

Aging and the Indian Face: An Analytical Study of Aging in the Asian Indian Face

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Background: Asian Indians make up almost one-sixth of the world's population. Although some aspects of facial beauty are universal, anthropometric morphology and age-related changes differ in all ethnic groups. Currently, there are hardly any published studies highlighting the process of aging in Asian Indians. We wanted to understand the aging patterns in different ethnic subgroups within Asian Indians and also compare the aging patterns with Caucasians.

Method: 300 participants, above 30 years of age, were selected from different Indian ethnic groups (North, South, East, West). Recent good-quality photographs as well as those from the preceding decades (20 years and beyond) were studied. A validated grading score of 1–5 was used for assessing various aging parameters.

Results: Significant differences exist in the process of aging between Asian Indians and Caucasians. Maximum signs of aging were reported in the age group of >70 years. Earlier signs of aging (in 30–40 years) were more visible in North and East Indian ethnic groups followed by West and South Indians in decreasing order. Also, South Indians showed the least signs of aging (early as well as overall) compared to the other 3 ethnic groups in any given age range.

Conclusions: This study attempts to understand in greater detail the aging process of the Asian Indian population. This study could open up specific treatment protocols to treat this population in the fields of facial esthetics and facial cosmetic surgery. (*Plast Reconstr Surg Glob Open* 2020;8:e2580; doi: [10.1097/GOX.0000000000002580](https://doi.org/10.1097/GOX.0000000000002580); Published online 17 March 2020.)

INTRODUCTION

Aging is an ongoing process. However, aging patterns are known to be different in each race. Studying and analyzing human aging allows us to understand how to enhance and rejuvenate the aging face better.¹ Anthropometric statistics derived from geometric models of human faces assist us to understand the diversity

of aging and facial perceptions.² However, in most studies on aging and defining the parameters of “beauty,” the Caucasian face has been the prime subject of focus.

Thus, despite Asian Indians forming almost one-sixth of the world's population, no data are available on how they age. Although some aspects of facial beauty are universal, esthetic preferences vary amongst different ethnic groups and cultures. This is because of the cosmetic concerns, which differ according to variations in facial bony anatomy, morphology, and skin tones, both in relatively young age and during aging. Anthropometric features of Indians differ significantly from those of the Caucasian faces.³ Due to the absence of data and prevalence of literature from Caucasian faces, Asian Indian faces are being treated as per the norms derived from Caucasian literature on facial esthetics. However, this is not ideal, as ethnicity and regional variation significantly influence aging.⁴

India is a country of immense diversity, culture, different climatic conditions, and geographic locations. In India, regional differences exist in shape and color that

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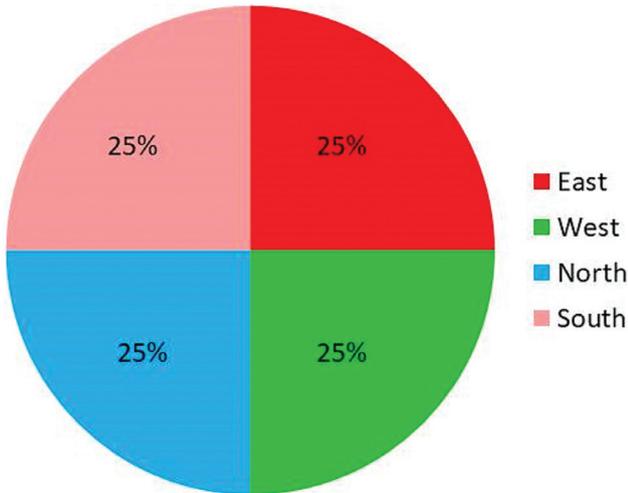


Fig. 1. Pie chart illustration on distribution of participants from different ethnicities.

vary from region to region and get exacerbated due to aging.⁴ Prasanna et al. in their study mentioned that the overall facial height of North Indians was larger than that of South Indians. Also, the facial width of South Indians is broader compared to North Indians, in both genders.⁵

Ghosh et al. also mentioned that the people from West Bengal can have broad to very broad faces.⁶

The main focus of this paper is to study aging patterns amongst various Asian Indian subgroups and to address the lacuna in the literature regarding the aging patterns of the Asian Indian face. This analysis would assist in ascertaining and redefining the various treatment algorithms for facial rejuvenation.

