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## Assessment of knowledge, importance and management of uncontrolled bleeding in dental surgical procedures among dental professionals

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### Abstract

**Background:** Uncontrolled bleeding can cause risks of morbidity and complications in dental surgical procedures, therefore it is very important to have adequate knowledge about handling and management of such scenarios if and when they occur. The purpose of this study was to assess the knowledge, importance and management of uncontrolled bleeding in dental surgical procedures among dental health professionals in Pune.

**Materials and Methods:** A questionnaire study was conducted among dental health professionals in Pune city. A structured, self-administered, close-ended questionnaire was designed to collect the data which consisted of two parts and comprised of 23 questions related to knowledge, attitudes and practices in management of uncontrolled bleeding. The reliability statistics were calculated and Cronbach alpha value was 0.751. Statistical analysis was done using descriptive statistics.

**Results:** In this study, there were a total of 166 participants of age 21 and above. 92.8% of the participants were aware with some of the medical conditions associated with uncontrolled bleeding in dental surgical procedures while the others were unaware or not sure. 92.2% of the participants agreed that medical history plays an important role in dental surgical procedures while the others disagreed to it.

**Conclusion:** The most of the participants are aware about the causes of uncontrolled bleeding although there is a need for guidance about the management of uncontrolled bleeding, especially in patients on anticoagulant therapy where the matter is still not well defined despite of guidelines.

**Keywords:** anticoagulant therapy, bleeding disorders, dental surgical procedures, medical condition, uncontrolled bleeding

### Introduction

Dental surgeries include procedures from simple dental extraction to alveoloplasties it may present with risk of complications such as Pain, nerve injury, swelling, infections and bleeding. Risk of morbidity and complications in surgery can occur due to uncontrolled bleeding, therefore it is very important to have knowledge about management of uncontrolled bleeding during dental surgical procedures [1] and also there must be an awareness about the impact of it [2]. Risk factors contribute to uncontrolled bleeding in patients who are on anti-platelet, anti-coagulant medication as well chemotherapeutic agents, local causes such as poor oral hygiene, infection or local trauma [3] also who have uncontrolled hypertension, liver disease, platelet deficiency, Von Willebrand factor deficiency and hemophilia [4]. Hemophilia is the most common inherited lifelong bleeding disorder with frequency of 1 in 5000-30000 births which is characterized by excessive bleeding and prolonged clotting time into mucosa and soft tissue and also been associated with morbidity and mortality as well as numerous impact on overall health [5]. Ischemic events in heart, lungs and brains are caused by thrombotic and thromboembolic occlusion of blood vessels, which is prevented by anti-platelet and anti-coagulant therapies, long term use leads to increase in the bleeding time and also associated with risk of post-operative hemorrhage [6]. Therefore it is important to consult physician to assess the patient's need for any dental surgical procedure [7].

Dental and medical evaluations, history and investigations should be done before any dental surgical procedures to minimize risk of complications in patient that present with personal and/or family history, abnormalities in laboratory reports suggestive of inherited or acquired bleeding disorder and also in patients on anticoagulants/antiplatelet medications<sup>[8, 9]</sup>. Knowledge about management procedures in cases bleeding disorders plays an important role in reducing complications;<sup>8</sup> and also decision to interrupt or continue anti-platelet therapy for a dental surgical procedure in patient by referring to their physician<sup>[10]</sup>. A broad range of hemostatic agents are available to avoid complications when long lasting bleeding occurs despite if the proper use of traditional techniques of hemorrhage control, as adjunctive measures to enhance hemostasis in the course of dental surgeries<sup>[11]</sup>. Therefore, the study aimed to assess the knowledge, importance and management of uncontrolled bleeding in dental surgical procedures among dental health professionals in Pune.

### Materials and Methods

A questionnaire study was conducted among dental health professionals in Pune city to assess knowledge, importance and management of uncontrolled bleeding in dental surgical procedures. The objectives of this study were to estimate the knowledge, importance about uncontrolled bleeding and to create awareness about the possible complications in dental surgical procedures. The study duration was about three months. The participants were selected based on the following inclusion criteria: i) The practicing dentists, ii) Participants who are willing to participate in the study. Non-practicing dentists, dental students and dental auxiliaries are excluded from the study. The input parameter for sample size calculation used as follows: 80% power of the study, alpha error 0.05, effect size 0.3 (medium), and degree of freedom as 5. The calculated sample size was 156 using G\*Power software version 3.1.9.2 (Heinrich Heine University, Düsseldorf). The final considered sample size for the study was around 166. The convenient sampling technique was used in the study. A structured, self-administered, close-ended questionnaire was designed to collect the data which consisted of two parts and comprised of 23 questions related to knowledge, attitudes and practices in management of uncontrolled bleeding. The first part consisted of demographic data such as age, gender, qualification and experience and the second part consisted of questions based on knowledge,

