

# Defining eye enhancement

## Part one: the opportunity

Will a contact lens that enhances the natural beauty of the eyes and delivers excellent clinical performance open up new opportunities for your patients and your practice? In the first of two articles, Karen Walsh sets the scene for a new concept in contact lenses: the eye enhancement lens

Throughout history, people have enhanced the appearance of their eyes. Evidence of the use of eye make-up dates back to Ancient Egypt as long ago as 4000BC. Today, the global cosmetics industry is a multi-billion dollar business and new ways of enhancing the eyes, whether with make-up or surgery, are constantly emerging.

In our profession, we examine the eyes in minute detail. But do we ever stop to consider the eye as a focus for human expression, emotion and beauty? And do we appreciate that our patients might want to enhance the appearance of their eyes?

The eyes receive greater attention than any other feature of the face<sup>1,2</sup> and provide important cues that influence attraction during social interactions. Dilated pupils indicate emotional arousal and are rated as more attractive.<sup>3</sup> Direct gaze influences other people's perceptions of attractiveness.<sup>4</sup>

Tracking gaze confirms that, with or without make-up, the eyes are the facial feature that attracts most attention and efforts to enhance their appearance has a greater effect than enhancing any other feature.<sup>5</sup>

The aesthetic impact of contact lenses is well recognised and this is a key part of the greater confidence that contact lens wearers feel.<sup>6</sup> Using contact lenses, it has also long been possible to radically alter one of the most prominent attributes of the eyes: eye colour. Coloured contact lenses offer the potential to completely change the colour and appearance of the eyes, whether or not vision correction is required.

Yet a surprisingly small proportion of people take up this opportunity. In Europe, coloured lenses account for only 2 per cent of total soft lens sales value and have been declining in market share since 2011.<sup>7</sup> In the UK, only 1 per cent of total soft lens sales are coloured lenses.<sup>7</sup>

Could the reason be that traditional coloured lenses simply do not meet patient needs in terms of cosmetic effect and clinical performance? Would a new concept in contact lenses – the eye enhancement lens, which enhances the natural iris rather than changing eye colour – alter perceptions and open up an entirely new opportunity? And what if such lenses were to address both appearance and performance, the two key reasons to start wearing contact lenses?<sup>8</sup>

Experience outside Europe suggests that such a lens could have a significant effect on the contact lens market. In Asia, where eye-enhancing lenses have now been available for a decade, the coloured lens and eye enhancement sector as a whole is outpacing total soft lens growth.<sup>9</sup>

More remarkable still, in Asia 91 percent of consumers wanting to alter the appearance of their eyes now opt for eye-enhancing contact lenses rather than coloured lenses.

### The Asian perspective

'Natural beauty' is prized in Asian countries. Many Asian women have complicated make-up regimes intended to achieve a natural-looking result. Likewise, there is a belief that the focus of the face – the eyes – should keep a natural form, even when enhanced with cosmetics or contact lenses.

Johnson & Johnson Vision Care introduced an eye enhancement lens in 2004 in South Korea, in Japan a year later and then in most Asian countries. There are three variations of the lens available in the Eastern region, designed specifically for the Asian eye. These lenses enhance the appearance of the iris, and give it more definition, dimension and brightness, without changing the colour of the eye. An additional effect is to make the iris seem larger, another desirable feature for many Asian women.



Figure 1 Dot-matrix coloured lens designs (left) can produce a flat, unnatural effect on the eye (right)

For eye enhancement lens wearers, eye health is another important factor in deciding whether they have achieved natural beauty or not. While there are many coloured and enhancing lenses available in Asia, the quality and potential impact on ocular physiology of some brands has been called into question in a report recently published in Japan, co-sponsored by the Japan Ophthalmological Association and Japan Contact Lens Society.<sup>10</sup>

As we will see in Part two of this article, Johnson & Johnson Vision Care's eye enhancement contact lenses are designed and manufactured to the same high performance standards and ocular health outcomes as used across its proven clear contact lens range.

