



**ORIGINAL ARTICLE**

**CLINICAL-EXPERIMENTAL EVALUATION OF THE TOPICAL HEMOSTATIC EFFECT  
CAPROFER IN THE PRACTICE OF ORAL SURGERY**

Karen Lalaev<sup>1\*</sup>

<sup>1</sup> Professor Department of Oral and Maxillofacial Surgery, Yerevan State Medical University after M. Heratsi, Armenia

\* Corresponding author: Karen Lalayev, Professor Department of Oral and Maxillofacial Surgery, Yerevan State Medical University after M. Heratsi, Yerevan, Armenia;  
e-mail: [karen.lalaev@gmail.com](mailto:karen.lalaev@gmail.com)

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**Abstract**

Sufficient hemostasis during oral surgical procedures is crucial for successful outcomes, can play a key role in establishing hemostasis and to reduce healthcare resource utilization. The search for a topical hemostatic drug that gives the desired effects has led to the need to develop a new substance based on a chemical compound with excellent hemostatic properties.

This study is aimed at experimental and clinical evaluation of effectiveness as a topical hemostatic Caprofer and their impact on ease of operation in clinical dental practice.

Based on the obtained clinical and experimental material, it is possible to come to an objectively justified conclusion about the high therapeutic efficacy topical hemostatic Caprofer which allows its widespread use as a therapeutic and prophylactic agent for bleeding and inflammation of the maxillofacial region.

Caprofer, which has a hemostatic action, is used as in prophylactic, as well as in medical purposes in case of post-surgical bleeding in the oral cavity, creates favorable conditions for wound healing characteristics, characterized by a pronounced advantage over hemostatic any analogous local action, expressed in instantly developing hemo static effect after its application to a bleeding wound. Along with distinct hemostatic characteristics, there were so, that the caprofer favorably differs and its high antimicrobial, antioxidant and anti-inflammatory action. Based on clinical-experimental studies, we present the possibility of confirm these properties of the drug.

**Keywords:** hemostasis, hemostatic drug, Bleeding in oral surgery, topical hemostatic drug, Caprofer

**Introduction**

Bleeding is a threatening and most dangerous companion of many injuries and diseases. Bleeding is inevitable in case of any oral surgical procedures. The chief causative factor of bleeding is damage to the blood vessels during surgery. In this case, meticulous

surgical procedures, availability of ideal hemostatic agents, proper postoperative care and follow up can reduce the complication to a greater degree. Profuse bleeding can to several complications like the formation of hematoma, delayed wound healing, persisting infection, wound dehiscence and necrosis.

Bleeding during and after surgery oral surgery poses a great danger to the patient and can lead to serious consequences if uncontrollable.<sup>1-5</sup>

Bleeding from socket after tooth extraction faces everything dentistry, the incidence of post-extraction bleeding ranges from 0% to 26%.<sup>6</sup>

Having a wide knowledge of management approaches let the clinician know when to apply special approach.

Haemostasis, a physiological arrest of haemorrhage at the site of vascular injury, is a wondrous feat of evolution.<sup>7</sup>

Various processes involved in hemostasis process are:

- Vasoconstriction,
- Formation of a platelet plug,
- Coagulation (secondary hemostasis).

The control of bleeding in the oral cavity is more important compared to the operation outside the oral cavity, because there is already less access, and if there is bleeding, this further reduces visibility in the surgical area.<sup>8</sup>

Bleeding can be caused by various local or systemic factors. Predisposing factors include neglect of postoperative instructions, including avoidance of gargling or rinsing the mouth and persistent regurgitation. Pre-existing local infections such as pericoronitis, periapical granulomas, and the presence of nutritional deficiencies such as anemia may also be associated with the development of profuse bleeding, which may require additional hemostatic agents.<sup>9</sup> Complications of bleeding in oral surgery can occur in both healthy and sick people system compromised.

Ideal hemostatic agents should provide instant closure blood vessels without injury surrounding tissues, be immunologically inert and must maintain a tissue seal until the vessels are tissue obliteration and healing occurs.<sup>10-12</sup>

Topical hemostatic agents are compounds that are applied topically to stop superficial bleeding and capillary leakage. A good remedy should achieve hemostasis in a short period of time; it should be biocompatible, not delay healing, and work best with a particular surgical procedure.<sup>13,14</sup>

The use of an adrenaline dressing or an acrylic splint, however in some cases the bleeding comes mainly from capillaries that cannot be stopped by mechanical means, so hemostatic agents will be of particular importance in these procedures.

Primary bleeding occurs at the time of injury and is a direct result of injury. Secondary bleeding occurs some time after the injury for various reasons (melting of a thrombus or erosion of the blood vessel wall by a purulent wound process).

To improve the visibility and success of the operation, reduce operator and patient stress, minimize the operation time and the risk of post-operative complications such as swelling, bruising and infection it is important to stop bleeding during oral surgery.<sup>15</sup>

Bleeding can be arterial, venous or capillary, depending on the source of damage to the vessel.

