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# Mucous Membrane of the Tongue: Macro-and Microscopic Differences After Chemical (alkali, acid) and Thermal Burns

O.A Fedorovych [1*], I.E. Herasymyuk [2]

1. Ternopil State Medical University Ternopil Ukraine. [E-mail: expire87@mail.ru, +91-969575887]
2. Ternopil State Medical University Ternopil Ukraine [E-mail: herasymyuku@rambler.ru; +91-637156401]

In experiments on rats we examined morphofunctional changes in the bloodstream, mucous membrane and muscles of the tongue after chemical and thermal burns. We found that pathological processes are more deepening later date after alkali burn.

*Keyword:* Tongue, Arteries, Mucous Membrane, Thermal, Chemical Burn

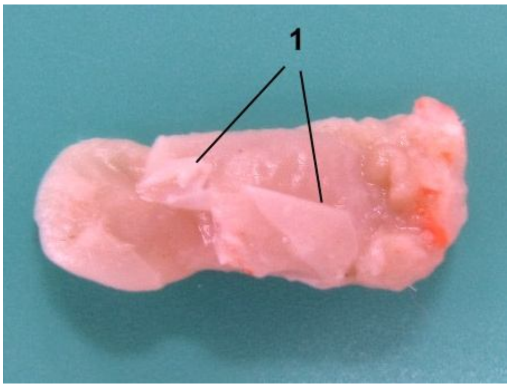
## 1. Introduction

Traumatic lesions of the mucous membrane of the tongue are very common nowadays. Insufficiency of the guidelines on the diagnosis and management of this condition drows attention of physicians [1, 6]. Mucous membrane of the oral cavity constantly undergoes various injuries [3]. This loads to different changes in the mucous membrane. There are mechanical, chemical, physical and combined trauma of the tongue. Clinical symptoms depend on the power, duration of the damaging agent, local conditions, state of microbiocenosis and total reactivity [4].

Burns are the most videly spread trauma of the mucous membrane. They can be caused by hot food, fire, hot air, acid, alkali using of arsenic paste, phenol, formalin, formalin-rezortsyn mixture, silver nitrate [2, 5].

Today we don't have enough scientific literature about macro- and microscopic changes in the mucous membrane of the tongue after thermal and chemical burns.

The main goal of our research was to study all differences in the mucosa of the rats tongue after thermal and chemical burns in the experiment.




Detachment of the mucous membrane of the tongue with the development of ulcer – 1.

**Pic 1:** Rat tongue 24 hours after thermal burn (macroscopic material)

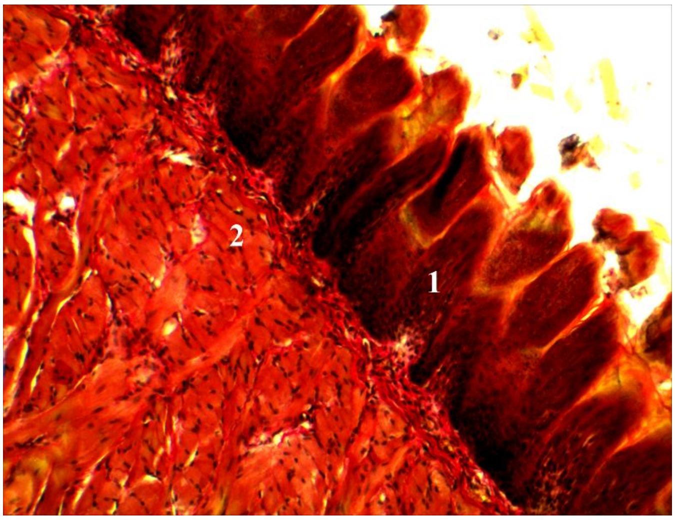
## 2. Materials and Methods

In the experiment we used 78 white mature rats weight 180-200 g. They were divided into 4 groups. The first group was consisted of control animals. The second and third group – under ketamine anesthesia we modeled the chemical burn with sulfuric acid