MATERIALS AND METHODS

Participants

This study followed the Declaration of Helsinki rules and secured Institutional Review Board approval from the ethics committee of The Esthetic Clinics, India. All N = 300 participants (75 per Asian Indian subgroup ethnicity) were above 30 years of age. Participants from different races and different locations of India (North, South, East, and West) were distributed equally in each regional group. The sample size was calculated using single population proportion formula: $n = (Z\alpha/2)^2 p(1 - p)/d^2$, by considering the following assumptions: $Z\alpha/2 = 1.96$ (standard score value for 90% confidence level), $P = 0.5$ (since there is no similar study conducted in the study setting) in India, and d (tolerated margin of error) = 5.6%. Then, finite population correction



Fig. 2. Sequential photographs of a woman from the South Indian ethnic group.

formula was applied for the study. The population size of India is 1.32 billion (2017). Finally, 50% response rate was added and the total number of suggested study participants became 267. We took a sample of 300 participants to avoid bias and error. The sample size was then divided equally amongst 4 Indian ethnic groups (75 each). Sample size was calculated by using the Raosoft software.

Both written and oral consents were recorded. Age groups ranging from 30 to 75 years (30–40, 40–50, 50–60, 60–70, and > 70), with equal numbers of men and women enrolled in each group (Fig. 1). Good-quality photographs of these individuals from the preceding decades (20 years and beyond) were studied (Figs. 2–7).

All the individuals were subjected to standardized digital photographs in frontal view, at 45 degrees and at 90 degrees. For analyzing the effects of aging on the photographs, we divided the face into upper face (trichion to nasofrontal angle), midface (naso-frontal angle to subnasale), and lower thirds (subnasale to menton). The observer (an experienced facial plastic surgeon and dermatologist) graded the severity of aging changes on a scale of 1–5, using validated grading scores of various aging parameters.⁷ The individuals in the study were shown their sequential photographs from each decade,

and they filled out a questionnaire on their perception of how they had aged.

Inclusion Criteria

Adults of more than 30 years of age of both genders and Asian Indian origin, whose photographs at different ages were available, allowing the use of their photographs in publication, were included. Only those patients who agreed to participate in the trial and signed a detailed informed consent form were included.

Exclusion Criteria

Individuals with congenital facial deformities, a history of undergoing any previous esthetic procedures at any stage in life, injections/surgery/lasers, and mixed or inter-regional Asian Indian origins were excluded from the study.

Changes in each third of the face were noted, and age-related grading of change was performed on a scale of 1–5. For assessing changes of aging, various parameters like nasolabial folds, forehead lines, crow's feet, marionette lines, and tear troughs were taken into consideration. For the same, a validated scoring, ie, Carruthers' grading scale was used.⁷ It is a 5-point grading scale (0–4) with 0 indicating no signs of aging and 4 indicating maximum aging at that age.



Fig. 3. Sequential photographs of a woman from the North Indian ethnic group.



Fig. 4. Sequential photographs of a woman from the East Indian ethnic group.

RESULTS

A significant correlation existed in all the demographic variables of the study ($P < 0.005$, covariance: 27.096). Seventy-five participants each (25%) were included from the 4 main, different ethnic regions of India (North, South, East, and West). The age of initial photographs of the participants and the final photographs taken at the commencement of the study were also significantly correlated in all the 4 ethnic groups. This demographic distribution of study participants is shown in [Table 1](#).

Effects of aging were assessed based on 12 parameters, measured by mean \pm SD and interpreted in all 4 Asian Indian ethnic groups. For all the parameters, the maximum signs of aging were reported in the age group of >70 years. The summary view of the aging changes noted in our study is presented in [Table 2](#).

Aging parameters like forehead lines (mean \pm SD: 4.02 ± 0.61), brow position (mean \pm SD: 3.84 ± 1.29), Crow's feet (mean \pm SD: 4.02 ± 0.56), tear trough deformity (mean \pm SD: 4.19 ± 1.21), nasolabial folds (mean \pm SD: 3.92 ± 1.11), marionette line (mean \pm SD: 3.95 ± 1.46), fullness of buccal pad (mean \pm SD: 2.42 ± 0.6), and jaw line at rest (mean \pm SD: 2.62 ± 0.71) were greater in North Indians, at all age groups, compared to the other 3 ethnicities.

Similarly, other parameters like dermatochalasis (mean \pm SD: 3.49 ± 1.71), lower eye lid fat bags (mean \pm SD: 3.90 ± 0.82), loss of cheek volume (mean \pm SD: 4.01 ± 0.47), and increase in neck volume (mean \pm SD: 3.72 ± 0.62) were higher in East Indians, compared to the other 3 ethnicities ([Table 4](#)).

The earliest signs of aging were seen as early as 35–40 years ([Table 3](#)). Also, aging was seen earlier in the North Indian population (in 30–40 years) followed by East Indian ethnic group, followed by West and South Indians in decreasing order. The South Indian group showed the least signs of aging (early as well as overall), compared to the other 3 ethnic groups in any given age range.

Interestingly, it was also noted that the initial signs of aging in Indians were noted much earlier than Caucasians ([Table 3](#)).

