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REVIEW FACIAL SURGERY

The Ideal Eyebrow: Lessons Learnt From the Literature

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Abstract The concept of facial aesthetic has been around for centuries, popularised in the Renaissance period by artists such as Da Vinci. The eyebrow is also known as the master line of the face and is used as a reference for other facial angels and contours. The criterion of the aesthetically pleasing eyebrow has been a subject of much debate over the years, ever since make-up artists such as Westmore described the modern concept of the ideal brow in the 1970s. The concept of the ideal brow has evolved over the decades, subjected to influence by cultural trends and differences. This narrative review aims to examine the current evidence in the literature with regard to the ideal eyebrow from an aesthetic point of view, taking into account gender, age and ethnic differences. A set of guidelines are also proposed in order to help clinicians tailor the appearance of the eyebrow to individual patients based on the author's personal opinion.

Level of Evidence V This journal requires that authors assign a level of evidence to each article. For a full description of these Evidence-Based Medicine ratings, please refer to the Table of Contents or the online Instructions to Authors www.springer.com/00266.

Keywords Brow lift · Eyebrow · Brow · Aesthetics

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Introduction

The concept of facial aesthetic has been around for centuries, popularised in the Renaissance period by artists such as Da Vinci. Humans have attempted to characterise the ideal face using various rules and canons, dating as far back as the ancient Greek times [1]. In facial aesthetics, the upper third of the face, measured from the trichion to the glabella, is considered to be of primary importance [2]. The eyebrow is also known as the master line of the face and is used as a reference for other facial angles and contours [3]. Indeed make-up artists will tailor the shape, angle and thickness of the brow to individual faces. The criterion of the aesthetically pleasing eyebrow has been a subject of much debate over the years, ever since Westmore described the modern concept of the ideal brow in the 1970s [4]. This narrative review aims to examine the current evidence in the literature describing the ideal eyebrow, taking into account gender, age and ethnic differences. A set of criteria are proposed based on the available evidence to help guide aestheticians and surgeons in tailoring the eyebrow shape to different faces.

The ideal Brow

Beauty is an ever-evolving concept. Contemporary ideas around the ideal female brow originated with makeup artists like Westmore in the 1970s. According to Westmore [4], the ideal brow conforms to the following rules (Fig. 1):

(1) Begin on the same vertical plane as the inner canthus of the eye and the lateral extent of the nasal ala. (A–D)

(2) The peak of the brow should be located above the lateral limbus (LL). (Point C)
(3) The brow should end laterally at a point along an oblique line drawn from the ala to the lateral canthus of the eye (alar-lateral canthal line). (A–B)
(4) The medial and lateral ends should be on the same horizontal level, approximately 1 cm above the bony orbit. (B–D)

Since then, several changes to the Westmore model have been proposed. Ellenbogen [5] proposed a model in the 1980s, which largely agreed with the Westmore model, but suggested that the caudal aspect of the medial brow should be 1 cm above the orbital rim. Several authors though thought the Westmore criteria yielded a 'surprised' and unnatural look as the peak of the brow was placed too medially. Wolfort et al. [6] believed that the peak should be half way between the LL and LC, but agreed with Westmore that the medial and lateral extents of the brow should be on the same horizontal level. Whittaker et al. [7] reported that the peak of the brow should be at the junction of the middle and lateral thirds (i.e. two thirds of the way along the length of the eyebrow). This concept was supported by Byrd, who also noted that the apex defined by Whittaker and colleagues corresponded to the intersection of the brow with a line drawn from the lateral nasal ala to the LL (Fig. 2). In his series on reporting outcomes following endoscopic brow lift, Byrd noted that a peak of 8–10 mm superior to the medial brow yielded the optimal aesthetic outcome [8]. Cook et al. agreed with Whittaker and Byrd and suggested that the peak should be above the lateral canthus [9], which places the peak in a similar position described by Byrd and Whittaker.

