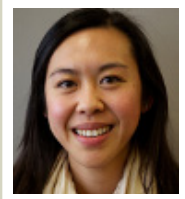


# Contact Lens Update

CLINICAL INSIGHTS BASED IN CURRENT RESEARCH

## Makeup and your eyes: friend or foe?

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Many people believe the eyes are the most important aspect of facial attractiveness,<sup>1</sup> and cosmetics are applied around the eyes to enhance and accentuate their appearance. Various forms of eye cosmetics are used around the world and the earliest documentation of eye cosmetic use dates back to ancient Egypt, where they were made from botanical sources (e.g. henna, cedar or sycamore sawdust, burnt almonds), animal sources (e.g. honey, milk, blood) or minerals.<sup>2</sup> Fast forward 5000 years, and the formulation of eye cosmetics and their intended application is vastly different. Modern day eye cosmetic products include eye shadow (powder or cream), eyeliner (liquid or pencil), mascara (waterproof or not), concealer (cream or liquid) and eye creams. Personal preference typically dictates which products a patient may choose to use, and the way in which they choose to use these products may have implications on ocular comfort, ocular health and the contact lens-wearing experience.

### Effects on the ocular surface

#### ***Particles in the tear film disrupt tear film stability and reduce ocular comfort***

Eye cosmetics are obviously applied in close proximity to the ocular surface. While eye shadow and mascara are applied to the peri-ocular skin and eye lashes, respectively, eyeliner is often applied millimetres away from the lid margins or directly on the lid margin. During routine slit-lamp examination, particles of cosmetic products are often seen suspended in the tear film or bound to the surface of contact lenses.<sup>3</sup> Poor manual dexterity, application technique or eye rubbing may be one route of entry for these products to enter the tear film; however, substances applied to peri-ocular skin demonstrate slow and eventual migration into the tear film,<sup>4,5</sup> which can disrupt tear film stability<sup>6</sup> and reduce ocular comfort.<sup>7</sup>

#### ***Use of eyeliner along the eyelid margins: As yet an unproven "hazard"***

One small pilot study found using eyeliner along the inner lid margin actually increased lipid layer thickness, although this was attributed to the migration of lipids and waxes from the eyeliner pencil itself.<sup>8</sup> The common conception that applying eyeliner along the eyelid margins "clogs" the meibomian glands has not been demonstrated, or published in the peer-reviewed scientific literature to date.

#### ***Anti-aging eye creams and meibomian gland dysfunction***

There is some compelling evidence to support the notion that anti-aging eye creams may ignite meibomian gland dysfunction. Retinoic acid (and its derivative, retinoid), a common ingredient found in anti-aging skin care products and some anti-acne products, has been shown to cause thickening and keratinization of meibomian gland ducts, degeneration and necrosis of meibomian gland acinar cells, peri-acinar fibrosis and decreased lipid content of meibomian tissue<sup>9</sup> in animal models. Although these effects have yet to be found in humans,

practitioners ought to be aware of the unintended ocular physiological implications these products can have, considering the prevalence of dry eye associated with increased age, and the growing trend to use anti-aging cosmetics.

### ***“Safe and effective” pharmaceuticals linked to conjunctival and eyelid hyperemia***

Eye care practitioners should also be aware that pharmaceutical agents are a common ingredient in cosmetics. One of the common side effects of prostaglandin analogues in the management of glaucoma is darker, thicker and longer eyelashes. In December 2008, the US Food and Drug Administration (FDA) approved the use of Latisse® (Allergan) 0.03% bimatoprost ophthalmic solution to be applied cutaneously daily along the lash line, for eyelash hypotrichosis.<sup>10</sup> Although shown to be “safe and effective”,<sup>11</sup> the incidence of conjunctival and eyelid hyperemia was significantly greater in subjects using 0.03% bimatoprost than subjects randomized to a vehicle-control.<sup>11, 12</sup>

### **Safety concerns?**

As consumers make more informed choices about which chemical products to include in their daily lives, many have become concerned with the safety profile of ingredients in their day-to-day care products.

### ***Harmful ingredients and additives banned in some countries***

Old formulations using potentially harmful and toxic ingredients such as lead-compounds and preservatives such as benzalkonium chloride, thimerosal and chlorhexidine are rarely used in any modern day cosmetic products.<sup>13</sup> In fact, the safety of cosmetic products are highly regulated by governmental bodies such as the European Union Cosmetics Regulation, and coloring additives are regulated by the FDA.<sup>14</sup> Although it is still used in Africa, the Middle East and South Asian cultures, the FDA bans the import and sale of kohl in the USA<sup>15</sup> as this product frequently contains lead compounds and other heavy metals, which are harmful to human health.

### ***Bacterial contamination***

Bacterial contamination over the lifetime of a product is inevitable. One study found bacteria in 30% of mascaras tested after three months of use. The amount of bacteria within a product is related to the amount of use, the age of the product and the number of users (e.g. testers at cosmetic counters).<sup>16, 17</sup> Preservatives are commonplace in cosmetic products and are a fundamental part of maintaining safety and stability in the products that we use.<sup>14</sup> Preservatives inhibit bacterial growth within a product, which can prolong the life-span of the product; however, their efficacy diminishes over time.<sup>18</sup> Cosmetic products are labelled with a symbol showing a jar with an open lid, indicating the number of months the product remains usable after opening. Eye care practitioners should remind all patients they should refrain from eye cosmetic use during an eye infection, and that eye cosmetic products need to be replaced after the infection is resolved.

### **What about contact lens wearers?**

Using eye cosmetics simultaneously with contact lenses may cause symptoms of dryness and discomfort.<sup>19-21</sup> However, few clinical studies support this hypothesis. Cosmetic products are prone to binding to the surface of contact lenses which may not be readily removed with rubbing and rinsing with multipurpose solutions.<sup>3</sup> Irreversible lens deformation and reduced optical clarity of silicone hydrogel lenses can be caused by cosmetics such as mascara and eye make-up removers.<sup>22</sup> This stresses the importance of reminding patients to remove their lenses with clean hands prior to removing their eye cosmetics. For regular users of eye cosmetics with a tendency to apply cosmetics within the lash line, practitioners should consider refitting these patients into a daily disposable contact lens so patients have optimum vision and comfort daily.

### Education is key

The common practice of eye cosmetic use is unlikely to change, and the range of eye cosmetics used by any one individual will differ. Transient tear film changes occur with the use of eyeliner, and discomfort is reported when using some eye cosmetics. Patients should be educated as to where eye cosmetics should be applied, and be reminded of regular replacement of products. Cosmetics usage should be taken into consideration when managing the contact lens wearer and the dry eye patient.

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