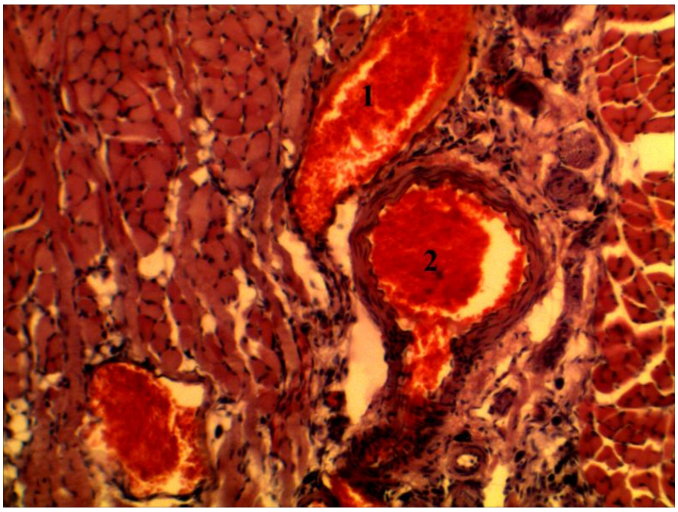
45% and sodium hydroxide solution 50% via microsynerge. The fourth group under ketamine anesthesia we modeled the thermal burn by applying a metal rod (area 7 mm, heated to 120C) during 5 sec. to the anterior third of the tongue. From the experiment rats were deduced by introducing intrapleural high doses of concentrated sodium thiopental. All experiments were conducted according to the "Rules of work using experimental animals"

For histological examination we took pieces of tissue from different parts of the tongue after 1, 3, 7 and 15 days from the beginning of the experiment. We fixed them in a solution of formalin 10 %, liquid Karnua and 96 % alcohol.

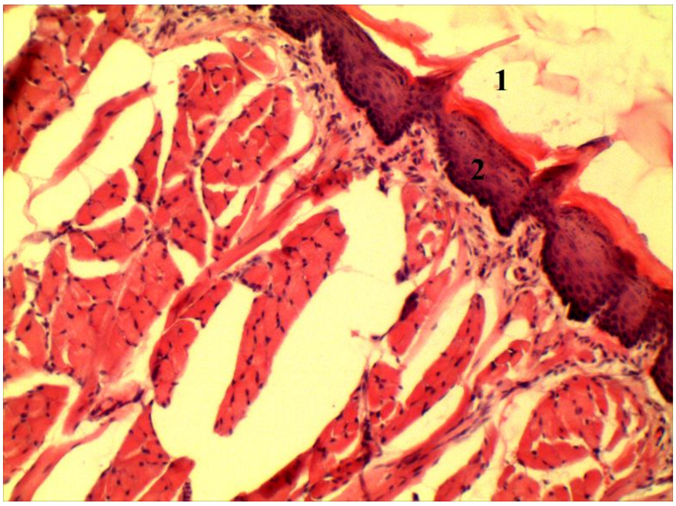
Paraffin sections of thickness 5-8 mcm (micrometers) were in there mutually perpendicular planes, dyed in hematoxylin and eosin, Weigert's resorcin-fuchsin stain, Van Guson's stain. To indentify glycogen we used PAS-reaction.




Destractural changes on the surface of the mucous membrane – 1
Thichened muscle fibers, reduced intermuscular intervals – 2
**Pic 2:** Histological sections of rat's tongue 24 hours after thermal burns. Dyed in hematoxylin and eosin. x 140.




Venous and arterial plethora of the tongue – 1,2.
**Pic 3:** Histological sections of rat's tongue 3 days after alkali burn. Dyed in hematoxylin and eosin. x 140.




Coagulation necrosis of the superior layers of the mucous membrane - 1,
hyperplasia of the epithelium of mucous - 2.
**Pic 4:** Histological sections of rat's tongue 7 days after acid burn. Dyed in hematoxylin and eosin. x 140.

## 3. Results and Discussion

After thermal and chemical burns of tongue different macro- and microscopic changes arised: necrobiotic processes in the mucosa, inflammation in the muscle, development of the reverse reperative processes. All this alterations were development on the type of the damaging agent. Thermal burns are the shortest in duration and reverse amplification, that's why fastest changes occur as a result of the thermal factor. The latest changes occur in alkali burns, they are the deepest and the furthest. Acid burns occupy an intermediate position.

24 hours after thermal burns we observed the development of inflammation (hyperemia, edema, mucosal damage) leading to necrosis of the superficial layers and infraction of the structural of filliformes and fungiformes papillae. Muscle fibres thickened because of dehydratation. Amount of glycogen decreases in the superior muscle layers of the tongue and increases in lymphoid glandular structures. The tone of the walls of arteries increased: narrowed lumen of blood vessels, thickened media, intensed simuosity of internal elastic lamina, increased venous plethora.

After acid burns coagulation necrosis occurred and formed brown lamina on the mucosal surface of the tongue. At acid burns of mucosa, with destruction changes and desquamation of the superior layers, interstitial and paravasal edema accrued. Intramuscular partitions and spaces around the vessels were become wider.