In major oral and maxillofacial surgical procedures and periodontal surgical procedures electrocautery and suture ligatures are most commonly used to control bleeding from small and major vessels. But in such clinical cases, local hemostatic agents are advisable.

The best treatment for perioperative bleeding is prevention. This includes a careful preoperative patient history, necessary medical advice, familiarity with the management of patients with possible hemorrhagic diathesis, careful intraoperative technique and appropriate postoperative instructions, care and follow-up. Non-compliance by the patient with the treatment regimen or postoperative instructions should also be considered. During surgical interventions in the oral cavity, persistent minor bleeding is often observed, although sometimes an episode of bleeding prevents the continuation of the procedure and requires immediate attention. Common sources of this intraoperative complication are incisions in the area of granulosomatous tissue, vessels in the periosteum or mucosa, or interference with nutrient arteries in the alveolar bone. Identification of the source of bleeding requires good illumination, adequate retraction, and careful aspiration.

Once a bleeding site has been identified, it should be packed, clamped, cauterized, polished, cleaned, and/or sutured to control.

Topical hemostatic agents should be available and applied as needed. Topical hemostatic agents provide control of external bleeding by enhancing the natural

clotting process through various physical reactions between the agent and blood or by various mechanical means.<sup>16-18</sup>

The ideal styptic should be lightweight, easy to store, and quickly applied to a bleeding wound. It should fit the wound, allowing the styptic to reach hard-to-reach injury sites with direct pressure. The dressing should cause minimal local tissue destruction, be easy to remove from the wound, be free from particles that can spread systemically, and the dressing should not be washed away by rapid bleeding from high-flow blood vessels.

For evaluation and selection of ideal hemostatic agents for a particular case scenario, it is mandatory to understand the physiologic procedure of coagulation.<sup>19</sup>

The ideal Local hemostatic agent should be biocompatible, easy to apply, safe and have an immediate effect.<sup>20,21</sup>

Local hemostatic agents are beneficial in controlling bleeding during oral surgical procedures in patients with congenital and acquired bleeding disorders and also in patients who are on antithrombotic medications for their systemic conditions.

Topical hemostatic agents can be divided into active substances containing fibrinogen and thrombin and activate the coagulation cascade.<sup>22,23</sup>

mechanical or passive agents: promote coagulation through their own production of fibrin, activating the extrinsic pathway of blood clotting.

Active agents directly involved in the coagulation cascade to cause thrombus formation include thrombin and products in which thrombin is combined with a passive agent to form an active product, these agents are useful in patients with bleeding disorders.

Cotton is considered one of the earliest topical hemostatic agents that is available in many forms like gauzes, sponges, rolls, and others. As such, further bleeding is to be expected. In this regard and to achieve fast and proper hemostasis, biotechnology made an explosive growth in introducing topical hemostatic agents in the last decade

They are non-toxic and non-pyrogenic. They are further divided into microfibrillar & absorbable collagen products. These products (eg, CollaPlug, CollaTape, and Helistat) are soft, white, pliable, nonfriable, coherent, sponge-like structures. It helps to

control bleeding, stabilize blood clots, and protects the wound bed to facilitate the healing process, these products should be held in place for approximately 2 to 5 minutes.

Several topical hemostatic agents are currently available in various configurations. They act in different ways.<sup>24</sup> Some improve primary hemostasis, while others stimulate fibrin formation or inhibit fibrinolysis.

Some of these are preparations of a procoagulant agent in combination with a carrier such as a collagen matrix. Others use a matrix to provide a template for the endogenous coagulation cascade to achieve hemostasis. Factors influencing the selection of an appropriate topical hemostatic agent include the type of procedure, cost, severity of bleeding, and surgeons' personal experience and preferences. Hemostatic agents for topical application can be generally classified as follows: 1) Hemostatic agents based on collagen, i.e., Aviten, Gelistat. The helical structure and the large surface area it provides are important for hemostasis.<sup>25</sup>

Contact with a bleeding surface attracts platelets. These agents are usually combined with a procoagulant agent, often thrombin, to enhance the effect. Side effects of these agents are very rare, such as the formation of granulomatous masses, the formation of adhesions, and allergic reactions.

Optical hemostatic agents can be broadly classified as follows:

- 1) Collagen-based hemostatic agents, ie. aviten, gelistat. The helical structure and the large surface area it provides are important for hemostasis. Contact with a bleeding surface attracts platelets. These agents are usually combined with a procoagulant agent, often thrombin, to enhance the effect. Side effects of these agents are very rare, such as the formation of granulomatous masses, the formation of adhesions, and allergic reactions.
- 2) Hemostatic agents based on gelatin, i.e., surgifoam, gel foam. The mechanism of action of hemostatic agents based on gelatin is not fully understood, but it is likely due to physical surface effects, and not to any effect on the blood coagulation mechanism. Gelatin-based devices have been reported to induce better clot quality than collagen-based hemostatic agents. The safety of these agents and the extent of tissue reactions

to them have not been clearly established. However, transient granulomatous inflammation of varying intensity was observed.