Some authors have described stringent numerical guidelines to help aid surgical planning. Connell [10] recommended a distance of 15 mm between the brow and the upper eyelid skin crease. McKinney and colleagues [11] in their guidelines based on 50 volunteers recommended a distance of 25 mm between the mid-pupil and the upper margin of the eyebrow, and a distance of 50 mm from the upper edge of the eyebrow to the hairline in a female, on average (Fig. 3). If the distance from the mid-pupil to the brow is less than 25 mm, then the patient may

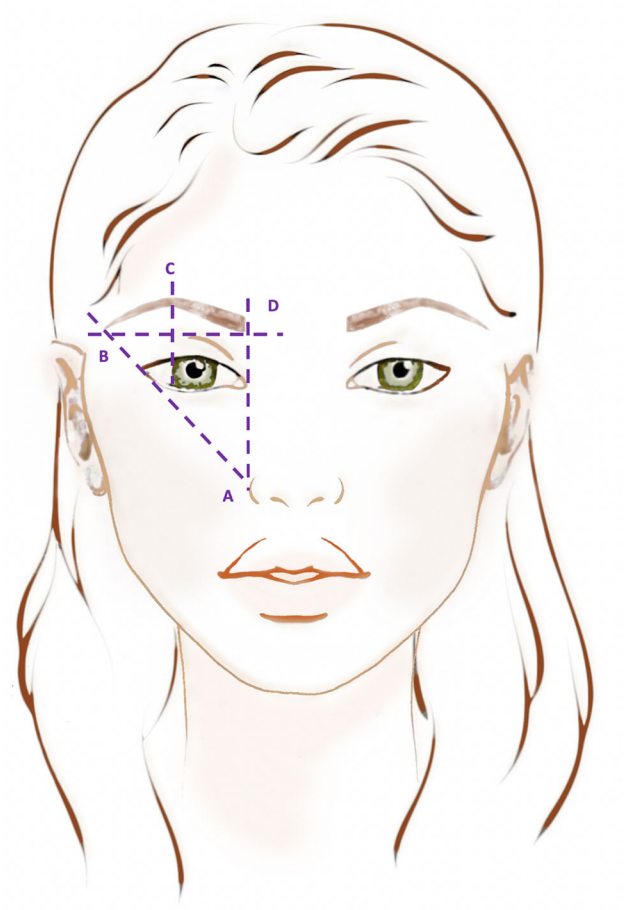

Fig. 1 The Westmore criteria for the ideal eyebrow

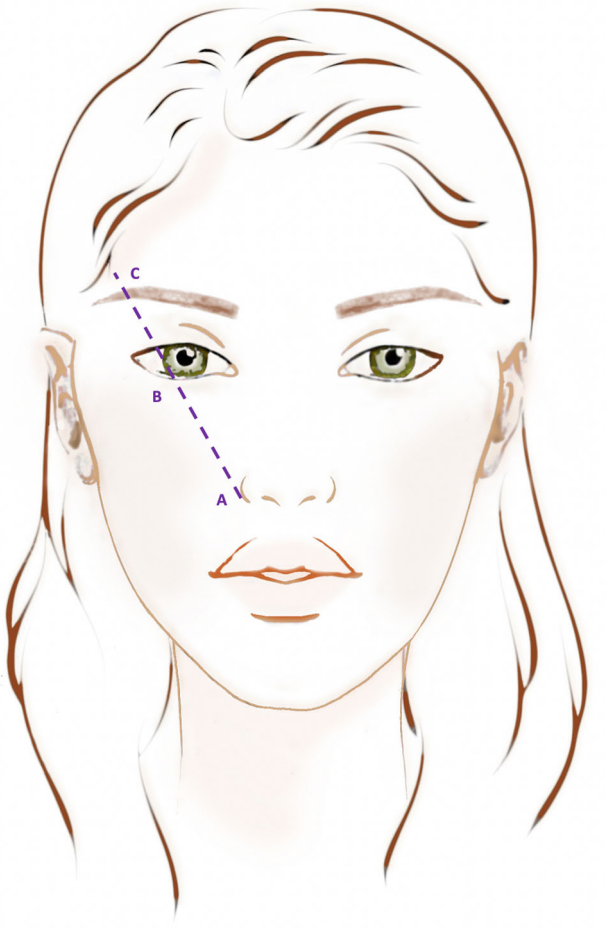

Fig. 2 Ideal brow peak (C) as described Byrd. The peak of the brow is along the line drawn from the lateral nasal ala (A) to the lateral limbus (B)

