5-10 minutes over an extraction socket is a useful act of risk management before discharge of the patient from the clinic to rule out any hemorrhagic tendency.

Keywords: Extraction socket packing, hemostasis, tooth extraction

Introduction

Dental extraction is one of the most common dental procedures done in routine dental practice. Often a dental surgeon is challenged with controlling inadvertent bleeding from the dental extraction socket. Packing the dental extraction socket with gauze and instructing the patient to apply gentle bite pressure over the gauze pack is the most common maneuver to control bleeding from the extracted socket. Most common post extraction instructions include, biting the gauze for 30-40 minutes. Although there is no unanimity among the dental surgeons regarding the ideal time for applying bite pressure over the dental extraction socket, it is generally expected that the time required for a clot to form in an extraction socket must be similar to that of the average physiological clotting time (4-9 minutes). However, in dental practice does haemostasis require the full clot to form or does it occur earlier? Conventionally there is no accepted average time range for socket hemostasis with estimates ranging from 30 minutes to 40 minutes.[1]

It is generally understood that primary haemostasis occurs due to vasoconstriction of the vessels in the socket followed by platelet plug formation, which occurs in the first few minutes. The formation and stabilization of the fibrin clot is the important aspect of secondary haemostasis.

An awareness of the average duration required for bleeding to stop after an extraction is required in dental practice and hemostatic control is an essential skill in dentistry. This study is an attempt to quantify the average time range required for hemostasis to occur in an extraction socket.

If the bleeding stops within five to ten minutes it would be advisable for all patients who undergo extractions to have their sockets checked for bleeding before being discharged from the dental clinic. The

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need to check for prolonged bleeding has become more necessary in recent times because more patients are on blood thinners. Sometimes they may be unaware themselves or they may miss informing the dentist prior to the procedure. Persistent bleeding discovered by the patient after removal of a pack at home could be an avoidable crisis if the dentists ensures that there is no bleeding tendency before discharging the patient. Informing the patient that hemostasis is achieved and giving of post-operative instructions is an important aspect of risk management.[2]

Methodology (Annexure 1)

Following acceptance from the institutional review board (IRB Min No: 9745); Patients requiring extraction in the dental outpatient department of a medical college hospital were screened for eligibility to be included in the study. Written informed consent was obtained from the eligible patients for the procedure prior to the enrollment in the study.

Inclusion criteria
1. Measuring B.P <150/90 mm hg
2. Patients not on any antiplatelet or anticoagulant medication
3. Age >15 years.

Exclusion criteria
1. Measuring B.P >150/90 mm hg
2. Patients on any antiplatelet or anticoagulant medication
3. Age <15 years
4. Pregnant women
5. Patients with known history of bleeding disorders.

Blood pressure was checked prior to the procedure. Extraction was done under local anesthesia (2% lignocaine with 1 in 200,000 adrenaline). Standard operating procedure involving careful detachment of the gingival mucoperiosteum at the gingival sulcus and extraction with forceps and use of elevator when required was followed. The sockets were compressed manually. Gauze pack was placed over the extraction socket and patient was asked to bite down on the pack to exert pressure for five minutes. If the tooth fractured and the tooth had to be removed surgically or if multiple adjacent teeth were removed the sockets were sutured after the extraction. Each patient was given post-operative instructions. At the end of five minutes the pack was removed and the socket was inspected. If there was no ooze from the socket a fresh pack was inserted and the patient was discharged with prescription for analgesics. The patient was instructed to discard the pack after 15 minutes.

If bleeding continued from the socket, a fresh pack was replaced and the socket reviewed after a further five minutes and a similar procedure followed if the bleeding stopped. If haemostasis was not achieved within 10 minutes (after change of the 2nd pack), the socket was sutured and a fresh pack was placed. This would be reviewed again for 15 minutes and 20 minutes after the extraction. If the bleeding persisted even after this period they would be investigated for a systemic bleeding disorder. On discharge after the procedure, patients were asked to report to casualty if there was recurrence of bleeding from the socket.