- 3) Hemostatic agents based on cellulose, i.e., surgical. Oxidized cellulose and oxidized regenerated cellulose have been in use for decades.

A number of mechanisms are thought to contribute to their hemostatic action, including blood absorption, surface interactions with proteins and platelets, and activation of both intrinsic and extrinsic pathways. These agents raise serious safety concerns. Surgical granulomas have been reported at a number of sites, and postoperative neurological complications have also been observed in some cases. Tissue adhesives have been widely used for decades due to their hemostatic and sealing properties. The main disadvantage of bioglue is that it can seep through the seams.

- 4) Hemostatic agents based on polysaccharides, i. e. These are polysaccharide-based products, a relatively recent addition to the hemostatic arsenal. Two broad categories are currently available, the first of which consists of glycosaminoglycans containing N-acetylglucosamine and the second of microporous polysaccharide hemospheres (MPH).
- 5) Inorganic hemostatic agents, ie. quick clot. Inorganic agents have also appeared relatively recently in the range of hemostatic agents. QuikClot is based on zeolite, a substance previously used for ion exchangers and catalysts. However, it is possible that the mouthwash may affect the superficial clot, but not bleeding from deep socket, an area inaccessible to the mouthwash. Resorbable hemostatic agents such as gel foam, resorbable collagen, microfibrillar collagen, etc. have a risk of adherence and infection, especially if any part remains unabsorbed by tissue.<sup>26-30</sup>

All these agents are very expensive. This thrombin-like action is present even in the presence of antithrombin and is not absorbed into the fibrin clot, so the action of hemocoagulase is prolonged. Hemocoagulase has two distinct enzymatic activities that promote blood clotting. One of them accelerates the conversion of prothrombin to thrombin

(thromboplastin-like enzyme), and the other causes the direct conversion of fibrinogen into fibrin monomer, which, under the action of thrombin, can turn into a fibrin clot (thrombin-like enzyme). In vitro thrombin-like farms.<sup>31-33</sup>

The thromboplastin-like enzyme activates factor X essentially in the presence of factor III released from platelet aggregates at the site of bleeding. The activated factor Xa then supports the formation of thrombin at the site of the hemorrhage. However, in vitro, the thromboplastin-like enzyme can convert prothrombin to thrombin even in the absence of factor III and factor X. Hemocoagulase-induced fibrin deposition releases structurally different degradation products. These foods can play a critical role in improving hemocoagulase wound healing. However, this requires future prospective research.

The search for a topical hemostatic drug that gives the desired effects has led to the need to develop a new substance based on a chemical compound with excellent hemostatic properties.

This study is aimed at experimental and clinical evaluation of effectiveness as a topical hemostatic Caprofer and their impact on ease of operation in clinical dental practice.

## **Materials and methods**

### ***Experimental study of the safety of the Caprofer***

Studies carried out on laboratory animals to identify harmful about the action of the drug caprofer made it possible to detect a very average lethal dose, fluctuating with intragastric administration within 4170 mg/kg for rats and 1800 mg/kg for rabbits, in the absence of any noticeable effects resorptive manifestations. Multiple intragastric administration of the drug in short doses of 1/3.1/6.1/16 of TL50 is not consistent with the absence of statistically reliable deviations from on the side of the respiratory rate, pulse and body temperature, hematological indicator of the morphological picture of the blood, hemocoagulability and the degree of increase in body mass in comparison with the level indicated new indicators in control animals. According to the results of pathological studies in the dynamics of the experiment enta in the direction of the study of drug toxicity in acute experiments on rats and rabbits, and

also on the basis of histological analyzes of internal ranks of animals in a chronic experiment (multiple seeding for 10 days) caprofer qualifies as a drug with a low degree of toxicity, in the relationship of various parenchymal organs in the absence of cutaneous resorptive Ruin.

Experimental studies carried out on guinea pigs by the ap method licence sensitization, with the aim of identifying allergogenic features of drugs ata, not long-term positive results in case of contact of the Caprofer on the skin blood.