Glycogen disappeared in the superior layers of the tongue muscle, but stayed in deep layers. The bloodstream changes were: dilatation of the arteries slimming of the wall, decreased simuosity of internal elastic lamina.

Alkali burns were less pronounced: desquamation of the superior layers of the tongue mucosa, minor dilatation lumen of the arteries, local cluster of erythrocytes. The amount of glycogen did not change.

On the third day of the experimental observation there was a further development of pathological changes. At thermal burns the most of the mucous membrane fell of pale-pink ulcer with a smooth bottom appeared on that place. Microscopic structural changes were the same as before. Quantity of the glycogen increased. The tone of the arteries walls was still increased, capillary blood stasis combined with venous plethora.

The same macro- and microscopic processes were also in rats with acid burns, but amount of the glycogen decreased. On the 3rd day of the experiment where the alkali burn modeled deep desquamation of the mucous membrane and interstitial edema came up. Glycogen highly increased. Arteries were constricted in one parts and dilatated in other. Sometimes in their lumen there were clusters of erythrocytes, rare intramural thrombosis, venous plethora and capillary blood stasis.

On the 7th day macroscopic look of the tongue, gystological structure and morofunctional state of the vessel recovered. Only in some places of the submucosal layer there were focal proliferation of connective tissue. Quantity of the glycogen was higher than in control group of animals. In the group of animals where the acid burn modeled ulcerative mucosal defect maintained. But histologically there were signs of regeneration. The amount of the glycogen increased, first of all around blood vessels.

In the group of animals with alkali burns changes progressed. On the back of the tongue there were deep ulcers and erosion with pale mucous around and hyperemic bottom. In the superior layers of the muscle there were dystrophic changes: enlightenment of the cell cytoplasm, karyolysis, homogenization of cellular elements. All this changes were followed by interstitial and submucosal edema. The amount of the glycogen increased and exceeded the control level.

After the 15 days of experiment in all groups there were regenerative processes in mucous, muscle blood vessels of the tongue. After thermal and acid burns we studied full regeneration, while after alkali burn, we observed proliferation of the connective tissue extension of the intermuscular intervals, fragmentation of muscle fibers, because of the deep liquefactive necrosis with involvement of the mucous, submucous membranes internal layers of muscles. The level of glycogen stabilized and was equal in the experimental group of the rats and control group.

1. Thermal and chemical burns of the tongue are followed by expressed micro- and macroscopic changes with different intensity and duration.
2. Thermal burns most likely cause changes, that are the shortest in duration and regeneration. Alkali burns cause latest changes, that are the deepest and longest in duration. Acid burns occupy an intermediate position.
3. By the action of acid burns coagulative necrosis develops, by the action of alkalis burns - liquefactive necrosis, by the action of thermal burns - acute catarrhal occurs.

Aspects for future research: all this findings can be basis for the development of the guidelines on the morphological noses and management of the tongue burns.

## 4. References


1. Abakarov DS Design and clinical and laboratory rationale of application "dyplen-dent C" for Treatment of injuries mucous shell PTA: Author. Thesis. for the sciences. degree candidate. honey. sciences specials. 14.00.21 "Dentistry" / DS Abakarov. - Moscow, 2004. - 24 p.
2. Borowski E., Mashkyleyson AL Disease oral mucosa and lips Moscow: MEDpress, 2001, 320
3. Dzyad A. Pathogenetic substantiation of correction of metabolic disturbances in patients with erosive and ulcerative lesions of the oral mucosa: Author. Thesis. degree candidate. honey. sciences specials. 14.01.22 "Dentistry" / OV Dzyad. -Odessa, 2002. - 18.
4. Doroshenko A. Content of proinflammatory cytokines in the oral mucosa of rats with inflammatory and destructive lesions of various origins. Dental technology 2009; 40(1):. 44-46.
5. Danilevsky NF, Leont'ev VK, Nesyn AF, Rakhno J. I. Disease oral mucous cavity Kiev, 2001, 271 .
6. Kulyhina V., Goray MA Dynamics of immunological parameters of oral fluid in the treatment of patients with chronic mechanical trauma of the oral mucosa. Modern Stomatology, 2010; 4: 72-75.
7. Ushakov RV, Abakarov DS,Ochyrov EA Effect of solkoseryl film "Dyplen-dent C" functional activity leukocytes and fibroblasts. Collection of materials scientific conference "Prospects of development postgradued education professionals stomatology profiles. Actual problems of Dentistry. " - M., 2003, 121-123.