attitude and practice in management of uncontrolled bleeding. The reliability statistics were calculated and Cronbach alpha value was 0.751. The questionnaire was prepared using Google forms (Google LLC, Mountain View, California, United States) and the link was distributed to the selected participants via e-mail, WhatsApp number and other social media platforms (Instagram, Telegram, etc.). A brief introduction about the study was given and informed consent was also taken from all the participants. Data collected were entered in a spreadsheet (Microsoft Excel, 2016). Statistical analysis was done using descriptive statistics (number and percentage). SPSS (Statistical Package for the Social Science) 23.0 version software (IBM Chicago, Illinois, United States). The p value was set at 0.05.

### Results

In table 1, there were a total of 166 participants out of which 137 were of age group 21-40 years and 22 were of age group 41-60 years while the rest were from 60 years and above. There were 106 female participants and 60 male participants. Majority of the participants were BDS (62%), MDS were 35.5%, PhD were 2.4%. 41% of participants had an experience of less than one year. 39.2% of participants had an experience between 1 to 5 years, 16.3% of participants had an experience of 5-10 years, 3.6% had an experience more than 10 years. In table 2, 92.8% of the participants were aware with some of the medical conditions associated with uncontrolled bleeding in dental surgical procedures while the others were unaware or not sure. Around 84.9% of the participants thought that the causes for uncontrolled bleeding were hypertension, bleeding disorder and clotting disorder while 1.2% was unaware. Around 65.1% of the participants thought that Vitamin K, Injection Pause and Ethamsylate are the systemic agents used in chemical methods to control hemorrhage. In table 3, 92.2% of the participants agreed that medical history plays and important role in dental surgical procedures while the others disagreed to it. Around 88% of participants agreed that it is important to perform medical test on patients with underlying disorder prior to dental surgical procedures while 4.8% of participants disagreed to it. In table 4, 46.4% of dental health professionals suggest performing International Normalized Ratio/Activated Partial Thromboplastin Time while 7.8% are unaware. Around 91.6% of participants prefer pressure pack as a primary method and 72.9% prefer adrenaline to control hemorrhage.

**Table 1:** Demographic details of study participants (N=166).

Sr. No.	Demographic details	Response	N	%	Total N (%)
1	Age	21-40 years	137	82.5%	166 (100)
		41-60 years	22	13.3%	
		61 and above years	7	4.2%	
2	Gender	Male	60	36.1%	166 (100)
		Female	106	63.9%	
3	Education	BDS	103	62%	166 (100)
		MDS	59	35.5%	
		PhD	4	2.4%	
4	Experience	Less than one year	68	41%	166 (100)
		1-5 years	65	39.2%	
		5-10 years	27	16.3%	
		More than 10 years	6	3.6%	