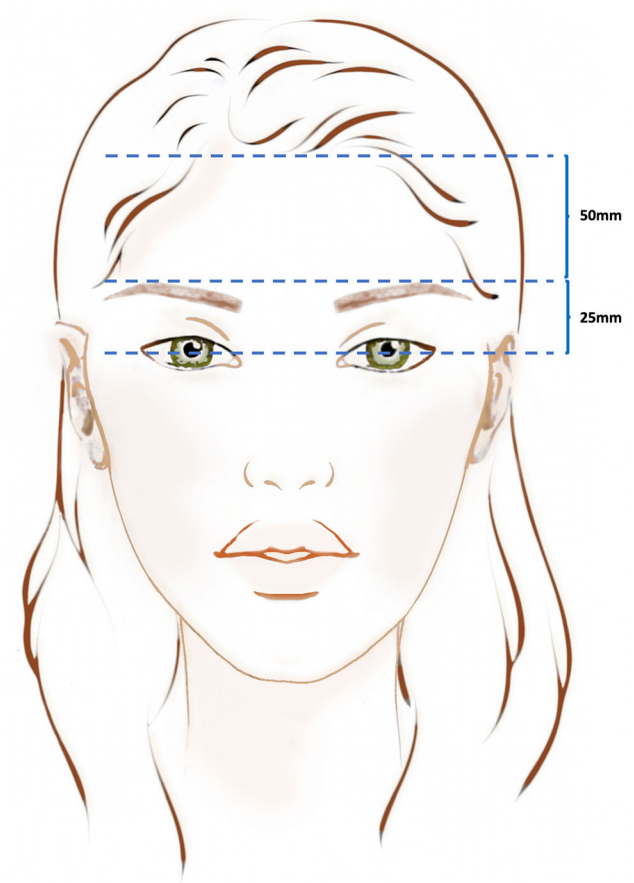

Fig. 3 Numerical guideline proposed by McKinney et al. The distance between the mid-pupil and brow should be 25 mm, and the distance between the brow and the forehead should be 50 mm

benefit from the forehead lift. These numerical guidelines were corroborated by Matarasso and Terino [12]. However, it is worth bearing in mind that all of these guidelines proposed were subjective in nature.

Other investigators felt that the eyebrow should not be evaluated on its own and should be assessed in conjunction with the peri-orbital region. Angres categorised the distance between the two medial canthi as 'close-set', 'well-spaced' and 'wide-set', and proposed that the medial brow position should alter depending on the distance between the two medial canthi. He agreed with the Westmore criteria that the medial brow should begin on the same vertical plane as the medial canthus in well-spaced eyes. However, in the case of wide-set eyes, the brow should begin medial to the medial canthus. Conversely, in close-set eyes, the brow should begin lateral to the medial canthus [13].

Baker and colleagues [14] studied the ideal brow in round, square, oval and long faces. They found that the Westmore brow was aesthetically pleasing in oval and round faces. Curved eyebrows with an arch lateral to the LL softened the angles of square faces, whereas a straighter, flatter brow suited long faces better, avoiding a high arch that adds length to the face. Biller and Kim [15] photographed four women, two each of Caucasian and Asian ethnicity of 30 and 60 years of age. Each model's image was modified digitally to create different eyebrow shapes; members of the public were asked to rate the images based on aesthetic preferences. The authors found that neither the ethnicity of the models nor the observer played a significant role in determining the idea brow position. Interestingly though, a more lateral brow peak was preferred in younger faces, whereas a more medial peak was favoured in older faces, highlighting an interaction between age and aesthetics of the ideal brow.

The Ideal Brow as Portrayed in the Media

The above studies have discussed the ideal brow from an observer's stance, either as the general public, or cosmetic surgeons. Another approach is to characterise the brows of women considered to be attractive in the media. Roth and Metzinger [16] analysed photographs of one hundred models published in fashion magazines during 2001 and compared them to one hundred and five random controls (from the general public) aged 21–61 years. In both groups, the peak of the brow was lateral to the LL, at 98% of the eye width in fashion models and 93% in controls. In models, the lateral brow ended at a more superior point than the medial brow, in contrast to the Westmore criteria. However, in the control group, the medial and lateral brow were most commonly at the same horizontal level. In models, the lateral brow ended at the alar-lateral canthal line, but ended even more laterally in the control group. Gunter and Antrobus [17] performed an in-depth evaluation of eyebrow aesthetics using popular fashion models and patients presenting to their cosmetic clinic, many of whom subsequently underwent brow lift surgery. They noted that in the cohort of patients, their brows were usually more arched, peaked more medially and terminated laterally at a lower level compared to the models. The authors stressed however, brows that looked pleasing on one individual do not necessarily looking pleasing on another. More importantly, the authors concluded that regardless of the shape and position of the eyebrow, attractive peri-orbital features were important in supporting the overall appearance of the brows. Gunter and Antrobus hence proposed the following criteria for attractive eyes:

