



ISSN Print: 2394-7489
ISSN Online: 2394-7497
IJADS 2021; 7(1): 170-174
© 2021 IJADS
www.oraljournal.com
Received: 12-11-2020
Accepted: 20-12-2020

Dr. Kavin T
Head, Department of Oral and
Maxillofacial Surgery,
Vivekanandha Dental College for
Women, Tiruchengode,
Tamil Nadu, India

Dr. Aravindh RJ
Professor, Department of Oral
and Maxillofacial Surgery,
Vivekanandha Dental College for
Women, Tiruchengode, Tamil
Nadu, India

Dr. Narendar R
Reader, Department of Oral and
Maxillofacial Surgery,
Vivekanandha Dental College for
Women, Tiruchengode,
Tamil Nadu, India

Dr. Indrakumar SP
Senior Lecturer, Department of
Oral and Maxillofacial Surgery,
Vivekanandha Dental College for
Women, Tiruchengode,
Tamil Nadu, India

Dr. Bhagya Sri TS
Intern, Department of Oral and
Maxillofacial Surgery,
Vivekanandha Dental College for
Women, Tiruchengode

Dr. Arshiya Farhath N
Intern, Department of Oral and
Maxillofacial Surgery,
Vivekanandha Dental College for
Women, Tiruchengode,
Tamil Nadu, India

Corresponding Author:
Dr. Kavin T
Head, Department of Oral and
Maxillofacial Surgery,
Vivekanandha Dental College for
Women, Tiruchengode,
Tamil Nadu, India

Assessment and comparison of the hemostatic efficacy of ferrum phosphoricum against other conventional methods in minor oral surgical procedures

Dr. Kavin T, Dr. Aravindh RJ, Dr. Narendar R, Dr. Indrakumar SP, Dr. Bhagya Sri TS and Dr. Arshiya Farhath N

DOI: <https://doi.org/10.22271/oral.2021.v7.i1c.1132>

Abstract

Background: Bleeding is an incessantly encountered complication after extraction.

Objective: The objective of this study was to determine the efficacy of Ferrum phosphoricum tablets as a local hemostatic agent against other conventional methods. It also aims to find out the ability of Ferrum phosphoricum to reduce postoperative complications in comparison to other methods.

Materials & Methods: The study included 30 patients with an indication for tooth extraction, divided into three groups (GROUPS I, II and III) and hemostasis was achieved viz., Ferrum phosphoricum tablets, Suturing and Pressure packs, respectively. Extractions were done both traumatically & atraumatically under Local Anesthesia with 2% lidocaine.

In Group I patients, Ferrum phosphoricum tablets were placed in the extraction sockets. Evaluation was done after every 2 minutes for 20 minutes. The parameters like Time of extraction, Tablet placement, Time of hemostasis achievement & Duration taken for tablet to dissolve were noted.

In Group II patients, sutures were placed immediately after extractions.

In Group III patients, pressure packs (sterile gauze) were placed at the site of extractions.

Patients were asked to report back on the 7th day from the day of extraction and the parameters like, healing and pain were documented. The data were then tabulated & sent for statistical analyses.

Results: Extraction sockets treated with Ferrum phosphoricum tablets achieved hemostasis earlier (3.92 minutes) when compared with pressure packs (9.05 minutes) and suturing (5.28 minutes). Ferrum phosphoricum treated patients showed significantly better healing and reduced pain.

Conclusion: Ferrum phosphoricum demonstrated to minimize the bleeding time. In addition, postoperative complications were seen to be reduced in comparison to other groups.

Keywords: Oral surgical, ferrum phosphoricum, complication after extraction

Introduction

Dental extraction or exodontia is the process where the tooth is removed from the socket in the alveolar bone. Bleeding is the most common complication that occurs during extraction. It can occur in both healthy and systemically compromised patients, hence maintaining hemostasis during any dental procedure is essential.

Hemostasis is the arrest of bleeding, whether it be by normal vasoconstriction (the vessel walls closing temporarily), or by local interventions or systemic means. Failure of hemostasis could occur in any patient; however, a number of different medical conditions and medications may interfere with this process [1].

Hemostasis can be achieved using different hemostatic methods such as mechanical, thermal/energy-based, chemical (pharmacological-based) methods. Conventional methods for bleeding control include electro-cautery, suturing, manual compression, or ligatures. While some newer hemostatic agents such as vegetal-origin (Surgicel, Hemostasis), fibrin sealants such as Tachosil or Tisseel, different sponge products such as only composed of gelatin (Gelfoam), or more specific techniques such as polyvinyl alcohol sponge (Merocel) can also be used [2].