DISCUSSION

Structural facial aging is mainly caused by volumetric fat loss, skeletal resorption, and redistribution of skin and soft tissue. In younger face, superficial and deep fat is distributed evenly. With aging, fat loss and hypertrophy cause irregular topographic changes on face. These changes develop on the temples, cheek, and lateral chin. It further



Fig. 5. Sequential photographs of a woman from West Indian ethnic group (1).

gets enhanced by bone resorption of the mandible and loss of lip volume. All this contribute toward the sagging of the overlying skin, leading to variability of ethnocentric features of both facial structures and beauty.⁸

The process of aging is a combination of intrinsic and extrinsic factors. Genetics and the natural process of aging (intrinsic), along with dermatosis (extrinsic), are different and unique for each ethnic group. As per the Fitzpatrick scale, Caucasians have type I skin, but Indians are a very varied race. Skin types in Indians can range from Fitzpatrick type II to type VI skin, amongst various Indian regions. The phenotypic variations within India, based on the different geographical regions, cannot be ignored. It is very important to consider all these facts while studying the aging process, as different races age differently.^{9,10} In the current article, we studied the aging pattern in the 4 Asian Indian ethnic groups and evaluated how it differs from Caucasians (Table 3). This article also highlights the variation in the pattern of aging that exists in different parts of India based on different geographical regions.

Aging Parameters Association with Ethnicity in Indian Population

Forehead Lines

Mayes et al. carried out a comparative study which reported that women in China show more severe signs of facial aging (severe facial lines) in 30–40 years. These changes were 20 years earlier than those reported in the United States.¹¹ Similarly, in our study, we found that forehead lines occur earlier (35–40 years) (Table 3). Also, we noticed that the appearance of forehead wrinkles was more prominent in West Indian ethnicities (1.51 ± 0.79) followed by East, North, and South Indian ethnic groups (Table 4).

Dermatochalasis and Brow Positions

Lam et al. reported that the distance from the eye brows to the upper eye lid margin is greater and is more prominently seen in Caucasians than Asians.¹² Also, the supratarsal crease in Asians is smaller and more camouflaged than Caucasians. The adipose fullness, epicanthal folds, and narrow palpebral fissures seem to be the



Fig. 6. Sequential photographs of a woman from West Indian ethnic group (2).

hallmarks in distinguishing the Asian upper eyelid from the Caucasians. It has been mentioned that the high lid crease and deep palpebral sulcus that define the usual Caucasian upper lid make the Asian upper lid appear unnatural and aged.^{12,13}

Jacob LC mentioned that 16% of the Caucasian individuals started showing the signs of dermatochalasis and brow ptosis by 45–50 years of age.¹⁴ In our study, we found that the mean age of occurrence of dermatochalasis was 40–45 years (Table 3), and the earliest signs of dermatochalasis were seen in the West Indian ethnic group (1.09 ± 0.14). Interestingly, maximum dermatochalasis was noted in the East Indian ethnicities (>70 years of age) followed by the West, North, and South Indian

population (Table 5) (SDC1) (see figure, Supplemental Digital Content 1, which displays sequential photographs of a man from East Indian Ethnic group (<http://links.lww.com/PRSGO/B317>).

The earliest signs of brow ptosis in Indians were seen as early as 35–40 years (Table 3). We also found that there is difference amongst the ethnicities in brow position, with South and East Indian ethnicities showing more drooping compared to the West and North Indian population at the age of >70 years (Table 6).

Crow's Feet

Crow's feet are the wrinkles usually formed on the lateral aspect of the eyes with aging.