(1) The intercanthal axis should be tilted upward from medial to lateral.
(2) The upper eyelid should cover 1–2 mm of the iris.
(3) The medial portion of the upper eyelid margin should be in a more vertical plane than the lateral margin.

(4) The upper eyelid crease should parallel the lash line, and divide the upper lid into upper two thirds and lower one third.
(5) The medial aspect of the supratarsal upper skin fold should not exceed the inner extent of the medial canthus.
(6) The lateral aspect of the supratarsal skinfold should not extend beyond the lateral orbital rim.
(7) Minimal scleral show between the iris and the lower eyelid.
(8) The lower eyelid should bow gently from medially to laterally, with the lowest point between the pupil and the LL.

Evolution of the Ideal Brow

The desirable brow appears to change over time. In a study of full-frontal photographs of models in fashion magazines published between 1946 and 2011, Griffin and Kim found there was a trend for the ideal brow peak to migrate more laterally over time from the LL to the LC. The exception was a sudden medial shift between 1966 and 1970, which corresponds to approximately when the Westmore brow was proposed (mid 1970s). Therefore, it may be that the Westmore brow reflected a preference or a trend at the time. The eyebrow height at the LC and the take-off angle have both decreased with time, albeit slightly. The mean height of the brow peak was 20–21 mm above the LC, and the mean take-off angle was between 17° and 20°. These values are fairly easy to measure, and can provide useful surgical guidance. The aforementioned study suggests that the ideal brow has been getting lower, flatter, and with a more lateral peak over time. This may not be surprising. A more dramatically arched brow with a medial peak gives a surprised yet unnatural look, that to some, can be a hallmark of cosmetic intervention. From studies of the ideal nose, it has been shown that cosmetic surgery can incite changes in beauty standards [18], and there has been a shift towards more natural appearances in the modern era [19].

Brow Ptosis and Age Affects

The aging process causes changes in the brow position and shape. A recent meta-analysis has shown that the brow height at the level of the medial canthus was higher in older than younger patients [20]. In the same study, assessment of the brow height at the level of the mid-pupillary line again showed that the brow height was higher in older patients. However, the apex point and the lateral brow end point showed significant decreases in height with age. Stabilisation or elevation of the medial brow, coupled with a fall in the apex height cause a decrease in the slope of the brow, which was particularly significant between 20–29 years and 40–49 years of age [21]. The lack of frontalis muscle fibres lateral to the temporal fusion line, with the unopposed gravity effect and the downward pull of the lateral part of the orbicularis oculi, makes the lateral brow more vulnerable to ptosis [22]. Knize also postulated that the supraorbital and supratrochlear nerves help the medial brow resist ptosis [22, 23]. Other factors that can cause brow ptosis include a lax frontalis muscle resting tone and corrugator supercilii hyperactivity acting in synergy with orbicularis oculi. A major iatrogenic cause is inappropriate administration of Botulinum Toxin Type A.

Gender Differences

The aesthetics of the upper face and the brow are also influenced by gender. The underlying facial skeleton is different in men and women. Men have greater forehead height and width. The average forehead height has been measured to be 5 cm in women and 6 cm in men [11]. In addition, men have more prominent supraorbital ridges which blend with the glabella, giving a greater glabellar projection in men [24]. The male brow tends to be thicker, heavier, and flatter. The vertical distance between the brow and the eye is less compared to females as the brow tends to lie over the supra-orbital rim with little arch [25] (Fig. 4). These subtle nuances are important to consider in facial rejuvenation treatment. It has also been speculated that time has a disproportionate effect on male and female aesthetics. Male aesthetics seem to remain relatively constant, whereas female aesthetics are much more influenced by trends [25]. However, the increasing popularity of cosmetic procedures in men may induce more trends as seen in women.