Local hemostatic agents are very useful in controlling bleeding during oral surgical procedures in patients with congenital and acquired bleeding disorders and also in patients who are on antithrombotic medication for their systemic conditions [3].

Ferrum phosphoricum is a Biochemic tablet that aids in building healthy blood cells. It is an excellent remedy for hemorrhage, which offers a new way to achieve hemostasis by working directly on a cellular level on all the cells in the body, including the hemoglobin of the red blood cells.

Ferrum phosphoricum is found primarily in the hemoglobin of red blood cells and in the muscle cells of lymph and blood vessels and in hair cells. It is responsible for transport of oxygen in the blood. It supports the blood circulation in the whole body and controls the iron metabolism and iron reservoirs. It is considered an outstanding tissue salt. It strengthens & toughens the cell walls of the blood vessels.

This remedy is primarily used for reducing inflammation, suitable for fevers, rheumatic pain, hemorrhage, nosebleed, headache, sore throat etc.,

The Ferrum content in this remedy helps to balance the iron and oxygen content in the blood while the phosphorous stops the bleeding.

The objective of this study is to evaluate the efficacy of Ferrum phosphoricum in controlling post extraction bleeding and determining its effect on pain and healing of extraction wound as compared with other method. To the best of our knowledge and belief, we consider this to be the first study of this kind.

Materials and Methods

This study was conducted in the Department of Oral and Maxillofacial Surgery, Vivekanandha Dental College for Women, namakkal, India. 30 patients, aged between 20 and 60 years, who required extractions were randomly selected from the OPD. The reasons for extraction were grossly decayed, chronic apical periodontitis, chronic destructive periodontitis, periapical abscess, root stumps etc.

Protocol

The written informed consent was obtained from all patients with their signature before starting with the treatment protocol.

In the Questionnaire, appropriate data were noted, such as age and sex of the patient, type of intervention, localization of intervention, duration of intervention and postoperative condition

Each patient underwent an assessment of general medical status and hematological investigations preoperatively including CBC, RBS, HbA1C, IOPAR, OPG, if required.

Patients under anti-coagulant therapy were asked to stop for 3 days.

Antibiotic prophylaxis was given to the patients, if indicated.

Procedure

Dental extractions were performed under Local anesthesia Lox 2%, (neon laboratories, Mumbai) consisting of lignocaine hydrochloride 2% with adrenaline 1:200000.

Management of extraction sites in each patient were divided into three groups

Group I: Ferrum Phosphoricum tablets,

Group II: Vicryl 3.0 suture material (simple interrupted sutures)

Group III: Conventional method i.e., pressure pack with sterile gauze.

In Group I, Ferrum phosphoricum tablets were placed in the

socket after the tooth extraction. A single Ferrum phosphoricum tablet was placed in single rooted teeth, using a tweezer in the extraction site. In multi-rooted teeth, two tablets were placed. The socket was evaluated after every 2 minutes and follow-up was done till 20 minutes.

In Group II patients, vicryl 3.0, which is a synthetic, braided and resorbable material made of polyglactin were placed. This material was expected to offer 7 to 10 days of support before resorption.

In Group III patients, after the extraction of tooth, immediate digital pressure was applied buccolingually, as it reduces the 'dead space' of the wound and helps to gain hemostasis, followed by placement of sterile gauze directly over the socket area and the patient was asked to bite down to apply the necessary pressure.

Time to achieve hemostasis was noted for all the groups using a stopwatch.



After extraction

Tablet placement



Gelatinous mass formation

On comparison, extraction sites with Ferrum phosphoricum tablet provided rapid hemostasis along with better coagulum filling when compared to other two Groups.

Patients were instructed with routine postoperative instructions and oral hygiene maintenance.

All patients were prescribed

Capsule Amoxicillin 500 mg every 8 hours for 3 days

Tablet Diclomol (Diclofenac sodium 50 mg + Paracetamol 500 mg) every 8 hours for 3 days.

Patients were reviewed on 7th postoperative day for assessment of pain and healing.

Bleeding time for all the procedures was measured.

The obtained data and values of the duration of bleeding were collected and statistically analysed using SPSS software version 25 [IBM Chicago].

Patients were reviewed on 7th postoperative day for assessment of pain and healing.

