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## Improvement Of Therapy For The Holstein-Ditch At Digitalis Dermatitis.

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### ABSTRACT

Reflects on the distribution of pathologies of the distal limb section of cows in Holstein selection and on evaluating the therapeutic effect of using antiseptics to restore musculoskeletal function in digital dermatitis. It was established that limb diseases accounted for 51.8% of cases from the total amount of surgical diseases in the group of animals studied. The results of studies in orthopedic medical examinations revealed the most widespread distribution of digital dermatitis (33.5%) and a specific ulcer of the sole of Rusterholz (19.9%). Hoof wounds - 8.8%, finger cellulitis - 5.1%, hoof defects - 4.7%, Limax - 4.7%, disease of the white line - 3.8% and laminitis - 2.1. %

**Keywords:** digital dermatitis, cattle, Holstein breed, orthopedics, hoof, specific ulcer, distribution, effectiveness of treatment.

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## INTRODUCTION

In the etiology of digital dermatitis, the reduction of resistance in the imbalance of the feeding ration, increased humidity in the rooms, air pollution, direct contact with sick animals, non-regular operation of manure removal systems, passive exercise, long-term presence in the pens of non-replaceable bedding, and the absence systems of regular planned preventive orthopedic interventions. This information characterizes the relevance of the issue of diagnosis and treatment of cows with hoof diseases, and explains the need to develop measures for their prevention. In this study, the therapeutic efficacy of cows using finger dermatitis of the innovative complex drug Solka Hoofgel was determined. This drug makes it possible to achieve recovery of all animals of the experimental group on average for  $14.7 \pm 1.26$  days, contributes to an earlier termination of lameness and scarring of ulcers. The use of Chemi Spray for this purpose ensured the recovery of 70% of the experimental animals, and the finest copper powder of sulfate and boric acid caused the recovery of 80% of the animals in 14 days of observation. The economic evaluation of the effectiveness of the use of the drug "Solka Hoofgel" confirms the advisability of its use in highly productive Holstein cattle.

The purpose and objectives of research. Technologies of intensive cattle breeding focused on the breeding of highly productive animals at the present stage of development of the industry are accompanied by an increase in the incidence of hooves in cows. These limb pathologies cause significant economic damage due to the high frequency of their distribution in the Russian Federation and abroad [1, 3, 4, 5, 6, 10]. According to a number of researchers in European countries, up to 50% of cows are subject to culling due to limb diseases due to a decrease in productivity and loss of reproductive function annually [2, 7, 8, 9]. The most common purulent-necrotic lesions of the distal extremities. Among purulent-necrotic lesions, 71.8% are ulcers (corolla, crumb, set of interdigital fissure, digital dermatitis), pododermatitis and laminitis - 11.21%, tiloma - 5.9%, specific ulcer of Rusterholtz - 3.59%, purulent wounds and abrasions - 2.68% [8]. In the Russian Federation, there has been a tendency to an increase in the prevalence of, the need for widespread diagnosis, the development of measures for the treatment and prevention of digital dermatitis (Mortellaro disease). The issue on this issue has worsened due to the intensification of the purchase of imported livestock and its adaptation to the climate and conditions of economic activity in Russia. The specialists of the Russian Federation were faced with the question of choosing the most effective means of treatment of a local nature in digital dermatitis.

Thus, the study of the distribution, etiology and the search for effective means of treating cows with digital dermatitis, in order to reduce the recovery time of musculoskeletal functions, reduce the time and cost of treatment, ensure the availability and safety of medical procedures, despite the large amount of scientific research still remains priority.

The purpose of the study is to increase the effectiveness of therapeutic measures in restoring the musculoskeletal functions of cows with finger dermatitis patients. For this, the following tasks were defined:

- to study the spread of diseases of the hooves of cows and determine the reasons for their appearance;
- to determine the therapeutic efficacy of therapeutic agents in the correction of the locomotor function of cows with finger digital dermatitis.

