

The Tracks of Our Tears

The role that tears play



THE COLLEGE
OF OPTOMETRISTS

We all cry sometimes, but have you ever wondered what your tears are made from, or what their role is in keeping your eyes healthy?

Dr Susan Blakeney of The College of Optometrists, says: “Tears are necessary to give you good vision, to keep the eye healthy and to protect the eye from irritants. However, you can also produce emotional tears when there are strong feelings of sadness or happiness. These tears are different and may contain hormones and chemicals released by the body - which could make you feel chemically better afterwards. Crying might make your eyes red and puffy, but they won't affect your eyesight - you can't literally 'cry your eyes out'!”

There are three types of tear - each containing a combination of water, fats, sugars and proteins * - and each has an important role in protecting and preserving the condition of our eyes:

Basal Tears

This is the liquid constantly present in the eye, which ensures that the cornea is constantly wet and nourished.

The cornea itself has no blood vessels, and is dependent upon the tear film for its oxygen supply, which it gets from the air when the eye is open. The thin layer of liquid also smoothes out irregularities and creates an even surface of good optical quality, which is reformed every time you blink.

The washing action of the liquid tear film reduces the ability of bacteria to adhere to the surface of the eye, while the antibiotic proteins in the liquid help kill them off. Basal tears also act as a lubricant, to limit the impact of friction on the eye caused by movement of the eyelid.

Reflex Tears

These tears are essentially the same as basal tears, but are a result of an increase in the level of liquid the eye produces in response to a sudden external stimulus. This could be the irritation of the eye by foreign particles, such as dust, or from irritant substances like onion vapours, tear gas or pepper spray. By creating a sudden increase in the level of basal tears, this reflex serves to immediately wash out irritants that may have come into contact with the eye, and makes your eyes 'water'.

Emotional Tears

When we cry due to pain, grief, anger or happiness, this increase in the liquid we produce in our eyes is generally referred to as 'crying' or 'weeping'. This is often accompanied with spasms of the whole body and interrupted breathing patterns.

Tears brought about by emotion have been shown to contain a different chemical make-up than to those of basal or reflex tears; they have more protein. A high level of emotions can trigger the parasympathetic branch of the autonomic system (the part of the body that acts as an unconscious control system), and will cause the glands near your eyes to produce tears. One researcher has suggested that by excreting these hormones in the form of tears, the body is helping you feel calmer and less emotional afterwards.

Epiphora

This is the name for an overflow of tears. This can be reflex or emotional (as above). However, it can also be a result of a drainage failure, where the small draining holes in your eyelids fail to drain the tears away efficiently into your nose. This can lead to leakage and an excess of water on the surface of the cornea, which can cause a 'watery eye' and blurring of vision. It can be made worse by cold winds or dry conditions.

* Tears include mucin, lipids, lysozyme, lactoferrin, lipocalin, lacritin, immunoglobulins, glucose, urea, sodium, and potassium

** Emotional tears include prolactin, adrenocorticotrophic and leucine enkephalin.