Statistical Analysis

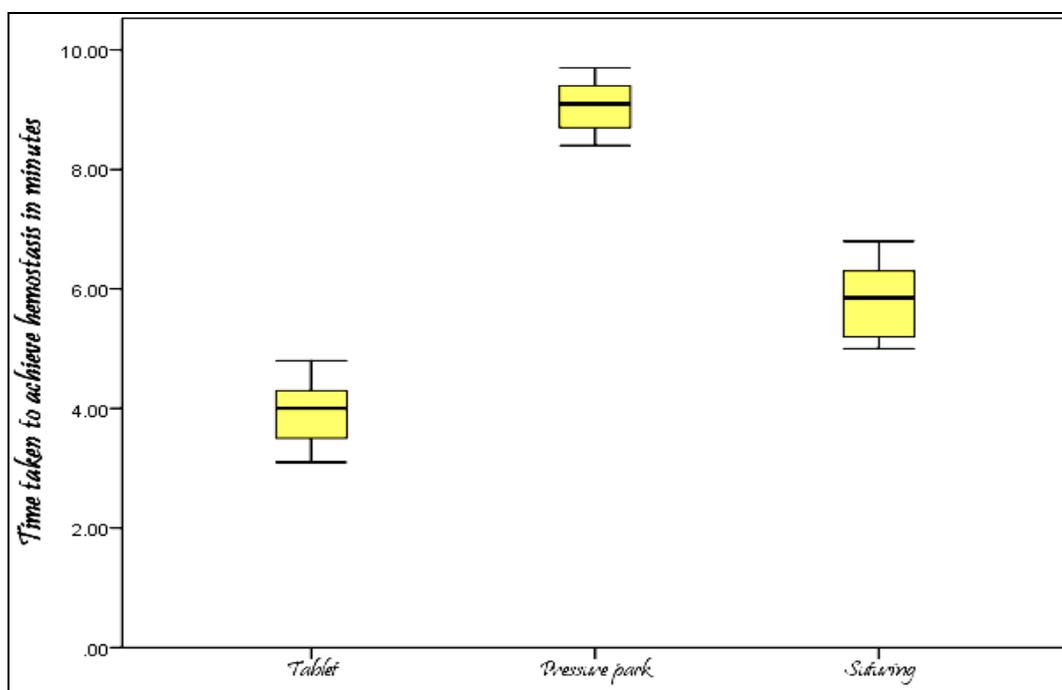
Descriptive statistics were done and the data collected were subjected to statistical analysis using SPSS software version 25 [IBM Chicago].

Table 1: One way ANOVA test Comparison of mean time of achievement of hemostasis in minutes among three groups-Tablet, pressure pack and suturing

Groups	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Tablets	10	3.92	0.55	0.174	3.5270	4.3130	3.10	4.80
Pressure pack	10	9.05	0.44	0.139	8.7350	9.3650	8.40	9.70
Suturing	10	5.82	0.62	0.196	5.3767	6.2633	5.00	6.80
Total	30	6.26	2.22	0.405	5.4357	7.0909	3.10	9.70
F value	229.404							
p value	0.000**							

Table 2: Post hoc test results (Tukey’s HSD post hoc test)

(I) groups	(J) groups	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Tablet	Pressure pack	-5.130	0.242	0.000**	-5.7304	-4.5296
	Suturing	-1.900	0.242	0.000**	-2.5004	-1.2996
Pressure pack	Tablet	5.130	0.242	0.000**	4.5296	5.7304
	Suturing	3.230	0.242	0.000**	2.6296	3.8304
Suturing	Tablet	1.900	0.242	0.000**	1.2996	2.5004
	Pressure pack	-3.230	0.242	0.000**	-3.8304	-2.6296



Graph 1: Groups

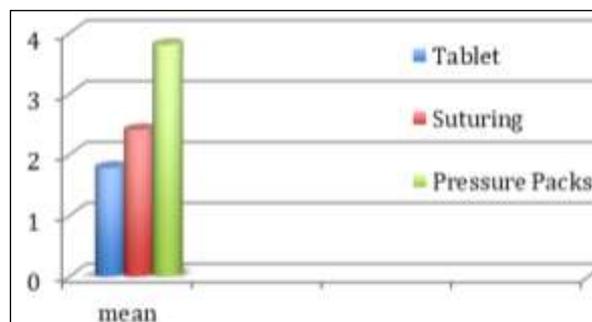
Results

Of 30 patients, there were 18 males and 12 females and their ages ranged from 20 to 60 years.