Ethnicity Differences

There are ethnic differences in eyebrow height which need to be taken into consideration. In a study of 89 African American and 75 Caucasian men and women, it was found that African American women had greater mean eyebrow height than their Caucasian counterparts across all ages; the same was true for African American men [2].

Eyebrow preference in Korean women has been investigated by several groups. One group has reported that a 1:1 height to width ratio (HWR), measured as the ratio of the vertical distance between the brow apex and the palpebral fissure to the horizontal distance between the medial and lateral canthi, was ideal, as was a take-off angle (TOA) of

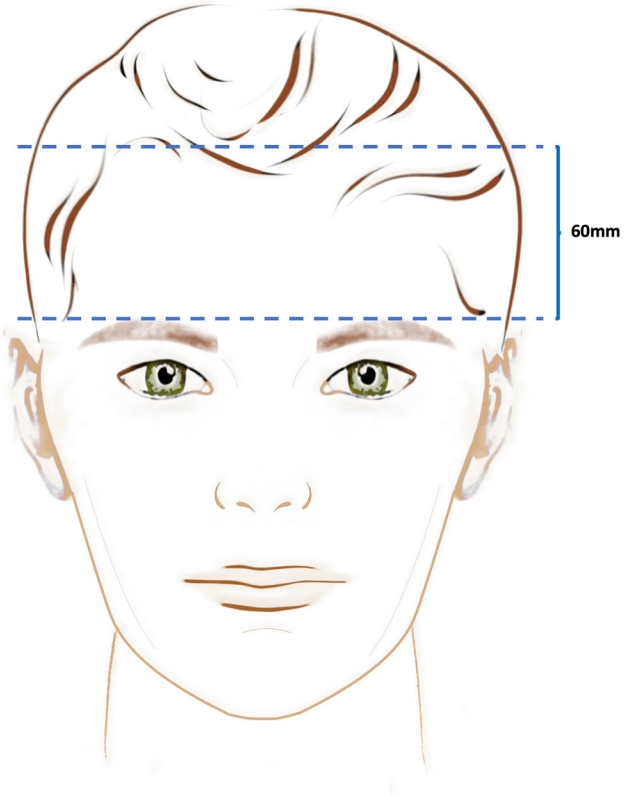

Fig. 4 The ideal male forehead and eyebrow

10° (Fig. 5). These measurements were interestingly the average HWR and TOA for Korean women in their 20 s as measured in the same study, suggesting that the ideal brow is closely linked to the concept of youth [26]. In another study amongst Koreans, both male and female visitors to a brow salon were asked to choose which brows they deemed to be ideal, young looking, healthy looking and sexy looking [27]. The ideal brow thickness was ¼ of the width of the eye at the LC among both sexes. Brow thickness of 1/3 of the eye width at the LC was considered young looking in both sexes. This was followed in preference by 1/4, corroborating other studies that the concepts of ideal are based on youth. Thick eyebrows of 1/3 of the eye width were considered the healthiest looking in women, but 1/4 was preferred in men. Lastly, thin eyebrows 1/5 of the eye width were considered the sexiest looking brow in both sexes. In that study, the order of preference for young- and healthy-looking brow thickness was identical, but different to that of sexy looking. The reason for this is not clear, as young and healthy would be assumed factors in sexual attraction. Whilst this study has not been repeated by other investigators in different ethnicity groups, it highlights and interesting concept that ideal brows could be different to what is perceived to be healthy or sexy looking.

