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THE STUDY OF MORPHOLOGICAL CHANGES IN THE SKIN CAUSED BY TATTOOING AND THE STUDY OF MORPHOMETRIC CHARACTERISTICS WHEN USING POMEGRANATE SEED OIL

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ABSTRACT

Tattooing is a popular form of body art, but its impact on skin morphology remains a subject of study. This research investigates the morphological alterations in the skin caused by tattooing and explores the morphometric characteristics when utilizing pomegranate seed oil. The study aims to enhance understanding of the effects of tattooing on skin health and to explore potential natural remedies. Materials and methods involved the examination of skin samples before and after tattooing, with the application of pomegranate seed oil on designated areas. Morphological changes were assessed using histological techniques, while morphometric analysis was conducted to quantify alterations. Results indicate significant differences in skin morphology post-tattooing, with notable improvements in skin health observed in areas treated with pomegranate seed oil. This research sheds light on the potential benefits of natural products in mitigating the effects of tattooing on skin health.

Key words: Tattooing, Skin Morphology, Morphometric Analysis, Pomegranate Seed Oil, Skin Health.

INTRODUCTION

Tattooing has become a pervasive cultural phenomenon globally, transcending its historical significance as merely a form of body modification to represent personal stories, beliefs, and artistic expressions. While tattoos are increasingly embraced as mainstream art, the long-term implications of this practice on skin health have raised significant concerns within both the medical and public health communities. With the growing popularity of tattoos across

diverse demographics and age groups, there is a pressing need to comprehensively understand the impact of tattooing on skin morphology and overall health.[2]

The relevance of studying the effects of tattooing on skin health is underscored by the intricate relationship between the skin and the external environment. The skin serves as the body's primary barrier against physical, chemical, and microbial insults, playing a crucial role in maintaining homeostasis and protecting against external threats. Any alterations to the skin's structure and function, such as those induced by tattooing, can potentially compromise its integrity and predispose individuals to various dermatological issues. [3]

Furthermore, the rise in tattoo-related complications, including allergic reactions, infections, and inflammatory responses, underscores the importance of elucidating the underlying mechanisms driving these adverse outcomes. Understanding the morphological changes that occur in the skin following tattooing is essential for developing evidence-based strategies to minimize associated risks and optimize outcomes for individuals seeking tattoo services. [4]

Moreover, the increasing interest in natural and alternative approaches to skincare further amplifies the relevance of exploring interventions such as the application of pomegranate seed oil in tattoo aftercare. As consumers seek safer and more sustainable options for maintaining skin health, there is growing demand for research that evaluates the efficacy of natural products in mitigating the adverse effects of tattooing. [7]

Additionally, the interdisciplinary nature of this research, which integrates dermatology, histology, and alternative medicine, underscores its relevance in advancing our understanding of tattoo-related dermatological issues and exploring holistic approaches to skincare. By bridging the gap between traditional tattooing practices and modern dermatological science, this research has the potential to inform clinical practice, public health policies, and consumer choices regarding tattoo aftercare. [9]

In conclusion, the relevance of studying the effects of tattooing on skin health lies in its implications for both individual well-being and public health. By comprehensively investigating the morphological changes induced by tattooing and evaluating natural interventions such as pomegranate seed oil, this research contributes to a deeper understanding of tattoo-related dermatological issues and information. [10]

Objective:

This study aims to examine the morphological changes in skin caused by tattooing and to evaluate the morphometric characteristics when using pomegranate seed oil. The research seeks to enhance understanding of the effects

of tattooing on skin health and to explore natural remedies to minimize adverse outcomes.ms evidence-based strategies for optimizing skin health in individuals with tattoos.

Materials and methods

For the experimental study, 150 white mongrel rats of both sexes, weighing 200-250 grams, were selected under standard vivarium conditions. These laboratory animals, which came from the nursery, were subjected to mandatory veterinary examination for the detection of existing diseases, assessment of fatness and age. The adopted animals were quarantined for 21 days in order to prevent the introduction of infectious diseases into the vivarium.

Laboratory animals were kept in special cages mounted on shelves. The total number of white mongrel rats contained in the cage, the date of the beginning of the experiment and the surname of the researcher responsible for its staging were indicated on the cage of experimental animals.