## RESEARCH METHODOLOGY

The clinical and experimental part of the scientific work was carried out in the conditions of the modern livestock dairy complex of the Samara region. First studied the spread of limb diseases in cows. In the period from October 2017 to March 2018, 1365 Holstein cows were examined during an orthopedic examination, and the analysis of primary veterinary registration documentation (hoof processing accounting forms, outpatient journals) was analyzed.

In a clinical study of diseased animals, attention was paid to the condition of the distal extremities and the work of the organs of the locomotor apparatus. In the formulation of medical diagnoses the decisive role was played: the data on the position and formulation of the extremities; morphofunctional state of the distal extremities; pathological changes in the area of the fingers. Using the method of palpation, pain was determined and its localization, the nature of the density of tissues and local temperature. In the area of the nidus, attention was paid to the organoleptic characteristics of the exudate discharge. Further diagnostic wiring was

performed, the degree and type of lameness were taken into account. The diagnoses were established in accordance with the semiotics of diseases generally accepted in veterinary surgery.

The diagnosis of digital dermatitis was considered established if the animal had red, sublime, strawberry-like painful ulcerations between the fingers, near the corolla or in the heel region, with localization near the corolus with areas of germination of long hair. In addition, ulcers were covered with purulent discharges with a specific and unpleasant odor.

The determination of the list of etiological factors in the appearance of diseases of the extremities was based on the study of the conditions of keeping and feeding of animals, the features of the microclimate of livestock buildings and the organization of orthopedic veterinary activities.

In the second series of experiments, the therapeutic efficacy of antiseptics for finger dermatitis was studied. According to the principle of analogs from the number of animals affected by digital dermatitis, three groups of 10 cows each were formed (two experimental and one control). The experimental groups included cows aged from 3 to 6 years, with milk productivity from 6500 to 8000 kg of milk per lactation, live weight from 685-778 kg.

Local treatment included a complex effect on the area of the pathological process. The treatment of ulcerative lesions in animals of all groups was performed according to the following scenario:

1. Surgical clearance, trimming of the hooves of all the limbs to ensure optimal function of the hooves.
2. Surgical treatment of the pathological focus: removal of necrotic tissues, patches of pathological growth of granulation tissue from the surface of ulcerous defects with a hoof knife to healthy tissues.
3. Application to the treated ulcerative defect of the investigational medicinal product with the subsequent imposition of a bandage dressing isolated from the environment by an elastic ungum bandage.

The animals of the first experimental group locally applied the drug "Solka Hoofgel" manufactured by Kanters (the Netherlands), waiting for 3 to 5 minutes, isolated with a bandage dressing. "Solka Hoofgel" is a gel-type drug that contains copper and zinc chelate minerals, organic acids, an adhesive component, stabilizers and emulsifiers. The drug has antimicrobial and adhesive properties, accelerates the healing of wounds, abrasions, cracks, retains healing properties after contact with feces, including under conditions of high humidity. The mechanism of therapeutic action is the denaturation of microbial cell peptides, which prevents the development of microorganism resistance to copper and zinc compounds. Copper is involved in the biochemical processes of growth and the formation of blood vessels, bones, ligaments and tendons, the synthesis of collagen and melanin. Zinc is necessary in the biosynthesis of keratin, the most important protein involved in the processes of horn formation and tissue epithelization.

In the second experimental group, the ulcerative focus was treated from a distance of 15 cm with the "Chemi spray" preparation manufactured by Livisto (Spain), until the creation of a drug film in the area of the defect with the capture of surrounding tissues. Next, apply a gauze napkin soaked in the same tool, and additionally a protective bandage. As an active substance, the spray contains chlortetracycline hydrochloride - a broad-spectrum antibiotic that is effective against many types of gram-positive and gram-negative bacteria. The second component of the drug - gentian violet, has an antiseptic effect against a number of gram-positive and gram-negative microorganisms, good permeability to the treated tissues, which contributes to the active delivery of chlortetracycline to the zone of inflammation.