**Note:** N – number, % - percentage.

**Table 2:** Knowledge related questions responses of study participants (N=166).

Sr. No.	Questions	Responses	N	%	Total
1	What is the average volume of blood in normal adult?	4.5-5 Litres	126	75.9%	166 (100)
		5.5-6 Litres	23	13.9%	
		3.5-4 Litres	3	1.8%	
		4-5.5Litres	14	8.4%	
2	Are you aware of some medical conditions associated with uncontrolled bleeding in dental surgical procedures?	Yes	154	92.8%	166 (100)
		No	9	5.4%	
		Not sure	3	1.8%	
3	What are the causes for uncontrolled bleeding during dental surgical procedures?	Hypertension	7	4.2%	166 (100)
		Bleeding Disorder	11	6.6%	
		Clotting disorder	5	3%	
		All of the above	141	84.9%	
4	What is the most common inherited bleeding disorder seen in dental Outpatient Department?	None of the above	2	1.2%	166 (100)
		Haemophilia	64	38.6%	
		Disseminated intravascular coagulation (DIC)	11	6.6%	
		Haemophilia and DIC	86	51.8%	
5	What is the normal prothrombin time and activated partial thromboplastin time?	None	5	3%	166 (100)
		10-20 seconds, 5-10 minutes	29	17.5%	
		5-7 seconds, 3-5 seconds	20	12%	
		5-10 minutes, 20-30 seconds	15	9%	
6	In which condition prothrombin time and activated partial thromboplastin time is prolonged?	11-14 seconds, 30-34 seconds	102	61.4%	166 (100)
		Anticoagulant therapy	141	84%	
		Disseminated intravascular coagulation	113	68.1%	
		liver disease	87	52.4%	
7	Anticoagulant drugs are given in which condition?	Hypertension	31	18.7%	166 (100)
		Diabetes Mellitus	25	15.1%	
		Stroke	2	1.2%	
		Ischaemic heart disease	17	10.2%	
8	What is the natural anticoagulant produced in the body?	Pulmonary embolism	5	3%	166 (100)
		All of the above	140	84.3%	
		None of the above	2	1.2%	
		Heparin	139	83.7%	
9	What are the most commonly prescribed antiplatelet drugs among the following?	warfarin	16	9.6%	166 (100)
		Coumarin Derivative	8	4.8%	
		Ethylenediamine tetraacetic acid	3	1.8%	
		Aspirin	25	15.1%	
10	Aspirin is contraindicated in which of the following medical conditions?	Clopidogrel	9	5.4%	166 (100)
		Heparin	6	3.6%	
		Aspirin and Clopidogrel	126	75.9%	
		Bleeding Disorder	66	39.8%	
11	What are the systemic agents used in chemical methods to control haemorrhage?	Bleeding and Clotting Disorder	59	35.5%	166 (100)
		None	5	3%	
		Vitamin K	32	19.3%	
		Injection Pause	9	5.4%	
12	Embolization of vessels can be done with the help of	Ethamsylate	5	3%	166 (100)
		All of the above	108	65.1%	
		None of the above	3	1.8%	
		I don't know	9	5.4%	
12	Embolization of vessels can be done with the help of	Angiography	151	91%	166 (100)
		X-Ray	5	3%	
		C.T Scan	5	3%	
		M.R.I	5	3%	

Note: N – number, % - percentage, CT scan - Computed Tomography, MRI - Magnetic Resonance Imaging.

**Table 3:** Attitude related questions responses of study participants (N=166).

Sr. No.	Questions	Responses	N	%	Total
1	Do you think medical history plays an important role in dental surgical procedures?	Strongly Agree	119	71.7%	166 (100)
		Agree	34	20.5%	
		Neutral	7	4.2%	
		Disagree	2	1.2%	
		Strongly Disagree	4	2.4%	
2	Do you think it is important to know about anticoagulant therapy and its protocol before proceeding with dental surgical procedures?	Yes	153	92.2%	166 (100)
		No	6	3.6%	
		Not sure	7	4.2%	
3	Do you think that blood thinners weaken your immune system?	Strongly Agree	68	41%	166 (100)
		Agree	27	16.3%	
		Neutral	39	23.5%	
		Disagree	24	14.5%	
		Strongly Disagree	8	4.8%	
4	Do you think Diurnal variation of blood pressure is also one of the causes of uncontrolled bleeding post extraction?	Strongly agree	82	49.4%	166 (100)
		Agree	40	24.1%	
		Neutral	30	18.1%	
		Disagree	12	7.2%	
		Strongly Disagree	2	1.2%	
5	Do you think it is important to perform medical test on patients with underlying disorder prior to dental surgical procedures?	Strongly agree	120	72.3%	166 (100)
		Agree	26	15.7%	
		Neutral	12	7.2%	
		Disagree	3	1.8%	
		Strongly disagree	5	3%	

Note: N – number, % - percentage.

**Table 4:** Practice related questions’ responses of study participants (N=166).

Sr. No.	Questions	Responses	N	%	Total
1	A patient comes to your OPD for dental procedure with lab. Report showing decreased platelet count and increased bleeding time, it is suggestive of?	Bleeding Disorder	67	40.4%	166 (100)
		Clotting Disorder	61	36.7%	
		Bleeding and Clotting Disorder	32	19.3%	
		Not sure	6	3.6%	
2	According to you dental procedures in patients on anticoagulants should/can be performed	With consent of physician	153	92.2%	166 (100)
		Without consent of physician	8	4.8%	
		I don't care	4	2.4%	
		I'm unaware	1	0.6%	
3	If a patient comes to your clinic with a toothache has a history of valve replacement surgery (prosthetic valve) and is on blood thinner, which lab investigation will suggest?	Activated partial thromboplastin time & bleeding time	24	14.5%	166 (100)
		Prothrombin time & activated partial thromboplastin time	24	14.5%	
		Prothrombin time/International normalised ratio	28	16.9%	
		International normalised ratio/activated partial thromboplastin time	77	46.4%	
		I don't know	13	7.8%	
4	What do you prefer as primary method to control haemorrhage?	Pressure pack	152	91.6%	166 (100)
		Ligation	1	0.6%	
		Sutures	6	3.6%	
		Other	7	4.2%	
5	What is your treatment approach for patients on anticoagulant therapy before and after dental surgical procedures?	Stop medication 3 days prior & start 2 days later	96	57.8%	166 (100)
		Stop medication 2 days prior & start 2 days later	19	11.4%	
		Stop medication 5 days prior & start 2 days later	44	26.5%	
		Other	7	4.2%	
6	Which chemical agent do you prefer to control haemorrhage?	Adrenaline	121	72.9%	166 (100)
		Gelatine sponge	18	10.8%	
		Bone wax	12	7.2%	
		Other	15	9%	