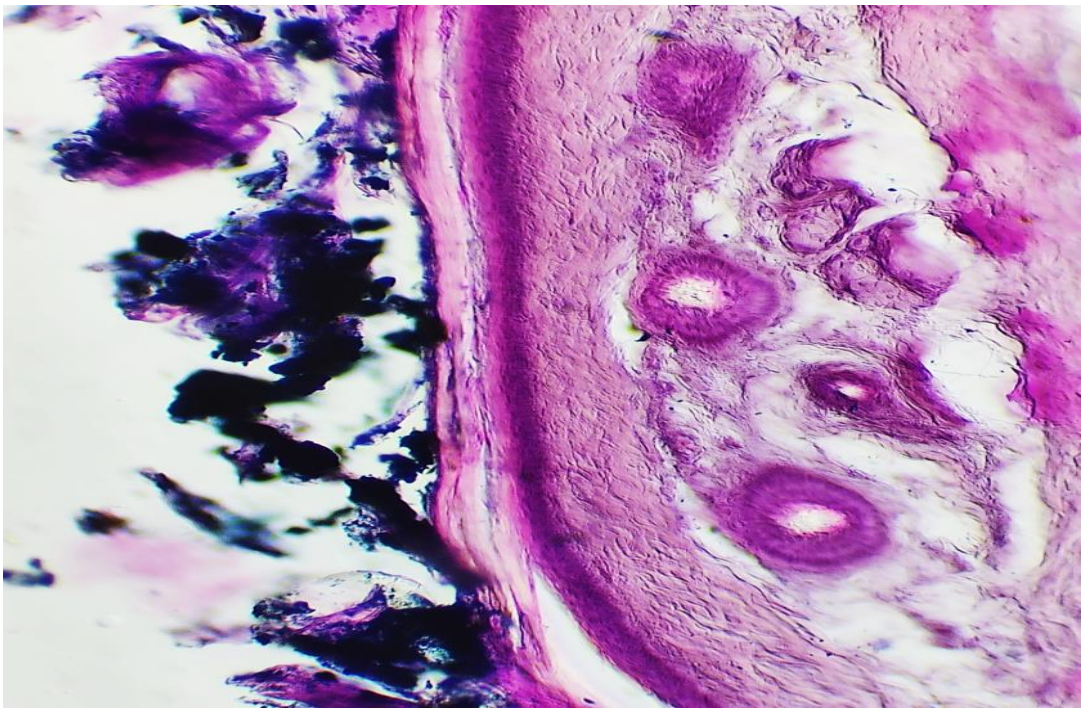
The vivarium premises were cleaned daily in the morning, the work related to cleaning the cages and the vivarium premises was carried out in special clothes. The corpses of animals that died during the experiment were buried in the ground, having previously been treated with a 20% solution of bleach with mandatory registration of appropriate documentation (an act on the disposal of slaughtered laboratory animals).

When preparing and conducting experimental studies, it was taken into account that proper maintenance and feeding of laboratory animals are of great importance. Violation of the regime and diet, non-compliance with hygienic measures during feeding contribute to the weakening of the animal body and increase their susceptibility to various infectious and somatic diseases. The occurrence of the latter during the course of the experiment can lead to distortion of the research results and, consequently, to incorrect conclusions.

All the groups were formed at the same time. The laboratory animals involved in the experiment were representative by age, sex, weight, conditions of keeping and feeding. After 30 days of feeding, groups of laboratory animals were humanely killed, then autopsies were performed. During the killing and autopsy of laboratory animals, the rules of biological safety and ethical principles of working with laboratory animals were observed. When working with laboratory animals, all the rules of biological safety and ethical principles of working with laboratory animals will be observed, given in the methodological manual Nuralieva N.A., Bektimirova A.M., Alimova M.G., Suvanova K.J. "Rules and methods of working with laboratory animals in microbiological and immunological studies", approved by the Ministry of Health of the Republic of Uzbekistan from 25 May 2016.

Results:

To identify the features of early and late morphological changes in the skin of white mongrel rats, in one group of rats, withdrawal from the experiment after the procedure was carried out until the 7th day - early changes and until the 30th day - late changes. 30 tattooed skin fragments were collected, 15 of them to identify early changes and 15 for late changes, and as a control we used 10 fragments of the tail skin of white mongrel rats before tattooing. The material was fixed in a 10% solution of neutral formalin for 24 hours, then carried out using alcohols of ascending concentration: 70-80-96-100 ° and chloroform, poured into paraffin, histological sections were made, stained with hematoxylin and eosin and Van Gieson (Fig. 1)