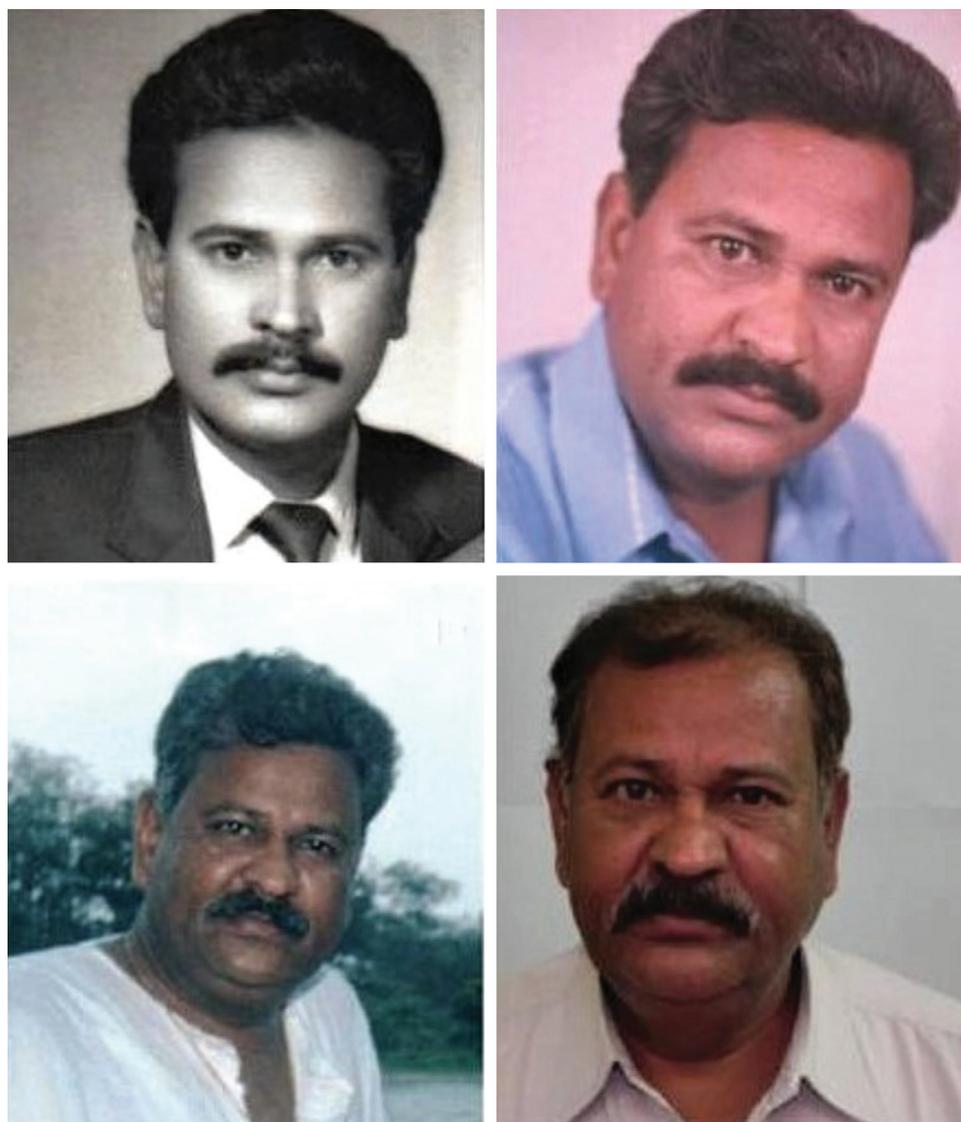


Fig. 7. Sequential photographs of a man from South Indian ethnic group.

Table 1. Demographic Data Distribution among Different Groups

Geographic Region	Participants Distribution N = 300	Age of Initial Photograph Mean \pm SD	Present Age Mean \pm SD	Covariance	One-way ANNOVA Test	
					df	Level of Significance
North	75 (25%)	27.2 \pm 3.66	51.2 \pm 3.25	27.096	03	$P < 0.005$
South	75 (25%)	26.7 \pm 6.74	52.96 \pm 6.62			
East	75 (25%)	30.2 \pm 7.26	54.96 \pm 7.43			
West	75 (25%)	28.7 \pm 4.74	56.96 \pm 5.64			

$P < 0.005$ is considered as significant

During facial expressions, persistent accordion-like contractions of the lateral orbicularis oculi muscle lead to its origin. Ptosis and laxity of the muscle also contribute to the same. Ryu et al. mentioned the mean age of development of crow's feet in Caucasians to be 50–55 years.¹⁵ However, in our study (Table 3), we found that crow's feet were noted as early as 35–40 years of age. The North Indian and West Indian ethnicities develop crow's feet wrinkles in the early 30–40 years,

earlier than the South Indian and East Indian ethnicities (Table 7).

Tear Trough Deformity

Tear trough is a 2–3 cm depression inferior to the pseudo-herniated orbital fat in the lower eyelid. Previous studies have reported a mean age range of 38–51 years for the appearance of the tear trough deformity in Caucasians.¹⁶ Other studies by Goodman et al. reported the

Table 2. Summary View of the Aging Changes Noted in Our Study

Aging Parameters	Aging Signs First Seen		Maximum Aging Seen		Minimum Aging Seen
	Decade	Ethnic Group	Decade	Ethnic Group	Ethnic Group
Forehead lines	3rd–4th	East West	>70	North	East
Loss of brow prominence	3rd–4th	North West	>70	North	East
Dermatochalasis	3rd–4th	West	>70	East	South
Crow's feet	3rd–4th	North West	>70	North	South
Tear trough deformity	3rd–4th	East West	>70	North	West
Nasolabial folds	3rd–4th	West	>70	North	South
Marionette lines	3rd–4th	North West	>70	North	South
Fat bags	3rd–4th	North West	>70	North	South
Loss of fullness of buccal fat pad	4th–5th	North	>70	North	South
Loss of cheek volume just below zygomatic arch	3rd–4th	North East West	>70	East	South
Neck volume	3rd–4th	North East West	>70	East	South
Jaw line at rest	4th–5 th	North	>70	North	South