A similar response was also established in the course of an embryotoxic study. Advances in the direction of studying the special effects of the drug on non-linear whites' rats with a single intra-abdominal administration in a toxic dose - 1/10 -LA50 -550 mg/kg. To judge the embryonic activity of the operation of the beginning of the production calculation of the number of yellow bodies in the ovaries, the number of implanted in the uterus ov, number of live and dead fetuses, place of resorption with the removal of the coefficient n redimlantal and post-implantation mortality. For the criterion of teratogenicity, we took the number of malformations of the developing fruit with using both macroscopic and microscopic methods Aliza. When studying the internal organs of the fetus by the Wilson method, not a single in the case with signs of deformity, but on the total preparations of the results of the study of sugar flight by the Dawson method (modified in the department of neurology of the NEC) showed lack of difference in comparison with control in the number of ribs, vertebrae, metatarsal and metacarpals ò bone. Taking into account the absence of an embryonic and teratogenic effect in the critical short-term pregnancy (8-12 days), under the influence of the toxic dose of the caprofer (550 mg /kg.), 1000 times the therapeutic dose, long-term t Estiration of the drug according to this indicator did not conduct. Based on the conducted observations, the mutagenic effect of toxic doses of drugs ATA (1/10 of LA50), the studied method of metaphase analysis of the bone marrow of mice, nali more cells with multiple aberrations, as well as an increase in the number of polyps no single cells were registered.

On the basis of experimental in vitro studies on the study of the specificity of hemost of the drug activity and its effect on the healing of the wound surface a high degree of density, firmness and strength of

fixation from the bottom was set covered tissues of the blood clot, formed by contact with the aratom.

In order to identify the effects of caprofer on the nature and timing of wound healing surface, in simulation experiments on rabbits, the study of biopsy material in the dynamics of healing of the well (2, 4, 6, and 16<sup>th</sup> day) was carried out without the use of and in the presence of existing hemostatics. In the course of observations, the exceptional efficiency of capr was demonstrated offerer as a powerful hemostatic and anti-inflammatory agent with favorable outcome in terms of healing time. The end of the second week is characterized by the development in the hole of the stem process a, its complete elimination, the absence of inflammatory phenomena in the gingival fold.

Considering the possibility of using a caprofer as a surfactant means in dentistry, it is of interest to study its effects and in other fields of applied medicine, in particular in dermatological and dermal therapy many wounds. Clinical observations of the healing process of experimental wounds on the wing and have made it possible to exclude the possibility of rebleeding and wound infection when used as a capropheric hemostatic agent.

On the basis of a solid clinical-experimental material that we have obtained it is possible to draw an objectively valid conclusion about the therapeutic effectivity osti, the innocence of the drug and the possibility of its wide application as therapeutic and prophylactic agent for bleeding and inflammatory conditions.

### *Specific antimicrobial activity drug Caprofer*

The drug caprofer is favorably characterized by a high level of antimicrobial, proti active and counter-leakage activity.

The results of the study of diffusion and inhibition of growth of microorganisms (Staphilacoccus aureus, etc.) in t solid medium under the influence of a 5% solution of iodine and the drug kaprofer of various breeding within 24 hours, and inhibition of microorganism growth by optical determination which microbial density weigh within 18 hours. on the microbiological analyzers "M-2" (ABABOD Diagnosties - SA) and waist) showed exceptionally high bactericidal activity of the capropher, s equivalence with iodine, which gives a complete basis for suggesting it as an iodine substitute that has

already noted the pain of severe hemostatic action (figure 1).

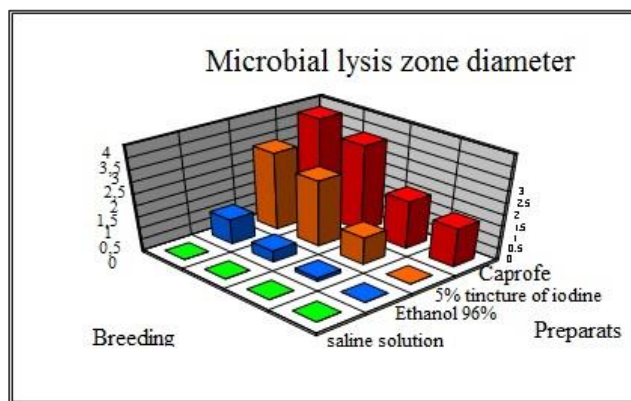


Figure 1. Comparative evaluation of the antibacterial activity of the drug Caprofer and 5% tincture of iodine

On a Petri dish planted with a solid lawn with a raised on a peptide bulge microflora of the oral cavity in 5 marked points on the nanocoagulant, taking into account the antimicrobial action of which was performed after 24 hours. exposure of Petri dishes in a thermostat at 37°C, which allows the field to be adjusted a new lack of growth of colonies of microorganism in the oral cavity in the area of application drug. For checking the antibacterial activity of the capper in comparison with The effects of a 5% tincture of iodine were also carried out in a series of experiments on animals. After the processing of the surgical field, the animal on the back of the piercing muscle incision 1.5 cm long. Wound surface in all teas is contaminated with the same amount of ash staphylococcus aureus (5 mln. microbial).

To check the antibacterial activity of the caprofer in comparison with the effect and 5% tincture of iodine was also carried out in a series of experiments on animals. After the processing of the surgical field, the animal on the back of the piercing muscle incision 1.5 cm long. Wound surface in all teas is contaminated with the same amount of ash pure staphylococc (5 mln. tel.), after that the edge of the wound in the experimental group filled with caprofer, in the control - 5% fixed iodine with the subsequent application we have 1 seam, and daily observation due to the nature of wound healing, which is determined on the 5th day after the operation new intervention and in the subsequent period of wound healing. Table 1 shows the results of testing.

