

Vital Role of the Eyelashes in Keeping the Eye healthy



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Abstract

The eye is a unique and very important sense organ, and it is in direct contact with the atmosphere therefore nature is well protected from atmospheric insults. The eyebrow and eyelashes play a critical role to play. Eyelashes are delicate and sensitive sensors which help the individuals to avoid the threat of foreign objects to the eyes in this short review we have covered various aspects of the eyelashes. Their placement and length are not only help in providing atmospheric insults but also contribute to facial attractiveness

Keywords: Eyelashes; Eye health; Eye; Facial Features; Facial Attractiveness

Introduction

The eye is an important sense organ and nature has protected it utmost by providing protective structures such as eyebrows, eyelashes, eyelids. Eyelashes act as filters for environmental pollutants particles [1]. Hair around the eyes plays a very important role in keeping the eye healthy. They protect against external factors; Eyebrows and eyelashes protect eyes by decreasing the amount of light and particles that go into them and make shield against dust and other small particles to enter the eyes. Human eyelashes are one of the facial features that contribute to facial attractiveness. The eyelashes have been practiced since antiquity. Eyelashes are delicate and sensitive sensors which help individuals to avoid the threat of foreign objects to the eyes [2].

Eyelashes have different structures and functions for animals living in different environments [3]. There is a link between environmental estrogens and eye disorders. Some of these xenoestrogens are making our eyes vulnerable to hundreds of diseases. Dry eye disease, uveitis, and progressive diseases, such as retinal bleeding and cataracts, are influenced by prolonged exposure to xenoestrogens present in the air and water [4].

Natural Protection to the Eye

Without eyelashes, our eyes would also dry out much quicker, and would be more likely to catch infection. Eyelashes together with eyelids also act as a barrier against exposure to too intense lights or high heat sources and lubricate the eyes [5]. These also produce sebum, apocrine sweat and pheromones; impact

on social and sexual interactions; thermo-regulation and being a resource for stem cells. Environmental pollution contributes albeit minor problems to the human eyes and eyelashes help in protecting the eyes [6]. Tears constantly cleanse the surface of the eye and keep the cornea transparent. The cornea gets oxygen and nutrients through tears by keeping the surface moist. In the absence of moisture, the cornea becomes dry and opaque; in turn can easily injure and be infected. Tears also trap and sweep away small pollutant particles that enter into the eye. Moreover, tears are rich in antibodies that help prevent infection [5]. The eyelids, lashes and tears shield the eye while undesirable light rays enter the eye [6].

It also provides a warning signal when eyes are exposed to the external stimulus, which directly leads to eye blinking. Eyelashes are also known as filters or sunshades that can help animals to adapt to the living environment [7] For example, camels, giraffes and ostriches living in dry and dusty areas with strong sunlight have unique, multi-layered thick eyelashes, which help them filter the dust in the air and shield the strong sunlight. However, pets such as cats that are far away from these environments have almost no eyelashes. Furthermore, eyelashes as a human facial detail can capture the attention of others (Figure 1) [8]. Obviously, eyelash loss or abnormal growth of eyelashes (Figure 2) can affect these functions and is even associated with the development of some diseases [9,10]. Another important function deserving further investigation is the inhibition of ocular water evaporation

since a moist ocular surface is critical for the health of eyes. To quantitatively understand ocular water evaporation is not an easy task because it involves multiple coupled transport phenomena

occurring adjacent to the eye. The effects of mammal eyelash lengths on ocular water evaporation were investigated by Amador et al. [4].



Figure 1: healthy growth of eyebrows and eyelashes.



Figure 2: Loss of Eyelashes.

Longer Isn't Better

Experimental results of Amador et al. [11] revealed that the eyelashes have an optimal length, at which the ocular surface has the lowest water evaporation rate. The functions of hairy eyes found on insects have also been revealed using a similar approach [12] suggesting that when the hair length of hairy eyes is almost equal to hair spacing, a thicker velocity boundary layer can be formed when compared with the smooth, hairless eyes. This simple mechanism prevents particle deposition on the ocular surface [13]. Length of eyelashes can be an indicator of general health and it has recently been proposed that there is an optimum length for eye protection, with the preference for eyelash length following an inverted-U function, with the highest ratings peaking at approximately one third of the eyes' width. Nevertheless, interestingly there is a difference between male and female faces, suggesting that while in general, eyelashes of an optimum ratio are considered more attractive, this preference is not solely a biologically adaptive phenomenon and is influenced by cultural norms .

Another important function deserving further investigation is the inhibition of ocular water evaporation since a moist ocular surface is critical for the health of eyes [14]. The answer might seem simple: Those thick hairs on the end of our eyelids simply exist to block intruding particles from landing on our eyeballs. And, in fact, that's what many scientists have hypothesized. It explains why camels evolved to have long lashes for wandering the dusty desert- and why our house pets, in comparison, have stumpy ones [14].

Eyelash Pathologies

1. Trichiasis: It is one of the most common eyelids malpositioned eyelashes that are misdirected against the ocular surface, having misdirected eyelashes causes the eye to become irritated because the lashes scrape against the cornea, the conjunctiva and the inside of the eyelids. This is most often a consequence of eyelid inflammation and scarring, although it can be a presenting symptom of an eyelid margin malignancy as well [15]. Trichiasis treatment involves removing the eyelash, follicle

or both, or redirecting eyelash growth. Sometimes trichiasis affects only a few eyelashes. Unfortunately, ingrown lashes do not resolve themselves.

Vitamin deficiency causes eyelashes to fall out. A nutrient-deficient diet has also been linked to lash loss. A lack of essential fatty acids can affect lash loss, as well as a lack of vitamins D, Zinc and Iron.

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