Table 3. Mean of Initial Signs of Aging in Indians and Caucasians

Aging Parameters	Indians Mean Age (Years)	Caucasians Mean Age (Years)
Forehead lines	35–40	50–60
Loss of brow prominence	35–40	45–50
Dermatochalasis	40–45	45–50
Crow's feet	35–40	50–55
Tear trough deformity	35–40	38–51
Nasolabial folds	40–45	50–60
Marionette lines	40–45	40–50
Fat bags	40–50	40–50
Loss of fullness of buccal fat pad	30–40	40–50
Loss of cheek volume just below zygomatic arch	40–45	40–50
Neck volume	35–40	30–40
Jaw line at rest	35–40	30–40

severity of the tear troughs in Caucasians to be at its peak in the sixties.¹⁷ The tear trough defect is a very common esthetic concern in Indians, even at a young age. Indians aged 20–30 years presenting with tear trough deformity mostly requires treatment for the medial hollowness. It may occur due to aging, chronic exposure to sunlight, and

tropical temperature.¹⁷ In our study (Table 3), we found the mean age of occurrence of tear troughs to be 40–60 years, with initial signs as early as 35–40 years. North and East Indian population develop it earlier compared to the West and South Indian ethnic groups (Table 8).

Nasolabial Folds

Nasolabial folds can be attributed to the age-related facial sagging, loss of skin elasticity, and adipose tissue accumulation. Goodman et al. compared the Caucasians with the Australian ethnic group. They stated that more than 30 % of women in the study showed moderate to severe nasolabial folds in the fifth to sixth decade of life in the Caucasian group, and by the third to fourth decade in the Australian group. Also, the nasolabial folds were seen more commonly in women compared to men of the same age group.¹⁷

In Indians, men and women exhibit greater changes in the nasolabial folds compared to other Asian and Caucasians.¹⁸ In our study, the mean age for development of nasolabial fold was found to be 40–45 years (Table 3). We also found that the folds developed early in East and West Indian ethnicities compared to North and South

Table 4. Forehead Lines Grading Scale Distribution between Different Ethnicities (N = 300)

Age Range (Years)		Forehead Lines Grading Scale Distribution				
		30–40	40–50	50–60	60–70	>70
Ethnicity	N%	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
North	75 (25%)	0.83 ± 0.29	1.89 ± 0.74	2.65 ± 0.05	3.47 ± 0.75	4.02 ± 0.61
South	75 (25%)	0.54 ± 0.32	0.84 ± 0.7	2.26 ± 0.65	2.82 ± 0.94	3.85 ± 0.84
East	75 (25%)	1.05 ± 0.41	2.07 ± 0.76	2.92 ± 0.93	3.01 ± 0.62	3.20 ± 0.82
West	75 (25%)	1.51 ± 0.79	1.92 ± 0.86	2.34 ± 0.73	3.05 ± 0.53	3.96 ± 0.17

Table 5. Dermatochalasis Grading Scale Distribution between Different Ethnicities (N = 300)

Age Range (Years)		Dermatochalasis Distribution				
		30–40	40–50	50–60	60–70	>70
Ethnicity	N%	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
North	75 (25%)	0.74 ± 0.26	1.32 ± 1.56	1.84 ± 0.37	2.26 ± 0.49	3.1 ± 1.12
South	75 (25%)	0.92 ± 0.44	1.15 ± 0.64	1.92 ± 0.24	2.24 ± 0.38	2.90 ± 0.32
East	75 (25%)	0.88 ± 0.41	1.96 ± 0.33	2.46 ± 0.12	3.16 ± 0.19	3.49 ± 1.71
West	75 (25%)	1.09 ± 0.14	1.55 ± 0.78	1.74 ± 0.61	2.92 ± 0.45	3.06 ± 0.77

Table 6. Loss of Brow Prominence Grading Scale between Different Ethnicities (N = 300)

		Loss of Brow Prominence Distribution				
Age Range (Years)		30–40	40–50	50–60	60–70	>70
Ethnicity	N%	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
North	75 (25%)	1.54 ± 0.66	2.02 ± 1.76	2.97 ± 0.96	3.45 ± 1.49	3.84 ± 1.29
South	75 (25%)	0.76 ± 0.21	0.87 ± 0.74	1.6 ± 0.34	2.00 ± 0.72	2.10 ± 0.75
East	75 (25%)	0.88 ± 0.41	1.74 ± 0.36	2.04 ± 0.72	2.56 ± 1.10	1.59 ± 1.4
West	75 (25%)	1.11 ± 0.74	1.92 ± 0.63	2.54 ± 0.41	3.12 ± 1.31	3.72 ± 0.97

Table 7. Crows' Feet Static Grading Scale Distribution between Different Ethnicities (N = 300)