Table 1. Comparative assessment of the effect of wound healing and their possible complications in case of use of Caprofer and 5% tincture of iodine

Preparations	The nature of healing and complications of wounds
Caprofer n=8	Caprofer n=8
5% Iodine Tonic n=8	2 cases of buildup
The nature of healing and complications of wounds	2 cases without suppuration with pronounced infiltrat

The results of pre-trial testing of the tested agents showed infection of the skin Current wounds by type of primary healing. Compared with the control group with the use of 5% tincture of iodine, the effect of ka the profiler is characterized by a high degree of antibacterial action, more and also a significant activation of the fibroplastic reaction.

In this way, the results of clinical trials of the caprofer in this series of the sequence is evidence of the non-commonness of its properties as an effective antibacterial terial agent, excluding the possibility of development of post-operative complications and shortening the duration of wound healing for 3-5 days after lower with the course of the wound process during using 5% tincture of iodine.

**Caprofer as an effective stimulator of thromboplastic activity and regulators hemocoagulation process in the experiment**

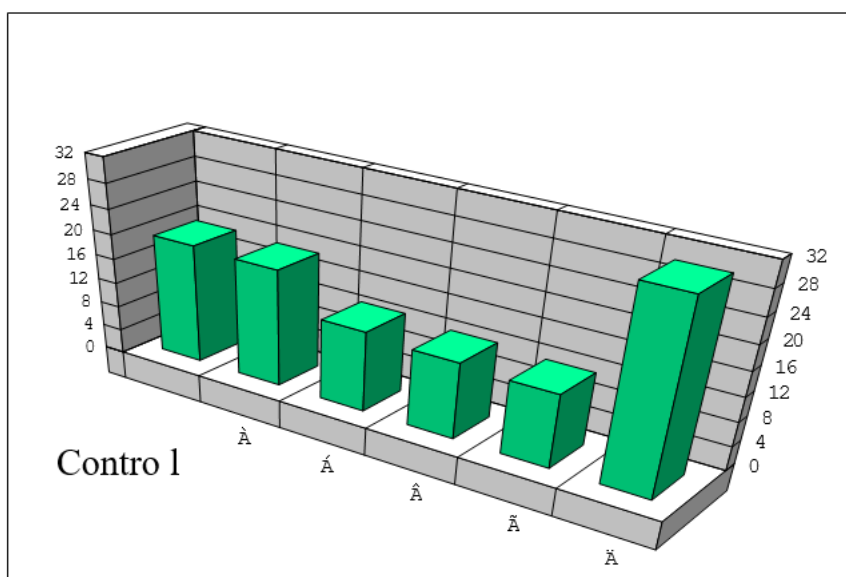
Despite the effect of the caprofer on the process of blood coagulation, the true mechanism Its participation in the complex system of hemocoagulation is still a problem mathematical. The âsèeds, the following, is the same, it is possible to the ruling and the reference, and the reference, and the reasons for the same knowledge.

No significant effect on the process of aggregation of thrombocytes, no as a hemolytic effect, the Caprofer acts as an anti-radical which and means, having an uncovered anti-inflammatory effect, that, apparently, is of paramount importance in achieving the effect of “instantaneous” stop sheep’s blood cheniya, clearly demonstrated in dental practice in the strains of the last series of flights.

Based on the foregoing, it is undoubtedly interesting to carry out the spice further research on the study of the features of the influence of caper on

the mechanics of farms entative regulation of the blood coagulation process. From the noted point of view, the identification of changes in thrombus deserves special attention plastic activity of blood and

tissue of the body, which is not the main answer responsibility for determining the effect of thromboformation (figure 2).



**Figure 2.** Change in thromboplastic activity (per second of thrombin time) of the brain of white rats against the background of intraperitoneal injections 0.4-1.0 ml phys. solution (A), Caprofer in dilutions 1/10 (B), 1/100 (B), 1/1000 (C), 1/10000 (D)

### Clinical Study

#### **Objective assessment of the results of a clinical study of an organic resorption hemostatic membrane with a hemostatic drug Caprofer**

Organic resorption hemostatic membrane, which differs from other similar local hemostatics in its prolonging action, was studied in 66 patients /28 men and 38 women/ with various dental interventions requiring bleeding control. They were performed in a comparative aspect, depending on the local and general causes of bleeding. All clinical observations are divided into four groups.

**The first group** includes observations of patients with no history of any general pathology of the body. This number included 27 patients, mostly individuals, in whom bleeding was due to atypical tooth extraction with damage to the mucous membrane, bone tissue and the presence of local inflammatory processes.

**The second group** included 19 patients with postoperative bleeding, which could be caused by a history of hypertension.

**The third group** included 11 patients who had anamnestic indications that they had increased bleeding during various surgical interventions.

