

The effect of certain materials as haemostatic agents in periapical surgery

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ABSTRACT

Four different materials were used to assess their activities to control blood oozing. A surprising result showed that chlorhexidine (2%) has good haemostatic activity beside gel foam. Local anesthesia showed haemostatic activity for short time, while no effect of normal saline on blood oozing during operation. Further studies on this approach are recommended for further evaluation of haemostatic activity of chlorhexidine.

Key Words: Chlorhexidine, haemostatic agent, periapical surgery, local anesthesia.

الخلاصة

تم إجراء دراسة لمعرفة فاعلية أربع مواد مختلفة للحصول على أقل مستوى للنضوح الدموي خلال العمليات المتعلقة بذروة السن. لقد تبين من خلال البحث أن للكلورهيكسيدات فاعلية جيدة لوقف النضوح بجانب الجيلاتين الماص الإسفنجي، بينما كان تأثير المخدر الموضعي قليلاً ولفترة وجيزة؛ ولم يكن هناك أي تأثير لمحلل الإرواء الوريدي على كمية النضوح. توصي الدراسة بإجراء مزيد من البحوث لغرض تقييم مدى نجاح الكلورهيكسيدات بتقليل النضوح الدموي خلال العمليات المذكورة.

INTRODUCTION

Haemostasis involves a complex series of reactions between the epithelial wall, platelets and plasma that ultimately prevent blood loss by formation of a fibrin clot after injury. The initial response to trauma is smooth muscle contraction of the vessel wall. This results in vascular constriction and reduction in blood flow, followed by platelet adherence to exposed collagen in the endothelial wall. This process enhanced by clotting factor ⁽¹⁾. There are many agents used as haemostatic agents in oral surgery ⁽²⁾.

In periapical surgery, the use of haemostatic agent is essential for isolation of root apex and haemorrhage control. Good haemostasis is initially achieved through proper anesthetic technique prior to tissue incision and flap reflection. Additional local haemostasis is attained with injection into soft tissue lesion if present. If a bleeding still exists, attempt can be made to inject directly into the bony cavity or flush directly the area with anesthetic solution ⁽²⁾.

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Local anesthetic solution with (2%) lignocaine alone act as vasodilator and analgesic agent which would result in their rapid removal following injection. They are, therefore, usually combined with vasoconstrictor in the commercial preparation. The resultant local constriction of blood vessels maintain a higher constitution of analgesic agent at the given site and less blood field⁽³⁾.

The most commonly used and the least expensive is the absorbable gelatin sponge (Gel Foam). It is water insoluble and biologically resorbable. This material forms a scaffold for platelet aggregation, and its action is intrinsic promoting disintegration of platelet causing a subsequent release of thromboplastin. This, in turn, stimulates the formation of thrombin in the interstices of the sponge^(1,2).

Chlorhexidine has been found to be highly efficient antibacterial and myostatic agent in the oral cavity^(4,5). Many authors advised to use chlorhexidine as a mouthrinse in periapical surgery (before and after) to improve and promote rapid healing⁽⁵⁾. In periodontology, chlorhexidine is widely used as antiplaque and antiseptic solution, and it has been proved that it has important role in gingival bleeding reduction⁽⁴⁾.

MATERIALS AND METHODS

Sample

This study was carried out on (65) patients aged (10–60) years old suffering from different dental problems, particularly in the periapical area. Those patients attended Oral and Maxillofacial Department, College of Dentistry, University of Mosul.

In this study, (4) different materials (3 liquid and 1 sponge-like) were used to control blood oozing during periapical surgery to estimate their effectiveness. Patients were divided into (4) groups according to the materials used:

Group 1: Gel Foam (Germany); (18) patients.

Group 2: Local anesthesia (xylestesin-A) lidocaine hydrochloride (2%) + adrenaline (0.015) mg; (17) patients.

Group 3: Chlorhexidine (2%) (Zeneca, UK); (20) patients.

Group 4: Normal saline (SAM) and serve as control group; (10) patients.

Patients included in this study should have a periapical lesion in the anterior and premolar region, upper and lower. Periapical surgery – either apicectomy, apical curettage or retrograde filling – have been done on those patients in a standard ordinary manner.