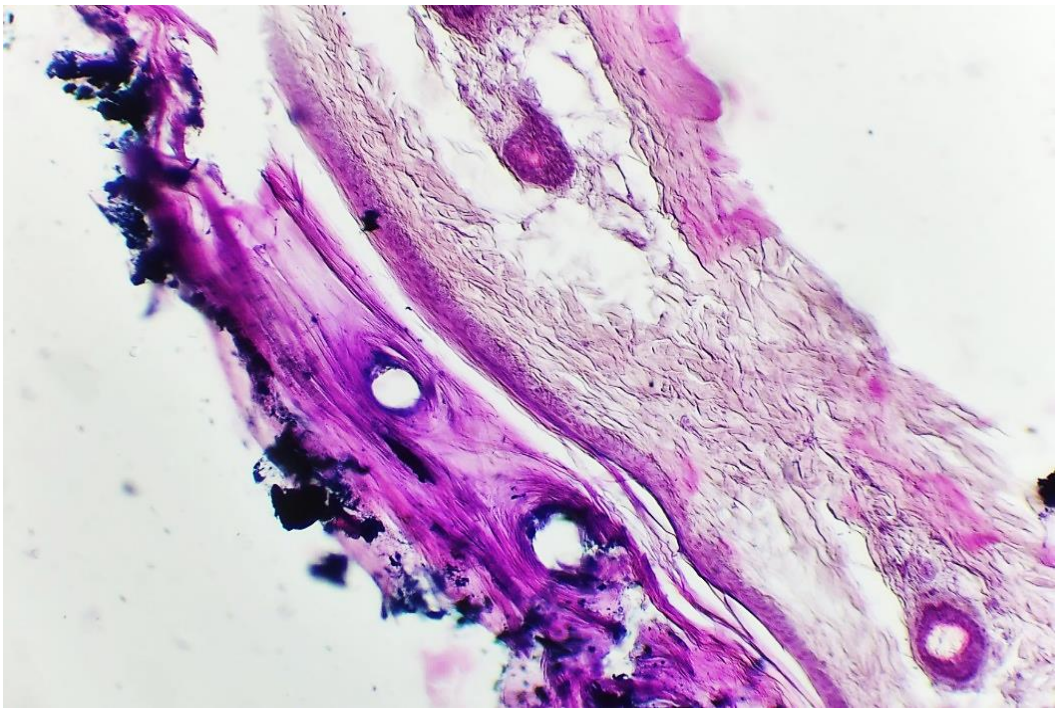


Morphological analysis of the skin of white mongrel rats was performed using light microscopy in accordance with the established principles of quantitative morphological studies. Histological examination of the skin sample of white mongrel rats obtained up to 7 days after tattooing revealed that pigments in the form of blue granules were located in the epidermis, and connective tissue consisted of a layer of dermis and edematous tissue. In addition, the epidermis was represented by a stratum corneum, keratinocytes, a granular layer consisting of several layers of cells, a spiny layer with uneven cells flattened towards the outer layer, and a basal layer, the cells of which were tightly adjacent to the basement membrane. The dermis was represented by papillary and mesh layers, the mesh layer of the dermis consisted of dense unformed connective tissue with a predominance of collagen fibers.

In our study, damage to the epidermis, connective tissue fibers, and spot hemorrhages occurred during tattooing. In addition, a microbial-free inflammatory process was observed, which occurs in response to a violation of the integrity of the skin and is accompanied by an expansion of capillaries, thinning of their walls, and an increase in their permeability. And there is also penetration of plasma, white and red blood cells into neighboring tissues. This process looks like edema and erythema in the area of damage, and a local increase in temperature is also felt.

In the area where the tattoo was applied, there was an accumulation of macrophage cells. They absorbed the destroyed fibers and dead cells. They perceived the pigment as an alien body, so they tried to remove it. The dye absorbed by the macrophage accumulated in the cytoplasm, that is, the process of incomplete phagocytosis was observed. Macrophages died, and the dye remained in the skin. (Fig. 3.6.)

At the same time, in some areas, on the first day after tattooing, redness of the skin was noted - hyperemia, as a result of increased blood flow to them. Most often, the occurrence of hyperemia is associated with mechanical effects on the surface of the skin, it may be temporary or accompanied by an infectious or inflammatory disease. It can also develop with excessive emotional stress, the influence of temperature and weather factors, for example, during prolonged stay in a hot room or in cold conditions, strong wind. (Fig. 2)



The adherence of the epidermis to the papillary layer of the dermis was different depending on the severity of skin edema, in some areas "voids" were noted between the basal layer of the epidermis and the dermis proper. In the deeper

layers of the dermis, namely in the reticular layer, focal leukocyte infiltration was noted, represented mainly by neutrophils with single eosinophils and lymphocytes.

Thus, after tattooing, early morphological changes in the skin can occur during the first seven days and the following changes are observed: edema, hyperemia, damage to the epidermis, connective tissue fibers and vessels, spot hemorrhages and an antimicrobial inflammatory process occurred in response to a violation of the integrity of the skin, accompanied by capillary dilation, thinning of their walls, increased their permeability. Plasma, white and red blood cells penetrate into neighboring tissues. The accumulation of coloring pigment was observed in the surface layers of the skin, in particular in the papillary layer of the dermis, mainly perivascularly.

Conclusions

1. It was found that the low effectiveness of traditional tattoo removal methods is associated with soreness, prolongation of the recovery period, ingestion of various infections, leaving scars and scars at the tattoo site, and the incidence of complications after traditional methods is on average 12.5%, and when using the laser method - 5%.

2. It was determined that the skin of rats differs from human skin in a number of parameters: the epidermal layer is very thin and consists in many places of only one layer of epithelial cells, which do not show the correct location of cylindrical basal cells, the nuclei of which are scattered randomly and the cell walls of which are not clearly visible; in some parts the epidermis is slightly thicker, several epithelial cells lying unevenly superficially in relation to basal cells. No regular division into strata can be distinguished; there is some desquamation of epithelial cells on the surface, but there is no real pronounced keratinization.

3. It was found that during the first seven days after tattooing, edema and redness were observed in white mongrel rats at the tattoo site, and the accumulation of coloring pigment was observed in the surface layers of the skin, in particular in the papillary layer of the dermis, mainly perivascularly. Hyalinosis, necrosis and hyperkeratosis were observed among the late morphological changes. The main morphological changes were observed from the dermis proper. The pigment dye accumulated mainly in the papillary layer of the dermis, reaching in some cases the terminal sections of the sebaceous glands.

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