### Developments in design

The different types of coloured lenses, whether translucent tints or opaque, have been reviewed in detail<sup>11</sup> as have the various methods of manufacture.<sup>12</sup> Of the opaque tints, the solid colour gives a flat, dull appearance to the eye whereas a printed iris pattern can produce a more realistic effect.

Iris patterned lenses are traditionally produced either with a dot matrix or a simulated iris on the surface. These lenses may allow some of the natural iris structure to show through but can still fail to give a realistic appearance. Dot matrix designs, in particular, can produce an unnatural effect (Figure 1).

A relatively recent concept is the limbal ring design. Limbal ring soft contact lenses incorporate pigments either on the surface of the lens or within the lens matrix that provide additional features to the iris and sclera. They are designed to add greater definition to the limbus and make the iris look larger.

Behavioural science tells us why a more defined limbal ring may be desirable. The limbal ring of the eye appears as a dark annulus where the iris meets the sclera. Both the width and opacity of the limbal ring are influenced by iris pigmentation and optical properties of the region.<sup>13</sup>

With age, the limbal ring becomes less prominent, making it a likely indicator of youth and health.<sup>14</sup> The limbal ring also becomes less visible due to conditions closely related to advanced age such as glaucoma and arcus senilis.<sup>15</sup>

Peshek et al<sup>14</sup> showed that both male and female faces with a dark and distinct limbal ring are rated as more attractive than otherwise identical faces with no limbal ring. In this study, observers were shown paired images of faces with simulated iris appearance, only the right hand images having the defined limbal ring (Figure 2).

Several types of limbal ring design lenses are currently available from various manufacturers, primarily in the Asia Pacific market. But, again, the effect with current lenses is often very unnatural due to a failure to mimic the natural appearance of the iris (Figure 3).



Figure 2 Examples of stimulus pairs, with faces with simulated dark and distinct limbal rings to the right <sup>14</sup>

### Limitations of coloured lenses

Poor cosmesis is not the only factor that has limited the success of traditional coloured lenses. Morgan and Efron<sup>16</sup> chart the decline in fitting of these lenses in the UK over a decade and suggest that reasons may include the limited options available, particularly in the daily disposable modality.

The benefits of daily disposables in general have received much attention in the literature. Most recently, a large post-market surveillance registry in the US confirmed an exceptionally low adverse response with this modality.<sup>17</sup> Over the equivalent of 471 years of patient wear, users of 1-DAY ACUVUE® MOIST® (etafilcon A) only reported three non-significant contact lens-related events and no serious or symptomatic infiltrative events.

The simplicity and convenience of daily disposable lenses are other attributes that contribute to the development of the overall contact lens market, and may appeal to people who might not use other types of lenses.

Practitioner concerns about the chair time required to trial fit patients with traditional coloured lenses given the large number of colour variants to choose from, and differences in fitting characteristics between clear and coloured lenses, may have been a factor in the lack of uptake.

Reports of complications associated with the sale of plano cosmetic contact lenses by unlicensed vendors may also have served to deter people from seeking, and practitioners from fitting, coloured lenses.<sup>16</sup>

A recent literature review found 23 publications covering 77 specific cases of ocular complications secondary to the wearing of contact lenses obtained from unregulated sources of supply without a valid prescription.<sup>18</sup> In most of these cases (94 percent) plano cosmetic lenses were worn and only one case involved a tinted lens with refractive power. These authors observe that, in most cases, the complications experienced were the result of risk factors that could be avoided had these patients received fitting and education from an eye care practitioner.

Another recent meta-analysis pointed to the importance of coloured and eye enhancing lenses being properly prescribed by an eye care professional and used in a compliant manner.<sup>19</sup>

In Europe, plano contact lenses are not currently classified as medical devices. However, with the forthcoming European Medical Devices Draft Regulation, which should be finalised in 2015, it is anticipated that plano lenses are to be included as medical devices.