**The fourth group** includes persons who underwent dental intervention in the conditions of a specialized hematological clinic with blood diseases –

- Werlhof's disease - 1 patients,
- Hemophilia - 1 patients,
- Hemorrhagic vasculitis - 6 patients,
- Capillary toxicosis - 1 patients.

Within each group, the following subgroups are distinguished depending on the nature and severity of the dental intervention.

Tooth extraction operation:

- 38 patients with trauma
- 9 patients without injury
- The presence of periodontopathy III degree 11 patients

Inclusion and exclusion criteria:

- 1) The age of patients is 20-50 years.
- 2) Absence of any local pathology such as cysts, tumors, generalized jawbone, or systemic disease preventing or affecting bleeding, blood clotting, or wound healing.
- 3) Patients with hemogram, bleeding time and clotting time within the normal range and without any bleeding and clotting disorders.
- 4) Patients in reasonably good general health (ASA I and II) with no contraindications for minor surgery and/or local anesthesia.
- 5) Pregnant patients were excluded from the study.

Bleeding time was checked on the study and control side without the use of other hemostatic agents.

Complication and side effect postoperative bleeding, pain and edema, and the patient is informed on how to evaluate these parameters. In our study, no patient suffered from uncontrolled bleeding.

### Method of application of Caprofer

In the bleeding hole after the operation of removing the tooth with a pot (according to Lexer), an application of Caprofer in cotton (figures 3a, b).



**Figure 3a.** Bleeding after tooth extraction

**Figure 3b.** Took hemostatic drugs Caprofer

It is especially effective for drainage after the operation of removing impacted and semi-impacted wisdom teeth - complex traumatic extractions of teeth, both with a prophylactic purpose against bleeding and further complications. With bleeding after tooth extraction along with local hemostatic drugs in patients with blood diseases, general hemostatic drugs were taken vikasol for at in the form of tablets, intramuscular introduction; dicynone for oral or

intramuscular, aminocaproic acid for intravenous administration solution.

### Results

The results of a clinical study of Caprofer showed the following results - the percentage of rebleeding was 3% only in patients with increased bleeding. In other groups, it was no higher than 1%. Such a low percentage of rebleeding when using a membrane with caprofer can be explained by:

- Firstly, it has an advantageous method of application, high adhesive properties, which allow to effectively fix the closest edges of the wound surface, and there is no need to keep a tampon in the wound;
- Secondly, studies have shown that the membrane has a stimulating activity on the regenerative process in the wound. Active tissue regeneration is also facilitated by the preservation of a dense blood clot in it for several days due to the caprofer with a membrane;
- Thirdly, bactericidal, preventing the occurrence of an inflammatory process in the wound.

The properties listed above explain, apparently, the complete absence of other complications of the healing of the hole - alveolar pain, alveolitis.

Based on the obtained clinical and experimental material, it is possible to come to an objectively justified conclusion about the high therapeutic efficacy of the Caprofer, which allows its widespread use as a therapeutic and prophylactic agent for bleeding and inflammation of the maxillofacial region.

With bleeding after tooth extraction surgery, as well as with secondary bleeding in order to prevent the prevention of secondary bleeding in patients with a number of somatic diseases.

To summarize the results, bleeding was stopped use Caprofer in all patients the average time to achieve hemostasis was in 4 group patients.

- The first group - 17 sec.
- The second group - 23 sec.
- The third group included - 29 sec.
- The fourth group

Werlhof's disease - 34 sec.  
Hemophilia - 50 sec.  
Hemorrhagic vasculitis - 32 sec.  
Capillary toxicosis - 36sec.

## Discussion

Bleeding in the area of surgical intervention is very disturbing for both the patient and the surgeon. The formation of stable blood clots or hemostasis are necessary to prevent blood loss and excessive bleeding. However, the self-coagulation process in the body cannot provide timely hemostasis without the help of hemostatic agents under certain conditions. Bleeding is one of the complications that can occur during dental surgery.

During dental surgery, it is important to stop bleeding to improve visibility and success surgery, reducing operator workload and the patient, minimizing surgery time and risk of postoperative complications such as edema, hematomas and infections. Several hemostatic to stop bleeding, you can use the following methods:

- mechanical methods (manual pressure, ligature, suture),
- thermal methods (electrocauterization or laser cautery)
- local hemostatic agents.