Ferrum phosphoricum group achieved hemostasis in a mean of 3.92 minutes, while subjects who received suturing achieved hemostasis in a mean of 5.82 minutes and those with pressure packs achieved hemostasis in a mean of 9.05 minutes. Hence, in the group where Ferrum phosphoricum tablets were used, hemostasis was achieved earlier than the other two groups. It was found to be statistically significant (p_0.000) demonstrating improved hemostasis with the use of Ferrum phosphoricum tablets. Also, there was no post extraction complication perceived on the 7th day postoperatively.

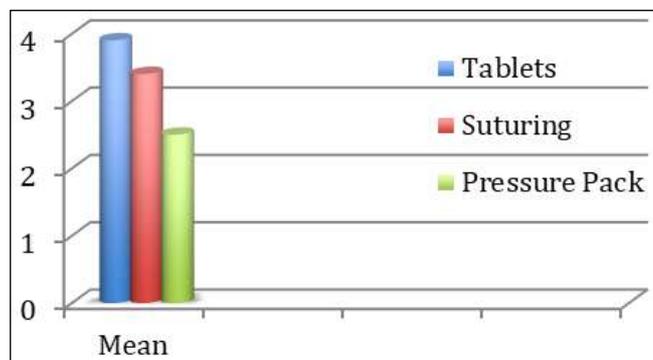
Pain experienced by the patients throughout the week during daily activities was documented on 7th post-operative day, with the visual analog scale in a range of 0-10, with 0 depicting no pain and 10 depicting worst pain experienced by patients [4].

Group I showed lesser pain comparatively.



Graph 1: Comparison of pain scores among three groups

Healing was also significantly better in Ferrum Phosphoricum group compared with the other two groups in terms of better epithelialization, tissue color and response to palpation, assessed using soft tissue healing index by Landry *et al.* [5].



Graph 2: Comparison of healing scores among three groups

In this study, none of the patients had any delayed bleeding on reviewing 7 days postoperatively and they did not require admission to the hospital at any stage.

There was no incidence of dry socket and postoperative trismus due to bleeding at local anesthetic injection sites or any untoward incidence in our study.

Discussion

Bleeding at the surgical site is very disturbing both for the patient and the surgeon. The normal range of bleeding, according to Duke is 2-5 minutes [6]. In this time frame, it is expected for the bleeding to stop. Extensive blood loss during oral surgery can cause hypovolemia, which may convert into hypovolemic shock and can lead to death [7]. To avoid such complications, prevention of blood loss during surgery is very essential. Several conventional hemostatic techniques are used to minimize blood loss. Mechanical methods include manual pressure, ligature and the application of the tourniquet. However, these methods can be intensive and time consuming [8].

Sealing of bleeding vessels can also be achieved by thermal methods such as electro cauterization or laser cauterization, but these methods can create area of char and necrosis of tissue, increasing the possibilities of infection and damaging wound edge which can be lead to impaired healing [9].

Although conventional agents are effective in controlling post extraction bleeding, they do not hold well in every situation [10]. Conventional methods are less effective for bleeding control in complex injuries and where accessibility to the area of bleeding is difficult. Newer methods are more superior to conventional methods as well as they can be easily applied. Hence the use of newer hemostatic agents is required [7].

The primary benefits of local hemostatic agents are a life-saving reduction in hemorrhaging caused by trauma, a reduction in factor dependency, a reduction in the cost of treatment, and rapid control of hemorrhaging, which reduces patient anxiety related to uncontrollable bleeding [11].

In our study, the process of hemostasis in patients after dental extractions was amplified by different methods like Ferrum phosphoricum tablet placement, applying dressing pressure with gauze for ten minutes and suturing.

Ferrum phosphoricum, a biochemic tablet was introduced by Schüssler, in 1874. He recommended the external application of these tablets for diseases like sprains, wounds, hemorrhages, hemorrhoids.

The Ferrum content in this remedy helps to balance the iron and oxygen content in the blood while the phosphorous stops the bleeding.

It is prepared by amalgamating the minerals such as iron and phosphorus. It is prepared by blending three solutions-iron sulfate, sodium acetate and phosphorus. The resultant product

Iron Phosphate is pulverized using large amounts of sugar lactose to make it non-toxic.

Ferrum phosphoricum is found to increase Hemoglobin and hence it finds an use in treatment of anemia [12]. It also breaks the tendency of low serum ferritin levels in blood. Literary evidences confirm that it can improve iron absorption from dietary sources. It has the ability to attract the oxygen and gives tonicity to circular fibers of blood vessels to contract and thus equalizing circulation [13].