Recent research has also focused on the quality of current coloured lenses and, in particular, the role of surface pigments in microbial adherence.<sup>20</sup> Oxygen delivery and the effects on ocular physiology have been a further focus for research.<sup>21,22</sup> Surface properties such as smoothness and lubricity have also been explored.<sup>23,24</sup>



Figure 3 Limbal ring contact lens designs from some manufacturers look unnatural compared to the appearance of the natural iris (right)

Many contact lens wearers desire a cosmetic design that is unique enough to make them stand out, yet still want to maintain a naturally subtle beauty effect. As we will see, current lenses have failed to meet expectations not just because of their unnatural or 'fake' appearance but also for performance reasons.

Daily disposability is particularly desirable in coloured and eye enhancement lenses; traditionally, significantly more of these lenses were fitted for part-time than full-time wear (63 percent vs 37 percent), a reversal of the pattern for clear lenses (22 percent vs 78 percent). They were also replaced less frequently, such that storage and compliance were a concern with reusable lenses.<sup>16</sup>

Part two of this article will report the results of this research and show how Johnson & Johnson Vision Care has addressed each of the issues with traditional coloured lenses in developing its eye enhancement lens.

As we will see, this resurgence of interest has led to new techniques for investigating the material properties of coloured and eye enhancement lenses, and comparing them with clear lenses. Clinical studies are also providing more information on the performance of the new lenses on the eye.<sup>25</sup> The emphasis of current research is thus very much on improving product performance as well as enhancing appearance.

### The new concept

Johnson & Johnson Vision Care has developed a new concept in eye enhancement contact lenses with the comfort, health and vision of the proven ACUVUE® brand. The lens is part of the 1-DAY ACUVUE® MOIST® family, for the ocular health benefits of a daily disposable modality.

The new lens has a pigment design that enhances the natural beauty of the eyes in a

different way to coloured lenses. The design uses translucency and opacity to create blending, definition and colour contrast against the wearer's iris, rather than masking the natural iris colour. The clean edge and colour of the limbal pattern creates definition between the iris and sclera. With highlights and shading, the iris-inspired design mimics the shapes and patterns of the natural iris (Figure 4).

Importantly, pigment is enclosed within the lens matrix using Beauty-Wrapped-in-Comfort™ technology ensuring no contact between pigment and the ocular surface. The level of surface smoothness (measured by Atomic Force Microscopy) and lubricity (coefficient of friction) in areas of enclosed pigment is comparable to non-pigmented areas, minimising interaction with the lens surface to that of a clear lens.<sup>23</sup>

The design philosophy behind the new lens, its material properties and clinical performance will be examined in detail in Part Two of this article. But first let us explore the potential for such a product with the results of a large-scale study of attitudes to the beauty lens concept.

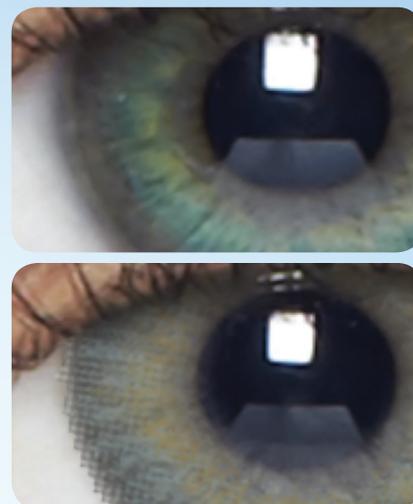


Figure 4 The new Johnson & Johnson Vision Care lens (left) enhances the beauty of the wearer's iris and provides a more natural look than coloured lenses on the same eye (right)

### Market potential

Research has improved our understanding of what consumers in Europe would want from a contact lens that could enhance their eye beauty.<sup>26</sup> Patients say they are looking for a

## ATTITUDES TO THE 'BEAUTY' LENS CONCEPT

Potential eye enhancement lens buyers want to see visible eye enhancement but it needs to be a natural look that is created.

These patients are:

- More likely to wear eye make-up frequently
- More likely to spend time on make-up
- More likely to use other eye enhancement skincare / beauty products
- More likely to keep up with beauty / skincare trends and media around this topic

Their mindset on basic contact lens features, such as attitudes to comfort, health, vision and handling, is no different from other patients.