The use of local agents to achieve hemostasis is an old and complex subject in surgery.<sup>33-35</sup> The development of new materials in chemical hemostasis is a continuous process that may potentially lead the surgeon to confusion. Over the past two decades, local hemostatic materials and devices containing platelets, fibrin, and polysaccharides have been gradually developed and implemented to induce faster and more stable thrombus formation, renewing or replicating traditional hemostatic materials.<sup>36-38</sup>

The ideal hemostatic agent should be flexible enough to adapt to the wound to ensure that it reaches and applies pressure to areas of injury that are inaccessible, should not cause degradation of the contact tissue, should not disintegrate into particles that can enter the bloodstream, be sufficiently stable, to withstand high pressure when bleeding in the

vessels, and can be easily removed when bleeding stops.<sup>39-45</sup>

There are several traditional hemostatic methods to minimize blood loss. Mechanical means include manual pressure, ligature, and tourniquet application.<sup>46-49</sup> However, these methods can be laborious and increase the operation time. Sealing of bleeding vessels can also be achieved with thermal methods such as electrocautery or laser cautery, but these create areas of charred and necrotic tissue that increase the likelihood of infection and damage to the wound margin. This can lead to impaired healing. Conventional methods are also less effective in stopping bleeding in complex injuries and in difficult access to the bleeding area. In such situations, topical hemostatic agents may be particularly helpful.<sup>50,51</sup>

Despite the various forms and functions of local hemostatic materials that have been developed, the development of effective hemostatic materials is therefore important to produce fast, effective, safe and ready-to-use new hemostatic materials.

Sufficient hemostasis during oral surgical procedures is critical for a successful outcome, a key step in safe and predictable surgery. The development of topical hemostatic agents useful for oral and maxillofacial surgery, a rapidly developing field holds the promise of creating future agents with increased efficacy, cost effectiveness, and fewer complications.

In the present study, Caprofer was applied topically to the extraction socket, which was used as the test side, and compared with the extraction socket, where no additional hemostatic measures were applied, which acted as the control side. Based on this study, it was concluded that the use of Caprofer after minor oral surgery not only provides faster hemostasis, but also accelerates healing due to the rapid formation of healthy tissue and a decrease in the likelihood of infection.

Currently, the drug Caprofer is widely used in medicine. The clinical efficacy of the drug is characterized by the reliability of its hemostatic and bactericidal action, service the main reason for recommending it for wide use in various spheres practical dentistry: therapeutic, orthopedic, surgical; in addition to the noted interest, shown in the caprofer in the known.<sup>52,53</sup> The temperature is determined by

the exceptional efficiency of its use in combination treatment of inflammatory diseases of the human-facial area, inflammation parad ointment and mucosal oral cavity, in the fight against intra-hospital infection, treatment ENT surgery, military field and thoracic surgery, neurosurgery, burns radiation origin, etc. According to clinical observations, the use of a caprofer in surgical later on, it is accompanied by a significant reduction in blood loss and laser loss with prevention of the development of folded hematoma. Notably, the maximum reduction in the incidence of postoperative complications of a suppurative nature and the creation of favorable conditions for the healer reduction of operative wounds by primary tension. Combination of the unique properties of hemostatic and bactericide in an effi cient but has been used in ENT practice for spontaneous and postoperative noses bleeding and such after tonsilectomy and other surgical intervention bodies on LOR-organs. At the same time, a method of therapeutic dynamic endoscopy with systolic the use of a caprofer for the purpose of processing the bleeding areas of the stomach and veins duodenum as hemostatic gastroduodenal bleeding, and so We have introduced a new method of conservative treatment of post-operative bleeding. The effectiveness of the use of caprofer in burns, ulcerative diseases and wounds of various origins, molecular-biological and biochemical deviations of the composition with lions during non-specific inflammatory processes of the oral cavity and the path of the cortex reactions with the help of a recommended drug. Based on our results, further studies are needed in which we can prove the use other surgical patients.

In this study, was evaluated clinically and experimentally. In accordance with results of an experimental study, Caprofer proved to be an effective hemostatic agents used for control bleeding.

Caprofer, which has a hemostatic action, is used as in prophylactic, as well as in medical purposes in case of post-surgical bleeding x in the oral cavity, creates favorable conditions for wound healing characteristics, characterized by a pronounced advantage over hemostatic amy analogous local action, expressed in instantly developing hemo static effect after its application to a bleeding wound.

## Disclosure

### *Conflicts of interest and financial disclosures*

The author declares that he has no conflict percent and there was no external source of funding for present research.

### *Source of funding*

The work was not funded.

### *Ethical approval*

The study was approved by the University ethics committee and was conducted in accordance with the Declaration of the World Medical Association. Informed consent Patients were informed verbally and in writing about the study and gave written informed consent.

### *Informed consent*

Informed consent was obtained from all individual participants included in the study.