		Crow's Feet Static Grading Scale Distribution				
Age Range (Years)		30–40	40–50	50–60	60–70	>70
Ethnicity	N%	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
North	75 (25%)	1.54 ± 0.66	2.02 ± 1.76	2.90 ± 0.81	3.75 ± 0.96	4.02 ± 0.56
South	75 (25%)	0.56 ± 0.21	0.96 ± 0.54	1.40 ± 0.14	2.80 ± 0.72	3.10 ± 0.79
East	75 (25%)	0.88 ± 0.41	1.74 ± 0.36	2.04 ± 0.72	3.56 ± 1.10	3.72 ± 1.4
West	75 (25%)	1.11 ± 0.74	1.92 ± 0.63	2.54 ± 0.41	3.12 ± 1.31	3.87 ± 0.47

Table 8. Tear Trough Deformity Grading Scale Distribution between Different Ethnicities (N = 300)

		Tear Trough Deformity Distribution				
Age Range (Years)		30–40	40–50	50–60	60–70	>70
Ethnicity	N%	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
North	75 (25%)	0.83 ± 0.46	1.23 ± 0.42	2.54 ± 0.94	3.29 ± 0.77	4.19 ± 1.21
South	75 (25%)	0.97 ± 0.29	1.32 ± 0.45	2.89 ± 0.17	3.16 ± 2.04	3.96 ± 1.11
East	75 (25%)	1.05 ± 0.41	2.07 ± 0.76	3.54 ± 0.93	3.72 ± 0.62	3.96 ± 0.37
West	75 (25%)	1.01 ± 0.79	1.92 ± 0.86	2.34 ± 0.73	3.05 ± 0.53	3.76 ± 0.17

Indian population. Also, it was noticed that the South Indian population shows least nasolabial folds in older age group of >70 years of age (Table 9).

Marionette Lines

With advancing age, commissural skin begins to sag, causing mandibulo-labial folds. This further leads to depression around the corners of the mouth, which we often refer to as marionette lines. This gravity-dependent movement of the malar fat pads coupled with the decrease in the perioral volume as well as deepening of the nasolabial folds shapes the aging midface.¹⁹ Studies suggest that the accumulation and/or ptosis of fat particular in the nasolabial folds, jowls, buccal areas, and submental regions is more marked in Asians as compared to Caucasians of similar age group.^{20,21} Studies have also shown that more men in the United States at around the fourth decade of life complain of marionette lines creeping onto the face as compared to Asian

men of the same age group.²² Singh et al. mentioned in their study that 38% of the Indian women over 30 years showed moderately to severely pigmented marionette lines.²³

In our study also (Table 3), we found the appearance of marionette lines in 40–45 years. It was seen earliest in North Indians. These lines become significant in other ethnic groups only after the fifth to sixth decade (Table 10).

Fat Bags and Fullness of Buccal Fat

McCurdy et al. mentioned that there is a substantially lower incidence of fine wrinkles in both darker and more lightly pigmented Asians, due to the increased dermal thickness as compared to the similarly pigmented Caucasians.²¹ Recent studies by the American Society of Plastic Surgeons found that the outer corner of African Americans' eyes drops lower and at a younger age as compared to Caucasians. This can make lower lids look looser

Table 9. Nasolabial Folds Grading Scale Distribution between Different Ethnicities (N = 300)

		Nasolabial Folds Distribution				
Age Range (Years)		30–40	40–50	50–60	60–70	>70
Ethnicity	N%	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
North	75 (25%)	0.91 ± 0.76	1.73 ± 1.24	2.77 ± 0.94	3.21 ± 0.71	3.92 ± 1.11
South	75 (25%)	0.89 ± 0.33	1.51 ± 0.72	1.76 ± 0.61	1.95 ± 0.98	2.91 ± 0.19
East	75 (25%)	0.97 ± 0.44	1.94 ± 0.13	2.76 ± 0.55	2.96 ± 0.27	3.09 ± 1.41
West	75 (25%)	1.01 ± 0.79	1.92 ± 0.86	2.34 ± 0.73	3.05 ± 0.53	3.86 ± 0.17

Table 10. Marionette Line Grading Scale Distribution between Different Ethnicities (N = 300)

		Marionette Lines Distribution				
Age Range (Years)		30–40	40–50	50–60	60–70	>70
Ethnicity	N%	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
North	75 (25%)	1.46 ± 0.76	1.96 ± 1.2	2.53 ± 1.2	3.75 ± 1.36	3.95 ± 1.46
South	75 (25%)	0.54 ± 0.32	0.84 ± 0.7	0.96 ± 0.65	1.75 ± 0.94	2.45 ± 0.84
East	75 (25%)	0.97 ± 0.24	1.02 ± 0.44	1.54 ± 0.32	2.56 ± 1.75	2.96 ± 1.25
West	75 (25%)	1.24 ± 0.96	1.89 ± 0.72	2.24 ± 0.74	3.12 ± 1.94	3.87 ± 1.14

and make under-eye bags more prominent in 40 years, resulting in an older appearance.²⁴