Note: N – number, % - percentage

**Discussion**

Uncontrolled bleeding in susceptible patients is a great matter of concern to the dentist before performing any dental surgical procedure [11]. Causes for uncontrolled bleeding are Hemostasis disorder and also antiplatelet and anticoagulant therapies [5, 6]. Dental health professionals practice local hemostatic measures and systemic agents to control hemorrhage [7]. The purpose of this paper is to assess

knowledge, importance and management of uncontrolled bleeding in dental surgical procedures among dental health professionals. In the present study 92.8% of the dental health professionals were aware about the bleeding disorders; this was 87% in the study done by George A *et al.* [12] (2017). According to Gopalasamy K *et al.* [2] (2015) most participants thought that the main cause for uncontrolled bleeding were bleeding and clotting disorders, this study showed the similar

reports. In study from Gorge A *et al.* [12] (2017) showed that 53 participants out of 100 encountered hemophilia as the most common bleeding disorder in their clinical practice, and a similar result is seen in this study with 64 participants out of 166. About 71.7% of the participants in this study thought that it was important to obtain medical history since it plays an important role in dental surgical procedures, whereas according to Okoye HC *et al.* [3] (2021) around 83.9% of participants thought the same.

Around 52.53% of the dental students were aware about the normal International Normalized Ratio test (which is currently the selected method for reporting Prothrombin Time values) according to Potdar S *et al.* [13] (2016) when compared to this study 61.4% of dental health professionals were aware of normal prothrombin time. Cerebrovascular disease and ischemic heart conditions are managed by antiplatelet and anticoagulant medications. The question remains whether to stop anticoagulant regimen before dental surgical procedure. What should be done by the dentist in such cases, whether the type of dental procedures matter. According to Shah AH *et al.* [14] (2015) around 85% of the practitioners were of the opinion to stop antiplatelet drugs before dental procedure while in our study 95.8% of the participants were of the same opinion. Some studies reported high risk of immediate bleeding in patients on anticoagulant regimen like Thomason *et al.* [15] (1997) excessive hemorrhage was seen in one patient with two surgical procedures on aspirin 150mg/day and also in study by Lemkin *et al.* [16] 1974 one patient with 18 extractions on 12-20 aspirin tablets daily, where platelet transfusion was done in both cases. While several others stated that minor oral procedures can be done without the risk of bleeding in such patients, hence it is life threatening as thromboembolism [11].

In the present study, around 92.2% of the participants thought that it is important to seek consent from physician before dental surgical procedures similarly a study conducted by Potdar S *et al.* [13] (2016) around 82.5% of the participants thought it was important to suggest physicians consent and a similar result is shown in a study conducted by Gopalasamy K *et al.* [2] (2015) with 70%. In study done by George A *et al.* [12] (2017) around 77.4% of the dental health professionals manage the bleeding disorder by applying pressure and from this study 91.6% of the participants used the same method. The limitation of this study was the small sample size; the study can be done using a large population with different variables.

### Recommendations

1. Proper medical and dental history should be obtained from patients, appropriate lab investigations should be suggested by the dentist before and dental surgical procedures in susceptible individuals along with proper physician's consent.
2. Availability of agents used in chemical, mechanical, thermal methods to control hemorrhage. And knowledge of Intravenous drug administration among dental health professional in order to prevent any medical emergencies and dependencies.

### Conclusion

The most of the participants are aware about the causes of uncontrolled bleeding although there is a need for guidance about the management of uncontrolled bleeding, especially in patients on anticoagulant therapy where the matter is still not well defined despite of guidelines. They should therefore be

encouraged to thoroughly screen the patients, especially prior to any surgical intervention, in order to avoid unexpected complications or events.

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