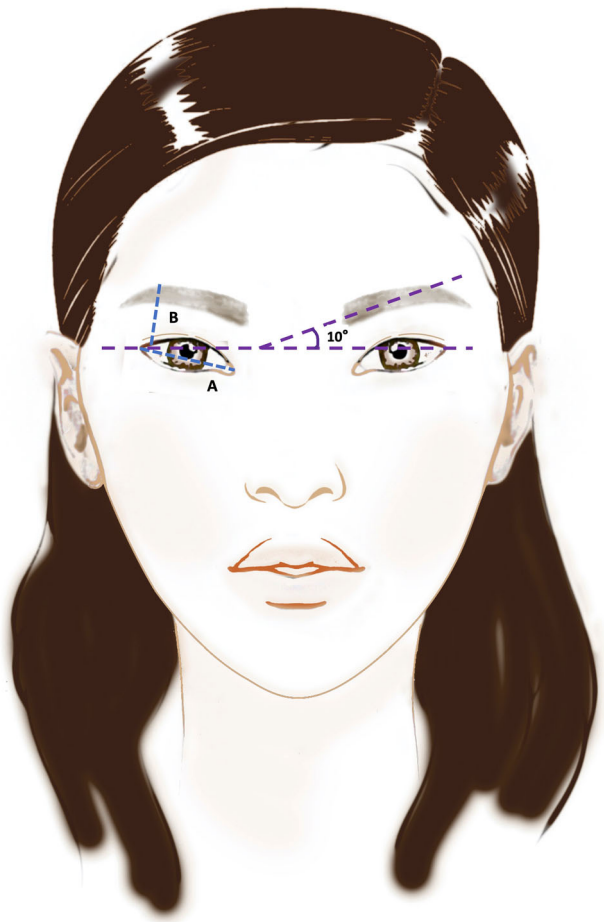

Fig. 5 The ideal Korean eyebrow with a take-off angle of 10° and a height to width ratio of 1:1. Line A extends from the medial to the lateral canthus. Line B is perpendicular to line A and extends to the highest peak of the brow. Lines A and B are equal in length. The take-off angle is measured as the angle between a horizontal line connecting the two lateral canthi and a line drawn from the medial brow to the brow peak

Pitfalls and Considerations in Brow Rejuvenation

The upper third of the face plays a vital role in facial expression. The most common mistake in surgical brow lift is over-elevation. Over-elevation with an excessively medial peak creates a permanently surprised, unintelligent look, whereas an eyebrow with a high lateral peak with little downward arch produces an angry look [28].

Men tend to have lower setting eyebrows with a less obvious arch; over-lifting in men can cause feminisation. Furthermore, the eyebrows should be considered in conjunction with the shape of the eyes and the height of the palpebral fissure. If the eyes have a significant upward slant, then the brows should have a greater TOA. Likewise, if the eyes have a downward slant, consider flatter eyebrows as 'ideal' eyebrows described above can appear excessively elevated on the face. For patients with a narrow

palpebral fissure, the height of the brow should be adjusted. Over-lifting can create a large vertical distance between the eye and the brow, making the palpebral fissure appear even smaller. This is a particular consideration in Asian patients, who tend to have narrower palpebral fissures [29].

One surgeon has noted that after subperiosteal brow lift, almost all of the brows were higher at 5 years post-operatively than they were at 1 year post-operatively, with a mean height increase of 2.5 mm [30]. This was corroborated by another group, reporting spontaneous and progressive elevation of the all sections of the brow (medial, central and lateral) [31], due to unopposed pull of the frontalis muscle. Hence, one must take into account spontaneous elevation post-surgery to avoid over-lifting. As the medial brow height remains constant or increases with age, and the lateral brow decreases in height, rejuvenation techniques should primarily focus on the lateral brow.

There should be a standardisation of how brow height should be measured for ease of future studies, as the upper and lower margins of the eyebrow are used interchangeably. The author proposes that the upper margin should be used, as women most often pluck hairs along the inferior margin in order to increase brow height, and agrees with Bruneau [32] that the intercanthal line (drawn from medial to lateral canthus of the eye) should be used as a horizontal reference, as it is a reproducible landmark and does not change with aging [33]. This is due to the strong medial canthal tendon acting as an anchor to the anterior lacrimal crest.

Proposed Criteria

Based on all the studies discussed in this review, the author proposes the following set of guidelines which can be used as a basic framework for consideration of a brow lift. The below guidelines are subjective in nature based on the current evidence in the literature:

- The medial brow should start in the same vertical plane as the medial canthus in patients with normal set eyes, which is approximately 1/5 of the width of the face according to neoclassical canons, and also equal to the distance between the two medial canthi.
- The starting point of the eyebrow should be adjusted accordingly to start more medially or laterally in wide-set and close-set eyes, respectively.