In Asians, previous studies reported that a weaker facial skeletal framework is seen, which results in greater gravitational soft-tissue descent of the midface, malar fat pads, ptosis, and tear trough formation. It also emphasized that South Asians tend to have fuller lips and higher cheek bones with more buccal fat often giving the lower cheek a more rounded contour.²⁵

In our study, we found that the initial signs of fat bag development were noted as early as 40–50 years. However, loss of fullness of buccal fat pad was noted earlier at around 30–40 years of age (Table 3). These findings were noted earlier in East and North Indian ethnicities followed by West and South Indians. These findings become significant only after the fifth to sixth decades (Tables 11 and 12).

Loss of Cheek Volume Just below Zygomatic Arch

With aging, there is deepening of nasolabial folds, subsequent hollowing of the cheeks, and loss of malar prominence. Also, there is lengthening of the lower eyelid, increasing visibility of the orbicularis oculi muscle, along with enhancement of tear trough and formation of crescent/“V”-shaped deformity along the maxilla and zygoma. Recession of the nasal alar cheek junction is also evident, as age advances. Individual fat compartments start becoming more discernible as separate entities rather than transiting smoothly from convexities to concavities as seen in youth.²⁶

In previous studies by Farkas et al., the North American ethnic groups were compared with Afro-American population. The study revealed that the earliest age-related changes in facial proportions of Caucasians were in the cheek volume, orbital region, nasal heights, and nasal widths, and are commonly seen in the fourth to fifth decade of life.²⁴

In our study also, we noted the earliest signs of loss of cheek volume by around 40–45 years of age (Table 3). We also found that Eastern ethnicities of India showed the loss of cheek volume prominence significantly in 50–70 years of age followed by West, North, and South Indian ethnic groups (Table 13).

Jaw Line Prominence and Neck Volume

A youthful jaw line is a straight line marked from the chin to the mandibular angle. Increased soft tissue laxity, inferior migration of the jowl fat compartment, and shrinkage of the mandible cause loss of definition of the jaw line. Also, with aging, the oval face becomes squarer due to the increase in the neck volume.²⁷ In Caucasians, the earliest signs of aging in jawline begin to appear in the third decade.²⁸

However, in our study, aging signs around neck started appearing in the second half of the third decade (35–40 years) Also, a significant increase in the neck volume was noted in the fourth to fifth decade of life in the East Indian ethnic group, followed by the North, West, and East Indians. Loss of definition of jaw line becomes prominent by the fifth to sixth decade. The loss of prominence

Table 11. Fat Bags Grading Scale Distribution between Different Ethnicities (N = 300)

		Fat Bags Distribution				
Age Range (Years)		30–40	40–50	50–60	60–70	>70
Ethnicity	N%	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
North	75 (25%)	0.83 ± 0.46	1.73 ± 0.27	2.74 ± 0.61	3.29 ± 0.89	3.89 ± 1.03
South	75 (25%)	0.71 ± 0.13	1.05 ± 0.25	1.81 ± 0.33	2.11 ± 0.26	3.02 ± 0.45
East	75 (25%)	1.05 ± 0.41	2.07 ± 0.76	2.92 ± 0.93	3.61 ± 0.62	3.90 ± 0.82
West	75 (25%)	1.01 ± 0.79	1.92 ± 0.86	2.34 ± 0.73	3.05 ± 0.53	3.86 ± 0.17

Table 12. Loss of Fullness of Buccal Fat Pad Grading Scale Distribution between Different Ethnicities (N = 300)

		Loss of Fullness of Buccal Fat Pad Distribution				
Age Range (Years)		30–40	40–50	50–60	60–70	>70
Ethnicity	N%	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
North	75 (25%)	0.53 ± 0.16	1.13 ± 0.24	1.34 ± 0.72	1.79 ± 0.32	2.42 ± 0.6
South	75 (25%)	0.45 ± 0.49	0.61 ± 0.18	0.89 ± 0.78	1.15 ± 0.29	1.51 ± 0.72
East	75 (25%)	0.85 ± 0.45	0.96 ± 0.76	1.22 ± 0.93	1.61 ± 0.46	2.10 ± 0.42
West	75 (25%)	0.84 ± 0.32	0.54 ± 0.7	0.96 ± 0.65	1.75 ± 0.94	2.15 ± 0.84

Table 13. Loss of Cheek Volume Just Below Zygomatic Arch Grading Scale Distribution between Different Ethnicities (N = 300)