Ferrum phosphoricum tablets, when placed locally in a hemorrhagic site, shows surprisingly rapid formation of gelatinous mass and this was first written and published by Dr. Farrington.

In our study, hemostasis was achieved in a shorter time when Ferrum phosphoricum tablets were placed in the extraction sites compared with the suturing and sterile gauze pressure packs. The cessation of bleeding was encountered gradually as the tablet dissolved. This was very evident from visual observation. It was also found to be effective in a 65 year old male patient who is hypertensive and diabetic, also with a history of CABS before 10 years. The patient is currently under Oral Anti Platelet therapy. So, this proves to give satisfactory results even for patients under Anti Platelet Therapy.

The use of antibiotics in conjunction with the Ferrum phosphoricum had no untoward effect on hemostasis, healing or pain scores. There was no incidence of dry socket at the Ferrum phosphoricum site.

The result of this study proved the fact that Ferrum Phosphoricum can be used as a local hemostatic agent, as it facilitates early hemostasis, better pain control, along with improved wound healing and reduced post-operative pain.

Based on the present findings, we think that Ferrum phosphoricum is effective, safe and easy to use.

Conclusion

Bleeding during surgery is a serious clinical problem that can be very disconcerting to the patient and could cause serious complications. So it becomes extremely significant to cease the bleeding at the earliest. Though there are many conventional methods, the use of Ferrum phosphoricum tablets is found to be much effective as The Ferrum content helps to balance iron and oxygen content in the blood while the Phosphorous stops the bleeding. Ferrum phosphoricum significantly shortens the bleeding time from the extraction socket after a tooth extraction. Also shows significantly better healing when compared to other conventional methods. It may be a reassuring method for controlling the bleeding in healthy patients.

References

1. Neal J McCormick, Undrell J Moore, John G Meechan. Haemostasis part 1: The management of Post-Extraction haemorrhage. Dent Update 2014;41:290-296.
2. Echave M, Oyagüez I, Casado MA. Use of floseal, a human gelatin-thrombin matrix sealant, in surgery: A systemic review. BMC Surg 2014;14:111.
3. Mani A, Anarthe R, Kale P *et al.* Hemostatic agents in dentistry. Galore International Journal of Health Sciences & Research 2018;3(4):40-46.
4. Campbell WI, Lewis S. Visual analogue measurement of pain. Ulster Med J 1990;59(2):149-154.
5. Landry RG, Turnbull RS, Howley T. Effectiveness of benzydamine HCL in the treatment of periodontal post-surgical patients. Research in Clinic Forums 1988;10:105-

6. Duke WW. The relation of blood platelets to hemorrhagic disease: Description of a method for determining the bleeding time and coagulation time and report of three cases of hemorrhagic disease relieved by transfusion. *JAMA* 1910;55:1185-1192.
7. Akolkar AR, Kulkarni DG, Gangwani KD, Shetty L, Channe SP, Sarve PH. Bleeding control measures during oral and maxillofacial surgical procedures: A systematic review. *J Dent Res Rev* 2017;4:79-89.
8. Zwischenberger JB, Brunston RL Jr, Swann JR, Conti VR. Comparison of two topical collagen-based hemostatic sponges during cardiothoracic procedures. *J Invest Surg* 1999;12:101-6.
9. Tan SR, Tope WD. Effectiveness of microporous polysaccharide hemispheres for achieving hemostasis in mohs micrographic surgery. *Dermatol Surg* 2004;30:908-14.
10. Sharma S, Kale TP, Balihallimath LJ, Motimath A. Evaluating Effectiveness of Axiostat Hemostatic Material in achieving Hemostasis and Healing of Extraction Wounds in Patients on Oral Antiplatelet Drugs. *J Contemp. Dent Pract* 2017;18(9):802-806.
11. Zusman SP, Lustig JP, Baston I. Postextraction hemostasis in patients without reducing the dose of oral anticoagulant: the use of fibrin sealant. *Quintessence Int* 1992;23:713-716.
12. Khurana A, Mittal R, Rath P, Moorthy K, Taneja D, Singh U *et al.* Ferrum phosphoricum 3X and Ferrum metallicum 3X in the treatment of iron deficiency anemia in children: Randomized parallel arm study. *Indian J Res Homeopathy* 2020;14:171-8.
13. Jadhav SS, Tiwari P, Lata K *et al.* Iron deficiency anaemia & Ferrum phosphoricum: a systematic review. *International Journal of Research and Review* 2019;6(2):83-91.