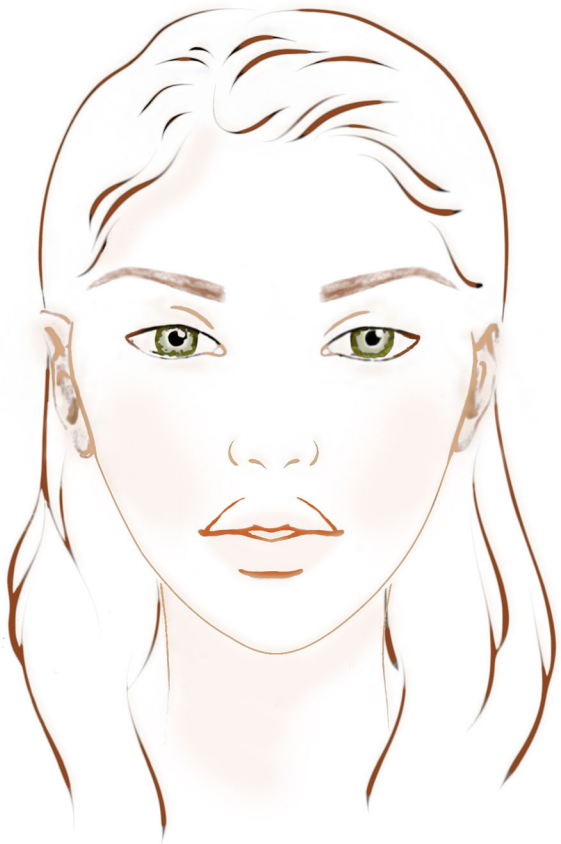

Fig. 6 Proposed ideal brow in an oval face

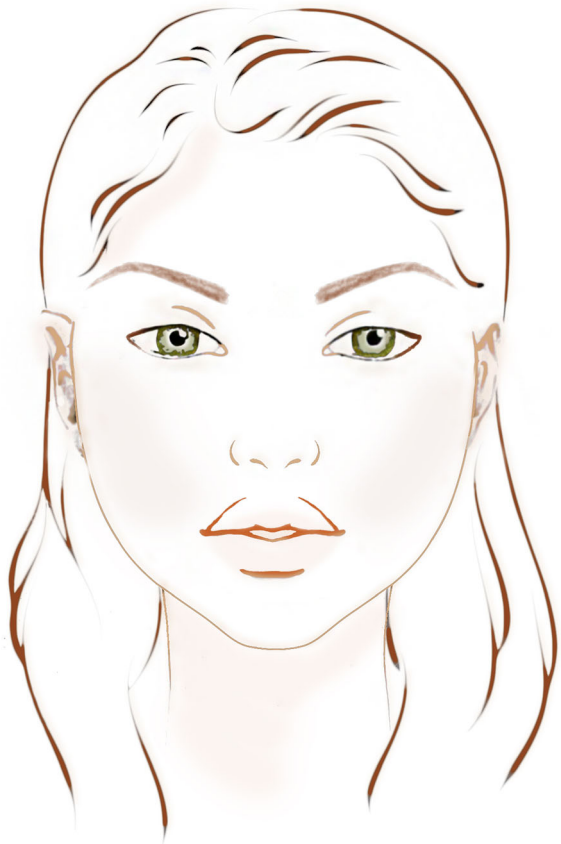

Fig. 7 Proposed ideal brow in a round face

- The brow peak should be between the LL and LC. In younger patients the peak should be directly above the LL, moving more medially with increasing age of the patient.
- The vertical distance between the upper margin of the palpebral fissure and the lower margin of the brow should be approximately equal to the height of the palpebral fissure.
- The lateral end of the brow should finish higher than the medial end.
- Male patients should have flatter eyebrows, unless they actively want more feminine looking brows.
- For patients with oval faces, the classical ideal brow works well and requires little modification (Fig. 6).
- For patients with round faces, consider a slightly more arched brow to elongate the face (Fig. 7).
- For patients with square faces, the brows should have a gentler arch, avoiding sharp angles. The lateral arch should be pointed more inferiorly to soften the angles of the face (Fig. 8).
- In patients with long faces, flatter brows with a less prominent arch avoids elongating the face even more (Fig. 9).