In the third control group, the pathological defect was sprinkled with the finest powder consisting of copper sulfate and boric acid (1: 1 ratio). Then they isolated it with a gauze napkin and a bandage bandage. Copper sulphate has a cauterizing, antiseptic, astringent, necrotizing, and erythropoietic local effect. Boric acid acts as an antiseptic, well penetrates the skin and mucous membranes. The mixture of these powders was an antiseptic, cauterizing, astringent and deeply penetrating agent.

Repeated application of therapeutic agents was carried out with subsequent dressings every 7 days. Therapeutic procedures were performed until complete clinical recovery. The total observation period was 28 days, which was the period of recovery of the last of the supervised animals. During the entire observation

period, the time when the lameness disappeared was noted, and during the dressings, the timing of the appearance of healthy granulations, the cessation of the formation of pathological exudate and the formation of scar tissue. Pay attention to the timing of extinction, changes in the size and boundaries of puffiness.

After collecting clinical data, an assessment of the economic efficiency of the veterinary measures carried out. To do this, first established the economic damage from reduced milk production for 28 days of illness of one animal in the absence of medical care. This took into account the average daily milk production among the animals of the analyzed groups and the level of daily losses of dairy products from parabolani. Based on the determination of the average duration of the disease in cows of the analyzed groups, they determined the economic damage from a decrease in milk productivity during the re-illness. In the future, we determined the volume of veterinary expenses as the sum of expenses for the treatment of animals, including the cost of medicines, labor costs and depreciation costs for equipment. Next, we determined the amount of damage prevented, the effectiveness of veterinary measures and the effectiveness of veterinary costs per ruble.

The research results were processed using mathematical statistics methods using statistical analysis programs for IBM PC, Excel, and Attestat. The calculation of the arithmetic mean of the indicator, its error and the indicator of the significance of differences - Student's criterion.

### RESEARCH RESULTS

As a result of studies of the spread of surgical diseases, it was found that 455 (33.3%) of the examined animals suffered from surgical pathology. Among these animals, 236 cases (51.9%) were recorded with diseases in the area of the extremity fingers, less often there were abrasions - 15%, joint diseases - 11.9%, wounds - 9.9%, eye diseases - 5.9%, abscesses and phlegmon - 3.5%, bruises - 1.1%, hematomas - 0.4% and bone fractures - 0.4%.

The structure of the pathologies of the fingers of the limbs included a statement of finger dermatitis in 33.5% of cases, to a lesser extent, a specific ulcer of Rusterholz - 19.9%, Pododermatitis - 17.4%, wounds - 8.8%, finger phlegmon - 5.1%, defects hoofs - 4.7%, limax - 4.7%, white line disease - 3.8%, and laminitis - 2.1% (Table 1).

**Table 1. - The spread of surgical pathology of the distal limbs in cows**

Surgical pathology	Number of animals	
	heads	%
1. Finger dermatitis	79	33,5
2. The specific ulcer of Rusterholz	47	19,9
3. Pododermatitis	41	17,4
4. Finger wounds	21	8,8
5. Phlegmon fingers	12	5,1
6. Hoof defects (creases, cracks, fissures)	11	4,7
7. Limax	11	4,7
8. White line disease	9	3,8
9. Laminitis	5	2,1
Total:	236	100

Localization of ulcerative pathological formations had a certain specificity, so in 96.2% of cases ulcers were recorded on the fingers of the hind limbs. Foci of lesions were most often noted on one of the extremities (52.6%) and less frequently on both (47.4%). Pathological lesions were mainly localized in the heel region (72.4%), less frequently in the interdnugular arch (23.7%) and on the corolla (3.9%).

In the etiology of digital dermatitis, injuries, stressful situations during animal rearrangements, massive planned and unscheduled veterinary activities, non-regular manure harvest, especially in winter, were predominant. Predisposing factors played a certain role: reduction of resistance due to unbalanced feeding, high humidity, gas pollution of rooms, the possibility of contact with sick animals, passive exercise, and the lack of a system of regular planned preventive measures for orthopedic diseases.

