

# Study of the factors influencing skin tension and the formation of wrinkles.

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## Abstract

Wrinkles, a visible hallmark of aging skin, arise from intricate interactions between various intrinsic and extrinsic factors. Among these factors, skin tension, defined as the mechanical force exerted on the skin due to underlying muscles and body structure, has gained recognition as a significant contributor to wrinkle formation. This abstract explores the connection between skin tension and wrinkles, highlighting the pivotal role of collagen and elastin in maintaining skin elasticity and discussing strategies to mitigate the effects of tension-induced wrinkling. Human skin, comprising the epidermis, dermis, and hypodermis layers, undergoes changes over time due to both inherent genetic influences and external factors like UV radiation, pollution, and repetitive facial movements. The dermis, housing essential components including collagen and elastin fibres, plays a critical role in skin health. Wrinkles develop due to the degradation of these fibres, leading to reduced skin elasticity.

**Keywords:** Skin tension, Wrinkle formation, Collagen, Elastin, Aging skin.

## Introduction

Skin tension varies across the body and is influenced by muscle activity, body posture, and weight fluctuations. High skin tension regions experience more pronounced wrinkling due to the persistent stress on collagen and elastin fibres. As the fibres are subjected to repeated stretching and relaxation, they lose their strength and elasticity, eventually resulting in the formation of wrinkles. The human skin, the body's largest organ, serves as a protective barrier against the external environment and plays a pivotal role in maintaining overall health. One of the most visible signs of aging is the appearance of wrinkles on the skin. Wrinkles are the result of complex interactions between various internal and external factors, including genetics, sun exposure, and lifestyle choices. Among these factors, skin tension has emerged as a significant contributor to the formation of wrinkles. This article delves into the intriguing relationship between skin tension and wrinkles, exploring the underlying mechanisms, the role of collagen and elastin, and potential strategies to mitigate their effects [1].

### *Skin anatomy and mechanisms of wrinkle formation*

To comprehend the role of skin tension in wrinkles, it's essential to understand the skin's structure and the underlying mechanisms of wrinkle formation. The skin consists of three primary layers: the epidermis, dermis, and hypodermis. The dermis, the middle layer, contains crucial components such as collagen, elastin fibres, and various cells responsible for skin health. Wrinkles form due to a combination of intrinsic and

extrinsic factors. Intrinsic factors are genetically determined and contribute to the natural aging process. Extrinsic factors, on the other hand, involve external influences such as ultraviolet (UV) radiation, smoking, pollution, and repetitive facial movements. These factors lead to the degradation of collagen and elastin fibres, resulting in diminished skin elasticity and increased susceptibility to wrinkling [2].

### *Skin tension and its role*

Skin tension, also referred to as mechanical tension, is the force exerted on the skin due to the underlying muscles and the overall structure of the body. Skin tension varies across different regions of the body and is influenced by factors like muscle activity, body posture, and weight fluctuations. The impact of skin tension on wrinkle formation is particularly notable in areas where the skin is tightly attached to underlying muscles. In regions with higher skin tension, wrinkles tend to form more prominently. This is because excessive tension on the skin can lead to structural changes within the dermis. Collagen and elastin fibres, which provide the skin with its strength and elasticity, are subjected to continuous stress. Over time, the repeated stretching and relaxation of these fibres can lead to their breakdown and eventual loss of elasticity [3].

### *Collagen and elastin: Guardians of skin elasticity*

Collagen and elastin are essential proteins that contribute to the skin's youthful appearance and resilience. Collagen provides the skin with its strength and structure, acting as a scaffold that maintains its integrity. Elastin, as the name suggests, imparts

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elasticity to the skin, allowing it to return to its original state after being stretched or compressed. With advancing age, the production of collagen and elastin decreases, and existing fibres become less organized. The combination of reduced production and disorganized fibres contributes to a loss of skin elasticity, making it more susceptible to the effects of skin tension. As skin tension increases, the diminished collagen and elastin fibres struggle to withstand the mechanical stress, ultimately leading to the formation of wrinkles [4].

### **Strategies to mitigate wrinkles from skin tension**

The relationship between skin tension and wrinkles opens the door to potential strategies for preventing or reducing their formation:

**Sun protection:** UV radiation is a significant contributor to skin aging and wrinkles. Regular use of broad-spectrum sunscreen helps shield the skin from harmful UV rays, thereby minimizing collagen and elastin damage.

**Healthy lifestyle choices:** Avoiding smoking and maintaining a balanced diet rich in antioxidants, vitamins, and minerals can support overall skin health. Adequate hydration also plays a crucial role in maintaining skin elasticity.

**Topical treatments:** Skincare products containing retinoid, hyaluronic acid, and peptides can promote collagen production, improve skin texture, and enhance its ability to resist tension-related damage.

**Dermal fillers and cosmetic procedures:** Injectable like hyaluronic acid fillers and procedures like microdermabrasion and laser therapy can help reduce the appearance of wrinkles by promoting collagen remodelling and improving skin texture [5].

## **Conclusion**

Wrinkles are a natural part of the aging process, influenced by a complex interplay of intrinsic and extrinsic factors. Among these factors, skin tension emerges as a significant contributor to wrinkle formation, particularly in regions where the skin is tightly attached to underlying muscles. Collagen and elastin, the foundation of skin elasticity, bear the brunt of this tension, leading to their breakdown and the eventual development of wrinkles. By understanding the intricate relationship between skin tension and wrinkles, individuals can make informed choices to protect and nurture their skin. From sun protection and healthy lifestyle choices to topical treatments and cosmetic procedures, a multifaceted approach can help mitigate the effects of skin tension, promoting healthier, more resilient skin as we age.

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