Typical comments on the eye enhancement lens appearance are:<sup>30</sup>

'Accentuate my natural eyes'

'Look effortlessly beautiful'

'A look like I [could] have been born with'

'Eyes look healthy, fresh and rested, not tired'

'Eyes look bright, express a mood'

'Eyes that get noticed [...but not fake]'

visible difference in appearance but a natural-looking effect, while meeting the basic needs of providing comfort, vision and handling.<sup>27</sup>

In fact, research suggests over a million women in the UK would say yes to a trial of an eye enhancement lens which delivered all of these attributes.<sup>28</sup>

Independent market research was commissioned among 1,400 females in the UK aged 16-30, a majority of whom (n=1,200) were either contact lens or spectacle wearers.<sup>29</sup> The aim was to explore attitudes to their personal appearance and to the eye enhancement lens concept.

An overwhelming majority agreed ('agree strongly' or 'agree at all') that their eyes were an important part of their overall look and beauty (89 percent) and agreed with the statement 'I like to look the best I can' (94 percent).

Participants were shown facial images of people wearing and not wearing Johnson & Johnson Vision Care eye enhancement lenses, and an explanation of the concept so they could visualise the product.

A high proportion said they would be interested in buying this type of contact lens in future ('definitely' or 'probably' would buy) should it be available at a price that was reasonable to them (65 percent for current contact lens wearers and 69 percent for spectacle wearers).

More than three in four (76 percent) of those likely to buy the lens were either already wearing contact lenses (36 percent) or, a higher percentage still, considering contact lenses (40 percent). Nearly two in five (19 percent) were not currently wearing any vision correction (Figure 5).

Those likely to buy were significantly more likely to wear make-up every day than those who were unlikely to buy (39 percent vs 25 percent), or to wear make-up most days (37 percent vs 24 percent). Potential buyers also spent significantly more time on their make-up regime. They were significantly more likely to use multiple eye cosmetics and to keep up with the latest trends in beauty and skin care products.

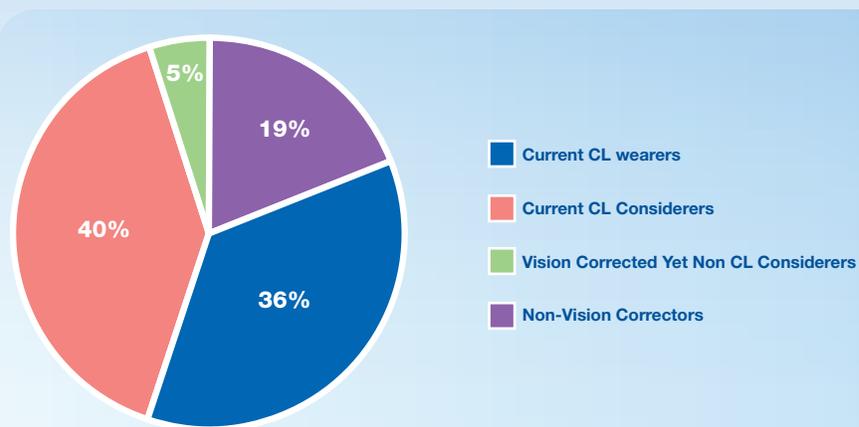


Figure 5 Breakdown of patients interested in trying the Johnson & Johnson Vision Care eye enhancement lens

Buyers wanted to see a visible difference in their appearance from the eye enhancement lens concept but, crucially, it still needed to be a natural look. 'Natural' and 'bright' were the key words they chose to describe the effect they would want with the lens. The basic features of contact lenses, such as comfort, health, vision and handling, were ranked as important, in addition to enhancing the appearance of the eyes.

The opportunity to experience how the lenses feel on the eye was among the factors most likely to make a difference to their likelihood of trying them (94 per cent 'much more likely' or 'more likely at all' to try) as well as the chance to see how they look on the eye (91 per cent).