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**ԿԱՊՐՈՖԵՐ ԴԵՂԱՄԻՋՈՑԻ ՏԵՂԱՅԻՆ ՀԵՄՈՍՏԱՏԻԿ ԱԶԴԵՑՈՒԹՅԱՆ ԿԼԻՆԻԿԱԿԱՆ-ՓՈՐՁԱՐԱՐԱԿԱՆ ԳՆԱՀԱՏՈՒՄԸ ԲԵՐԱՆԻ ԽՈՌՈՉԻ ՎԻՐԱԲՈՒԺՈՒԹՅԱՆ ՊՐԱԿՏԻԿԱՅԻՆՄԵՆ**

Կարեն Լալաև<sup>1</sup>

<sup>1</sup> Երևանի Մ. Հերացու անվան պետական բժշկական համալսարանի վիրաբուժական ստոմատոլոգիայի և դիմաձնոտային վիրաբուժության ամբիոնի պրոֆեսոր, Երևան, Հայաստան

**Ամփոփում**

Բերանի խոռոչի վիրաբուժական պրոցեդուրաների ընթացքում բավարար հեմոստազը վճռորոշ է հաջող արդյունքների համար, կարող է առանցքային դեր խաղալ հեմոստազի հաստատման և առողջապահական ռեսուրսների օգտագործման նվազեցման գործում: Տեղական հեմոստատիկ դեղամիջոցի որոնումը, որը տալիս է ցանկալի ազդեցությունը, հանգեցրել է նոր նյութի ստեղծման անհրաժեշտությանը:

Այս ուսումնասիրությունը նպատակաուղղված է որպես Կապրոֆեր հեմոստատիկ դեղամիջոցի արդյունավետության փորձարարական և կլինիկական գնահատմանը և դրանց ազդեցությանը կլինիկական ստոմատոլոգիական պրակտիկայում:

Ձեռք բերված կլինիկական և փորձարարական նյութի հիման վրա կարելի է օբյեկտիվորեն հիմնավորված եզրակացության գալ Կապրոֆեր հեմոստատիկ դեղամիջոցի բարձր թերապևտիկ արդյունավետության մասին, որը թույլ է տալիս դրա լայն կիրառումը որպես հեմոստատիկ և պրոֆիլակտիկ միջոց բերանի խոռոչի վիրաբուժության պրակտիկայում:

Կապրոֆերը, որն ունի հեմոստատիկ ազդեցություն, օգտագործվում է ինչպես պրոֆիլակտիկ, այնպես էլ բժշկական նպատակներով բերանի խոռոչում հետվիրահատական արյունահոսության դեպքում, բարենպաստ պայմաններ է ստեղծում վերքերի ապաքինման բնութագրերի համար, որոնք բնութագրվում են ընդգծված առավելությամբ անալոգ տեղային հեմոստատիկների նկատմամբ, որն արտահայտվում է արյունահոսող վերքի վրա կիրառելուց հետո ակնթարթորեն զարգացող հեմոստատիկ էֆեկտով: Հստակ հեմոստատիկ բնութագրերի հետ մեկտեղ, նաև Կապրոֆերը բարենպաստորեն տարբերվում է նաև բարձր հակամանրէային, հակաօքսիդանտային հակաբորբոքային ազդեցությամբ: Մի շարք կլինիկական-փորձարարական ուսումնասիրությունների հիման վրա ներկայացնում ենք դեղամիջոցի այս հատկությունների հաստատման հնարավորությունը:

**КЛИНИКО-ЭКСПЕРИМЕНТАЛЬНАЯ ОЦЕНКА МЕСТНОГО КРОВООСТАНАВЛИВАЮЩЕГО ДЕЙСТВИЯ ПРЕПАРАТА КАПРОФЕР В ПРАКТИКЕ ХИРУРГИИ ПОЛОСТИ РТА**

Карен Лалаев<sup>1</sup>

<sup>1</sup> Профессор кафедры Хирургической стоматологии и челюстно-лицевой хирургии, Ереванский государственный медицинский университет им. М. Гераци, Армения

**Резюме**

Достаточный гемостаз во время хирургических вмешательств в ротовой полости имеет решающее значение для успешных результатов, может играть ключевую роль в установлении гемостаза и снижении использования ресурсов здравоохранения. Поиск гемостатического препарата для местного применения, дающего желаемые эффекты, привел к необходимости разработки нового вещества на основе химического соединения с отличными кровоостанавливающими свойствами.

Настоящее исследование направлено на экспериментальную и клиническую оценку эффективности местного гемостатического средства Капрофер и его влияние на удобство работы в клинической стоматологической практике.

На основании полученного клинического и экспериментального материала можно сделать объективно обоснованный вывод о высокой терапевтической эффективности местного гемостатика Капрофер, что позволяет широко использовать его в качестве лечебно-профилактического средства при кровотечениях и воспалениях челюстно-лицевой области.

Капрофер, обладающий кровоостанавливающим действием, применяется как в профилактических, так и в лечебных целях при послеоперационных кровотечениях в полости рта, создает благоприятные условия для ранозаживляющих свойств, характеризуется выраженным преимуществом гемостатических средств перед аналогами местного действия, выражающееся в мгновенно развивающемся гемостатическом эффекте после нанесения его на кровоточащую рану. Наряду с отчетливыми кровоостанавливающими свойствами, капрофер выгодно отличается и своим высоким противомикробным, антиоксидантным, противовоспалительным действием. На основании ряда специальных исследований мы представляем возможность подтверждения этих свойств препарата.