Results

Total number of patients enrolled for the study between January 2016 to September 2016 was 1205. Of these males were 634 and females were 571. The patients included in the study had age range between 16 years to maximum of 82 years. In females the various etiology for which dental extraction indicated were caries (448), dental clearance for Radiotherapy/Bone marrow transplant (43), periodontal problem/mobility (76), sharp cusp/chronic cheek bite/pericoronitis (4). In males the various etiology indicating extractions were caries (390), dental clearance for Radiotherapy/Bone marrow transplant (131), periodontal problem (107), sharp cusp and chronic cheek bite/pericoronitis (6). Total number of tooth extraction done by closed method were 973 (these patients had simple extractions not requiring sutures). According to the protocol, suturing was done primarily following surgical extraction (94 cases) or when multiple adjacent tooth was removed (138 cases), Total number of such cases were 232, [Table 3] out of which quadrant extractions were 52 cases [Table 4]. During the study period, none of the patients reported back with recurrence of bleeding. <10 minutes haemostasis was achieved in 90.3% of cases.

From above results it is evident that
1. That bleeding from an extraction socket tends to settle in 10 minutes (96.5% of cases). 95% CI (Confidence Interval) = (95.5 – 97.6) [Table 1]
2. The above fact applies to extraction sockets whether they were single tooth extractions (97% of cases stopped bleeding in 10 minutes) 95% CI = (95.9 – 98.1) [Table 2] or whether they were multiple teeth extractions (94.4% of cases stopped bleeding in 10 minutes), provided suturing is done immediately after extraction of multiple adjacent teeth. 95% CI = (91.4 – 97.4) [Tables 3 and 4] 3. Single tooth extraction sockets tend to stop bleeding within five minutes in the majority of cases (83%) 95% CI = (80.6 – 85.3) [Table 2]
4. Multiple teeth extractions, which have been sutured after extraction also tend to stop bleeding in five minutes (68%) 95% CI = (62.1 – 74.1) but less frequently than single tooth extraction sockets. This difference is significant at P < 0.0001 (Fisher’s exact test) [Tables 3 and 4].

Only 14/1205 (1.16%) patients had bleeding more than 15 minutes. Among these 14 patients, in all of them the bleeding from the dental extraction socket stopped within 20 minutes except four (4/1205; 0.003%) patients who
needed suturing and additional packing with Tranexamic pack. These patients were of dental clearance with adjacent tooth dental extraction (1), periodontal problem/mobility (1), and surgical dental extraction following tooth root fracture requiring flap elevation (2/4).

There was no significant association between reason for dental extraction and time required for hemostasis.

### Discussion

The average time for bleeding to cease following dental extraction in healthy individuals, however, is not exactly known and needs to be specified. In recent years there has been an increase in the number of patients taking oral anticoagulants or antplatelets or combination of both presenting to dental clinics for dental extraction. Though various protocols exist for managing such cases, predictability of post extraction haemostasis is not certain. We need to know if there is a physiological standard of time for haemostasis by which to compare the various modalities of managing patients with coagulation disorders or on anticoagulant/antiplatelet medications.

A study comparing a socket dressing (Hemcon) used in extraction sockets with 52 control extraction sockets showed hemostatic time to average 9.5 minutes. However, some of control extraction sockets were in patients who were on anticoagulants for which the dressing was being tested. Studies using normal controls against anticoagulated patients requiring extractions are limited and the results do not report the average time for haemostasis in normal individuals.[3-7] In a Swansea study on anticoagulated patients, post extraction bleeding was checked 10 minutes after extraction and if found to continue to bleed the case was recorded as an immediate bleed.[8] Well defined outcome measures for comparison of post extraction bleeding are essential for more meaningful interpretation of studies in acquired coagulopathies.[9]

Average bleeding time (BT) by either Ivy or Duke’s method is considered a physiological standard. Bleeding time test is done by puncturing the skin and is not necessarily an indicator of the time taken for haemostasis (bleeding to stop) in other organs e.g. bleeding following gastric biopsy is of shorter duration than bleeding from the skin test.[10,11]

A study comparing the skin bleeding time with bleeding time after an extraction done in 30 subjects found that though the average BT was 5.9 minutes the oral BT (after extraction) was an average of 7.5 minutes (15). This may indicate that haemostasis after an extraction may be related to factors other than or in addition to those involved in bleeding from the skin. As noted by the authors, since the size of the sample was small, the average Oral BT detected of 7.5 minutes may not be representative as a physiological standard of a larger population.

In the present study, 1205 consecutive healthy patients between the ages of 16 to 82 years were evaluated for bleeding from the dental extraction socket after obtaining consent to be the part of the observational study. Presence or absence of bleeding from the socket was noted on removal of the pressure pack after the minimum period of 5 minutes as per routine procedure and was not done as an experimental measure. For this reason, the results of the study are reported in ranges. (0 to 5 minutes, 5 to 10 minutes, 10 to 15 minutes and 15 to 20 minutes). Allowing the socket to bleed without placing a pressure pack and directly observing time taken for stoppage of bleeding could have enabled a more precise determination of the time of hemostasis but may not have been ethical since it would contravene standard of care which require conventional haemostatic measures to be employed routinely for all patients. The option of removal of packs after shorter periods like one or two minute intervals, instead of five minute intervals could actually interfere with clot formation through disruption of the developing fibrin strands and was therefore avoided.