### Defining the future

What have we learned so far about the opportunities that a new concept in contact lenses, the eye enhancement lens, presents?

We know that the eyes are the facial feature that attracts most attention. We know the aesthetic impact of contact lenses in general and that this contributes to the greater confidence that contact lens wearers feel. And we know that many people are interested in enhancing the appearance of their eyes in a natural-looking way while also requiring that contact lenses deliver comfort, health, vision and handling.

Limited uptake of coloured contact lenses suggests that they have failed to meet expectations for either appearance or performance and there are concerns about the quality of some lenses and impact on ocular physiology. The lack of many daily disposable options may also have limited their success, along with possible concerns about chair time.

If these unmet needs were addressed, could the potential for a whole new category of contact lens be unlocked?

Recent research has focused on the design philosophy, material properties and clinical performance of a new type of eye-enhancing contact lenses. Part two of this article will reveal the technology behind the new concept and unveil the unique features of 1-DAY ACUVUE® DEFINE™ Brand Contact Lenses with LACREON®.



**THE EYES HAVE IT**  
**Dr. Helen Fawcner, senior lecturer at the School of Social, Psychological & Communication Sciences at Leeds Beckett University discusses the psychology of appearance and importance of the eyes**

The starting point, whether we like it or not, when we meet people is that the very first thing we're judged on is our appearance. And we judge other people's appearance too.

We know it's a real advantage to be physically attractive and that this has a 'halo effect' on all sorts of aspects of our lives. The eyes, along with the mouth, are very important features in communicating with other people. Studies in children and adults have shown the profound effect that visible differences in eye appearance such as strabismus can have on those affected.

The eyes are the place where people look when they're trying to communicate with others. And we know that eyes are an important feature when people rate their own attractiveness – if we ask them to reflect on how they think and feel about their own appearance.

We also know that women are judged much more on their appearance than men and that different features are important to their physical attraction. In men, for instance, handsomeness, hair and height are seen as less important than muscularity.

The history of enhancing our eyes goes back centuries, almost as long as people have been on Earth. If we go back in time, the Egyptians and Romans used kohl just as we might use eyeliner, eye pencil, mascara or fake eyelashes today. Some now choose more permanent solutions such as tattooed eyeliner or eyebrow enhancement.

In fact, people have been enhancing their eyes with make-up pretty much as long as we've been around. These days there are even eye make-up products that are marketed specifically for men. This all comes down to the fact that the eyes are an important focus point when we're looking at and communicating with people.

There is research evidence on people's choices around eye and vision correction. Much of that work shows that what drives decisions is function – their eyesight being improved – and comfort.

What struck me about 1-DAY ACUVUE® DEFINE™ is that it's a lens that quite naturally enhances appearance. The really important thing is it's a subtle improvement – it's you, but on those days when your eyes look really good. The difference is subtle but it is appreciable.

As to who are most likely to be interested in this lens, body image researchers talk about those who are 'more invested in their appearance'. Because 1-DAY ACUVUE® DEFINE™ enhances the eyes but doesn't scream 'look at me I'm wearing coloured contact lenses' it might also appeal to those who wouldn't normally consider something that enhanced their appearance.

Without a doubt, one of the biggest gender differences regarding body image is that women are allowed – and social mores make it more acceptable – to be concerned and talk about their appearance, to the extent that we're actually expected to be unhappy with the way we look!

These days, people are increasingly aware of their appearance and report ageing as something that concerns them. We know that the limbal ring fades with age. 1-DAY ACUVUE® DEFINE™ lenses enhance this feature and can give a more youthful appearance but still look quite natural.

Once people overcome the reluctance to try something new I think eye enhancement would be quite appealing, and not just in younger age groups. Again, it's 'your eyes but on a good day'. The dewy, sparkly-eyed version of you!

When patients try the lens, they'll see the difference. Positive comments from others, especially if unsolicited, can also be very influential and reinforcing, and might make all the difference.

**Further reading**

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