Conclusion

This narrative review has summarised the current evidence in the literature with regard to defining the ideal eyebrow from an aesthetic stance. Eyebrows are important in conveying facial expressions but also contribute to the overall harmony of the face. There may not be one ideal eyebrow that transcends trends and cultural influences. However, for those working in the cosmetic industry, it may be possible to have a template of a classically ideal brow, and tailor it according to the gender, age, and ethnicity of the patient. A set of guidelines has been proposed, based on the available evidence and based on the author's opinion, to help guide

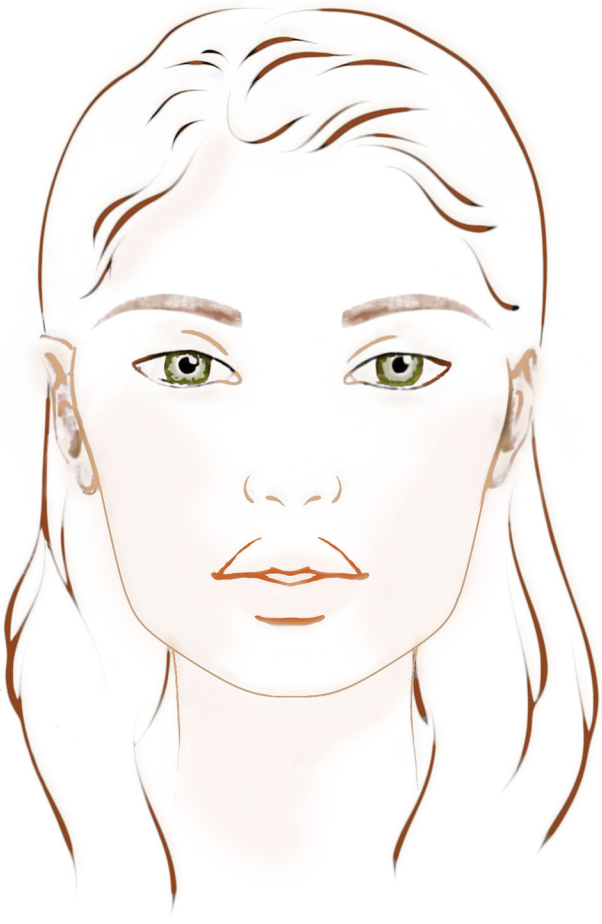

Fig. 8 Proposed ideal brow in a square face

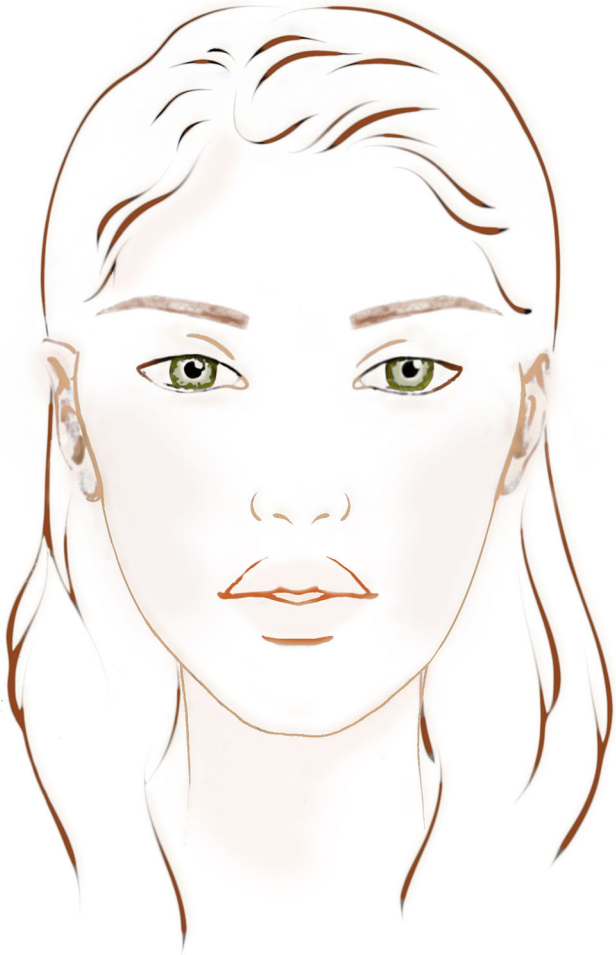

Fig. 9 Proposed ideal brow in a long face

aesthetic practitioners in the consideration of brow lift procedures.

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Author contributions AD conceptualised the article and wrote the manuscript.

Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflicts of interest to disclose.

Ethical Approval This article does not contain any studies with human participants or animals performed by any of the authors.

Informed Consent For this type of study informed consent is not required.

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