The study reveals that in the majority of healthy individuals the bleeding following uncomplicated extraction of a single tooth stops within the first five minutes after extraction if

### Table 1: Time for haemostasis in total cases (sutured+not sutured) (n=1205)

| Haemostasis achieved | n (%)     |
|----------------------|-----------|
| <5 min               | 965 (80.08) |
| 5-10 min             | 198 (16.43) |
| 10-15 min            | 28 (2.32)  |
| >15 min              | 14 (1.1)   |

### Table 2: Time for haemostasis when suturing was not done (single tooth extractions) (n=973)

| Haemostasis achieved | n (%)     |
|----------------------|-----------|
| <5 min               | 807 (82.93) |
| 5-10 min             | 137 (14.08) |
| 10-15 min            | 20 (2.05)  |
| >15 min              | 9 (0.92)   |

### Table 3: Time for haemostasis when suturing was done (multiple tooth extractions) (n=232)

| Haemostasis achieved | n (%)     |
|----------------------|-----------|
| <5 min               | 158 (68.1) |
| 5-10 min             | 61 (26.29) |
| 10-15 min            | 8 (3.44)   |
| >15 min              | 5 (2.15)   |

### Table 4: Time for haemostasis in cases where quadrant extraction is done (n=52)

| Haemostasis achieved | n (%)     |
|----------------------|-----------|
| <5 min               | 40 (76.92) |
| 5-10 min             | 7 (13.46)  |
| 10-15 min            | 4 (7.61)   |
| >15 min              | 1 (1.9)    |

Kumar, et al.: Time required for haemostasis in a dental extraction socket with the use of pressure pack.
a pressure pack is used. In only a minority of cases the bleeding proceeds beyond 10 minutes.

In complicated extractions and multiple adjacent tooth extractions in which suturing is required hemostasis is achieved with the use of pressure pack within 10 minutes in the large majority of healthy individuals. The proportion was similar to that seen in single tooth extractions. This is in contrast to the report that multiple teeth extraction in anticoagulated patients have more significant bleeding events than single tooth extractions.[7]

It is generally understood that bleeding stops following an extraction due to the primary hemostatic mechanism of vascular spasm and formation of platelet plug and early fibrin formation within the socket. This may be supplemented by indirect pressure of the pack on the small vessels in the loose gingival mucoperiosteum around the socket, detached during the extraction procedure. Suturing has a similar tamponade effect on the small vessels in the gingival flap by compressing the flap against the underlying alveolar bone even if primary closure of the flaps is not achieved for e.g. in molar sockets. Prophylactic suturing of the sockets can be recommended for extractions of multiple adjacent teeth or teeth extractions complicated by root fractures requiring removal.

Age, sex, location in the dentition (maxillary or mandibular, posterior or anterior) and periodontal condition, did not make any significant change in the average range of time taken for bleeding to stop in healthy individuals. The risk of prolonged bleeding after an extraction due to a previously undiagnosed bleeding disorder is low (less than 1 in 1000) provided a proper history has been taken to rule out anticoagulant drug intake, known bleeding disorder or uncontrolled hypertension. Interrupted sutures (silk/vicryl) are adequate when suturing is required and can be removed after 7 days for silk sutures.

Conclusion
With this study, it is now clear that up to 10 minutes of bite pressure over gauze placed at the extraction socket is adequate to achieve haemostasis in dental extraction socket. It is advisable to check for haemostasis before discharging a patient following extraction and it probably unnecessary for patients to be asked to keep biting on a gauze pack for 30 to 40 minutes following extraction, as is often recommended.

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Conflicts of interest
There are no conflicts of interest.

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Consecutive patients reporting to the Dental -1 opd for dental extractions.

Inclusion criteria:
1. Measuring B.P <150/90 mm hg
2. Patient not on any antiplatelet or anticoagulant
3. Age >15 years

After dental extraction gauze is placed at the dental extraction socket and checked after 5 minutes

Parameter to be measured
1. Age, 2. Sex, 3. Indication for dental extraction, 4. Number of teeth to be extracted, 5. Normal or surgical extraction, 6. Suturing required

Annexure 1: Flowchart of study protocol