		Loss of Cheek Volume Just Below Zygomatic Arch Distribution				
Age Range (Years)		30–40	40–50	50–60	60–70	>70
Ethnicity	N%	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
North	75 (25%)	1.07 ± 0.82	1.83 ± 0.79	2.86 ± 0.44	3.43 ± 0.49	3.78 ± 1.96
South	75 (25%)	0.97 ± 0.23	1.02 ± 0.44	1.74 ± 0.32	2.56 ± 1.75	2.96 ± 1.21
East	75 (25%)	1.17 ± 0.94	2.97 ± 0.36	3.37 ± 0.72	3.89 ± 0.97	4.01 ± 0.47
West	75 (25%)	1.02 ± 0.49	1.87 ± 0.53	2.84 ± 0.66	3.05 ± 0.53	3.76 ± 0.42

Table 14. Neck Volume Grading Scale Distribution between Different Ethnicities (N = 300)

		Neck Volume Grading Scale Distribution				
Age Range (Years)		30–40	40–50	50–60	60–70	>70
Ethnicity	N%	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
North	75 (25%)	1.09 ± 0.46	1.92 ± 0.61	2.61 ± 0.24	2.89 ± 0.45	3.02 ± 0.67
South	75 (25%)	0.73 ± 0.14	0.98 ± 0.49	1.76 ± 0.23	2.26 ± 0.39	2.70 ± 0.16
East	75 (25%)	1.05 ± 0.41	2.07 ± 0.76	3.04 ± 0.93	3.52 ± 0.33	3.72 ± 0.62
West	75 (25%)	1.01 ± 0.79	1.22 ± 0.86	2.34 ± 0.73	3.05 ± 0.53	3.33 ± 0.62

Table 15. Jaw Line at Rest Grading Scale Distribution between Different Ethnicities (N = 300)

		Jaw Line at Rest Grading Scale Distribution				
Age Range (Years)		30–40	40–50	50–60	60–70	>70
Ethnicity	N%	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
North	75 (25%)	0.73 ± 0.26	1.23 ± 0.94	1.59 ± 0.72	1.97 ± 0.45	2.62 ± 0.71
South	75 (25%)	0.65 ± 0.13	0.81 ± 0.27	1.19 ± 0.08	1.52 ± 0.36	1.98 ± 0.64
East	75 (25%)	0.79 ± 0.45	0.96 ± 0.76	1.22 ± 0.93	1.61 ± 0.46	2.0 ± 0.62
West	75 (25%)	0.64 ± 0.32	0.84 ± 0.7	0.98 ± 0.15	1.82 ± 0.74	2.25 ± 0.94

is more significant in North Indians followed by West, East and South Indian ethnic groups (Tables 14 and 15).

Golden Ratio Comparison between Asian Indians and Caucasians

The above parameters in the current paper emphasize that the aging of the face in Asian Indian is significantly different from the aging Caucasian face. Parameters like golden ratio play an important role in understanding the process of aging. The concept of “phi” was first developed by the Greeks, where beauty was calculated with mathematical proportions in the ratio of 1:1.618.²⁹

Stephen Marquardt developed a mask using the golden ratio and claimed that beauty is universal and beautiful faces conform to the facial golden mask, regardless of sex and race. However, Marquardt’s mask is associated with numerous problems. It is ill-suited for non-European populations, including sub-Saharan Africans and East Asians.³⁰ Awosika et al. revealed in his study that these proportions are not applicable to all ethnic groups.³¹ Veerala et al. tried to fit the mask on attractive South Indian faces, but the mask did not fit exactly, showing that ethnic discrepancies cannot be ignored.³²

In recent years, cosmetic surgeons are trying to understand and modify these proportions to apply for 3 different ethnic groups, viz. Caucasians, Asians, and Africans. Quantitative measurements of anthropometric data with patients’ facial parameters before and after surgery can be useful for the further planning and assessment of plastic

and reconstructive surgery.²⁹ Our facial aging parameters can be used to design a new model and algorithm for proposing this method in the Asian Indian population.

CONCLUSION

The process of aging has been a topic of interest amongst several esthetic surgeons across the world. As beauty parameters are mostly influenced by geographical, cultural, and morphological variations, a detailed knowledge of the morphological characteristics of face and aging process of the various geographic groups is crucial. Once the pattern, process, and the areas most affected by aging are known, it is easy to formulate guidelines which suggest the ideal age and the ideal method to carry out a specific cosmetic procedure.

We were surprised to see that the Asian Indian population (as per our study) ages earlier than the reported ages in Caucasian population (in other studies). This seems counterintuitive, given the melanin content in the Asian Indian skin and counterintuitive from what we have observed in our clinical practice as well. However, we cannot really comment on how other authors have reached the conclusions they did about aging in the Caucasian population, in their papers, but we do feel that these may need to be revisited.

This article represents our pioneering work toward figuring out the aging process of Asian Indian population. It can open up a gateway for new proposals of enhancing the understanding of the current concepts and techniques in the fields of facial esthetics and facial cosmetic surgery.

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