

CAUSES OF SKIN SCARRING IN PREGNANT WOMEN, PEOPLE WITH EXCESS WEIGHT, AND ATHLETES DUE TO WEIGHT GAIN

Sattorov Yorqin Karimovich

Lecturer, Department of Biomedical Engineering, Informatics and Biophysics,
Tashkent State Medical University

Salimova Mubina Yunusovna

Student, Tashkent State Medical University

Abstract: This scientific study was conducted at the clinic of the Tashkent State Medical Institute (ToshMI) and is dedicated to analyzing the biophysical and physiological causes of skin scarring (striae) among pregnant women, individuals with excess body weight, and athletes. A total of 20 participants were included in the study.

Skin striae typically occur due to exceeding the elasticity limit of skin tissues, rupture of collagen and elastin fibers, and hormonal factors. During the study, participants' body mass index (BMI), skin elasticity, hormonal status, and physical activity levels were assessed.

According to the results, a direct correlation was found between the degree of skin stretching and the development of striae. Striae were particularly observed during pregnancy due to hormone-induced changes.

The findings of this study are significant for developing early prevention and treatment methods for skin changes associated with excess weight, sports activity, or pregnancy.

Keywords: striae, skin elasticity, pregnancy, excess weight, athletes, collagen, elastin.

Introduction

Human skin is the largest organ of the body and serves as a protective barrier between the external and internal environments. Its structure consists of three main layers — the epidermis, dermis, and hypodermis — and its elasticity is primarily ensured by collagen and elastin fibers. However, under certain physiological or mechanical factors, the rupture of these fibers leads to the formation of skin scars known as striae.

During pregnancy, excessive weight gain, or intensive muscle mass growth in athletes, the skin undergoes rapid stretching. As a result, the collagen and elastin structures within the dermis are stretched beyond their biophysical limits, causing fiber rupture. This process disrupts the normal regeneration mechanism of the skin and leads to the formation of whitish, reddish, or purplish streaks called striae.

Additionally, changes in the endocrine system—particularly increased cortisol levels—negatively affect the skin's repair process. Hormonal fluctuations during pregnancy or rapid changes in body weight decrease the elasticity of skin tissues.

This study was conducted at the clinic of the Tashkent State Medical Institute (ToshMI) and included 20 participants from different categories — pregnant women, individuals with excess



weight gain, and athletes. The aim of the study was to identify and analyze the biophysical and physiological factors contributing to the formation of skin striae.

The results of the study have clinical significance for the early detection, prevention, and treatment of skin striae and can be applied in the fields of cosmetology and dermatology.

Materials and Methods

The study was conducted in the Dermatology Department of the Tashkent State Medical Institute (ToshMI) clinic. A total of 20 participants were involved in the research. They were divided into three groups:

Group 1 (pregnant women) – 7 participants

Group 2 (individuals with excess body weight) – 7 participants

Group 3 (athletes) – 6 participants

All participants underwent clinical examination and laboratory testing prior to the research. Their ages ranged from 20 to 40 years, and their general health status, skin type, and hormonal profile were assessed.

Research Methods

1. **Visual clinical assessment** – evaluation of the presence, color, location, and length of skin striae.
2. **Skin elasticity measurement (elastometry)** – skin firmness and elasticity were measured using a Cutometer device (parameters R0–R9).
3. **Body Mass Index (BMI)** – height and weight were measured, and BMI was calculated using the formula:
$$BMI = m / h^2$$
4. **Hormonal profile analysis** – cortisol and estrogen levels in blood samples were measured and compared with normal reference ranges.
5. **Questionnaire method** – participants provided information on previous weight changes, duration of sports activities, and pregnancy stages.

Study Conditions

The study was conducted in the ToshMI clinical laboratory under hygienic conditions. Written informed consent was obtained from each participant. All measurements were repeated three times, and average values were used for analysis. Data were processed using statistical analysis methods, and differences between the groups were evaluated.