The results of the study of the therapeutic effect of the use of anti-septic agents for digital dermatitis in cows are presented in Table 2. As a result of the use of the drug Solka Hoofgel, it was possible to achieve shorter terms of limping and scarring of ulcers in animals of the first experimental group.

**Table 2. - Therapeutic efficacy of antiseptics in cows with digital dermatitis**

Group of animals	Amount of animals	Disappearance of lameness	Scarring defect	Recovered	
	heads	days	heads	days	%
1 experienced	10	4,3±0,82	14,7±1,26	9	90
2 experienced	10	6,1±1,50*	16,8±0,42	7	70
Control	10	4,9±0,92	15,4±2,24	8	80

The use of “Solka Hoofgel” made it possible to restore the locomotor function of the affected limbs in 90% of the cows in 14 days of clinical observations. All animals of the first experimental group recovered, on average, for 14.7 ± 1.26 days of observation. In the second experimental group, where Chemi Spray was used, 7 animals (70%) achieved recovery in the 14-day observation period (70%), and 8 cows (80%) in the control group. The total rehabilitation period in the second group was 16.8 ± 0.42 days, while in the control group 15.4 ± 2.24 days. It should be noted that in the first experimental group the drug provided a shorter term for the disappearance of lameness (on average 4.3 ± 0.82 days), while in the second experimental group it took 6.1 ± 1.50 days with a significant difference from control group.

For the recovery of animals of the first experimental group, a total of 21 treatment zones of the pathological process were required, in the second 24 treatments, and in the control 22 treatments. In total, in the first experimental group, 9,653.7 rubles were spent on the treatment of 10 cows, 7,497.6 rubles in the second, and 9,240 rubles in the third. Thus, the most costly treatment with Solka Hoofgel was 965.4 rubles per cow, and the most budgetary therapy with Chemi Spray - 749.8 rubles. However, the largest value of the prevented damage per cow was achieved in the first experimental and control groups (Table 3). A similar trend is noted in the indicator of the economic efficiency of veterinary measures. The indicator of economic efficiency per ruble of veterinary costs most accurately determined the economic side of the effectiveness of treatment. The treatment with the Chemi Spray was the most profitable; for every ruble spent, its use provided an economic effect of 5.9 rubles. In the first experimental and control groups, this indicator was 4.8 and 4.9 rubles, respectively.

**Table 3. - The economic efficiency of the use of antiseptics for finger dermatitis in cows**

Indicators (on 1 head, rub.)	Group of animals		
	1 experienced	2 experienced	Control
Economic Damage from Rehab	1022,1	1449,9	1164,7
Veterinary costs	965,4	749,8	924,0
Damage prevention	5633,5	5205,7	5490,9
Cost effectiveness	4668,1	4456,0	4566,9
Cost-effectiveness of the ruble veterinary costs	4,8	5,9	4,9

**SUMMARY**

The research results allow us to conclude that the drug “Solka Hoofgel” provides shorter periods of relapse, contributing to the rapid recovery of milk production, activity and realization of the physiological func-

tions of dairy cows. It should be concluded that the treatment with this drug is the most costly, but in spite of this, it is cost-effective and profitable, since every ruble spent on treatment prevents economic damage by 4.8 rubles. In terms of service farms with intensive livestock technology and highly productive livestock, this product is the first choice.

The use of the second experimental group in cows of the Chemi Spray preparation has created conditions for a longer period of recovery of the animals and ensures a satisfactory level of veterinary measures. This conclusion is justified not so much by the percentage of recovered animals (70%), as by the economic effect of its use of this drug. However, when it is used on a more highly productive livestock, a decrease in the benefit from its use for the sake of more expensive and effective means is assumed.

It is advisable to consider a mixture of the smallest powders of copper sulfate and boric acid as a second-order preparation, since it has a successful combination of cost and good therapeutic effect (80%). Therefore, in cases where Solka Hoofgel is not available, the use of a mixture of the smallest powders is justified.

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