After incision and flap reflection, the tested materials were applied in the area of blood oozing after apical bone removal to improve bloodless field during operation and to facilitate the accuracy of surgical procedure and as follow: -

- 1) Chlorhexidine, local anesthesia and normal saline (liquid materials) were used as irrigant solutions during bone removal and then applied to the bone cavity via cotton roll emersed in those materials.
- 2) Gel Foam was used and applied in the periapical area after bone removal and irrigation with normal saline.

The grade of blood oozing during operation was made by clinical observation as shown in the following criteria:

- Grade A** No oozing
- Grade B** Mild oozing
- Grade C** Moderate oozing

RESULTS

The number of males and females involved in this study was shown in table (1).

Table (1): Distribution of the sample by sex

Males	Females
30	35

The grade of haemostatic activity among (4) different materials used in this study was shown in table (2). Chlorhexidine (2%) showed high percentage of haemostatic activity (80%), followed by Gel Foam and local anesthesia (39%) and (35%), respectively. Mild oozing was detected when local anesthesia and Gel Foam were used and they represent (65%) and (61%), respectively; while chlorhexidine and normal saline showed low percentage of oozing among all cases (20%) and (30%), respectively. Moderate oozing was detected only in case of normal saline group (control group) (60%), while other groups showed (0%).

Table (2): Grade of blood oozing in all groups

Materials Used	Oozing Grade		
	A	B	C
Chlorhexidine	80%	20%	0%
Gel Foam	39%	61%	0%
Local Anesthesia	35%	65%	0%
Normal Saline	10%	30%	60%

DISCUSSION

A less blood field during periapical surgery is important. This study compared the effect of (4) different materials in blood oozing control during periapical surgery. Gel Foam application is recommended in surgical site especially in large bony cavities because of its favorable tissue response in the ultimate healing process⁽⁶⁾. Gel Foam showed mild to moderate oozing control compared to other groups. This result might be related to the fact that Gel Foam exerts its action by scaffold formation to enhance platelet aggregation⁽⁵⁾. With the action of normal saline as irrigation solution its haemostatic activity might be affected. This irrigant solution might be interfered with the framework that form with fibrin during formation of blood clot⁽¹⁾.

Local anesthesia with vasoconstrictor also used as irrigation solution and to control blood oozing, but its bad taste and the danger of systemic absorption might cause some limitations of its uses^(7, 8). However, in this study the effect of this solution as haemostatic agent varied from mild to moderate. This effect was for short duration depends on the presence of solution in the surgical site as effect at the beginning then gradually decreased. This result showed some agreement with other study, which indicated that a 1:80 000 adrenaline solution placed on ribbon gauze would suffice when haemostatic control is necessary in the bony cavity. However, Gutmann and Harrison have cautioned against the use of high concentration of vasoconstrictor because they may cause systemic vascular damage⁽⁵⁾.

A surprising result of this study demonstrated the good effect of chlorhexidine in the oozing control during periapical surgery compared to other materials. The only observation in this field was demonstrated by Pameijer and Stanley⁽⁶⁾. They proved the haemostatic activity of (2%) chlorhexidine when they applied this solution immediately after pulp exposure. Chlorhexidine (0.12%) is widely used in periodontology to control gingival bleeding by its antiseptic and antiplaque activity preventing the adherence of bacteria on the tooth surfaces⁽²⁾, as well as it has low toxicity due to poor absorption by tissue⁽⁹⁾.

Unfortunately, one current information is available in the literature describing the success of chlorhexidine action as haemostatic agent⁽⁶⁾. However, it is of extreme importance to state that adopting any new action of commonly used material, which is safe and comes for the total comfort and benefit for both patient and surgeon should not be ignored. We are in the process of evaluation the *in vitro* effect of chlorhexidine on blood clotting mechanism.

CONCLUSIONS

The use of (2%) chlorhexidine during periapical surgery as irrigation solution serves three objectives:

- 1) By its antiseptic activity it can destroy microorganisms.
- 2) It can serve as coolant during bone removal.
- 3) It can be used as haemostatic agent providing bloodless field.

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