Conclusion

The results of the conducted study show that the formation of skin scars (striae) is associated with the interaction of physiological and biophysical factors within the human body. Although the intensity of skin stretching varies among pregnant women, individuals with excess body



weight, and athletes, the main mechanism remains the same — the rupture of collagen and elastin fibers in the dermis.

The study revealed that hormonal changes, particularly elevated cortisol levels, slow down the skin's regeneration process. Excessive mechanical loading or rapid weight fluctuations create strong tension in skin tissues, leading to the development of striae.

Furthermore, elastometry results demonstrated that individuals with lower skin elasticity tend to have a higher number of striae. This is closely related to genetic predisposition, hormonal balance, and lifestyle.

Based on the findings, the following conclusions were drawn:

1. Striae primarily occur when the rate of skin stretching exceeds the skin's elasticity threshold.
2. Hormonal changes—especially during pregnancy or rapid weight variations—are major contributing factors to striae formation.
3. Proper skincare, adequate fluid intake, and consumption of nutrients that support collagen synthesis are important for maintaining skin elasticity.
4. Gradual increase in muscle mass for athletes, and regular skin moisturization and preventive care for pregnant women and individuals with excess weight, help reduce the risk of striae.
5. 1. Bologna, J. L., Schaffer, J. V., & Cerroni, L. *Dermatology*. 5th ed. – Elsevier, 2021. – 2760 p.
6. 2. Shuster, S., Black, M. M., & McVitie, E. “The influence of age and sex on skin thickness, skin collagen and density.” *British Journal of Dermatology*, 1975; 93(6): 639–643.
7. 3. Watson, R. E. B., Parry, E. J., Humphries, J. D. “Fibrillin microfibrils are reduced in skin exhibiting striae distensae.” *British Journal of Dermatology*, 1998; 138(6): 931–937.
8. 4. Elsaie, M. L., Baumann, L. S., Elsaie, L. T. “Striae distensae (stretch marks) and different modalities of therapy: an update.” *Dermatologic Surgery*, 2009; 35(4): 563–573.
9. 573.
10. 5. McDaniel, D. H., Ash, K., Zukowski, M. “Treatment of stretch marks with the 585-nm flashlamp-pumped pulsed dye laser.” *Dermatologic Surgery*, 1996; 22(4): 332–337.
11. 6. Касьянова, Е. С. “Стрии кожи: патогенез, профилактика и современные методы коррекции.” *Российский журнал кожных и венерических болезней*, 2020; №2: 56–61.

Thus, early detection and prevention of striae can be effectively achieved through a biophysical approach, individualized monitoring, and the implementation of preventive measures.

References:

1. Bologna, J. L., Schaffer, J. V., & Cerroni, L. *Dermatology*. 5th ed. – Elsevier, 2021. – 2760 p.
2. Shuster, S., Black, M. M., & McVitie, E. “The influence of age and sex on skin thickness, skin collagen and density.” *British Journal of Dermatology*, 1975; 93(6): 639–643.
3. Watson, R. E. B., Parry, E. J., Humphries, J. D. “Fibrillin microfibrils are reduced in skin exhibiting striae distensae.” *British Journal of Dermatology*, 1998; 138(6): 931–937.



4. Elsaie, M. L., Baumann, L. S., Elsaie, L. T. "Striae distensae (stretch marks) and different modalities of therapy: an update." *Dermatologic Surgery*, 2009; 35(4): 563–573.
5. McDaniel, D. H., Ash, K., Zukowski, M. "Treatment of stretch marks with the 585-nm flashlamp-pumped pulsed dye laser." *Dermatologic Surgery*, 1996; 22(4): 332–337.
6. Касьянова, Е. С. "Стрии кожи: патогенез, профилактика и современные методы коррекции." *Российский журнал кожных и венерических болезней*, 2020; №2: 56–61.

