A COMPARATIVE STUDY OF NASAL ERGONOMICS OF TWO ETHNICAL GROUPS

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ABSTRACT: The present study was undertaken to observe the midline nasal ergonomics of (Meena & Jat) above 18 years of age. Study was conducted on the subjects from two ethnic's community of Rajasthan. A random sample of people above 18 years of age was chosen for examination. Following parameters were used with the help of coordinate calipers – nasal width, nasal length, nasal height and nasal depth. Nasal index and nasal elevation index of each community were calculated. The present study reveals characteristics ethnic marker of each community and bring forth some striking features. Nasal index, and nasal elevation index both were having significant relationship ($P < 0.001$). Relationship showed a more deviated nose in Jat males than Meena males. Jat males have a significance protruded longer and more elevated nose than Meena counterpart. The widths of nose were similar and there is a greater degree of deviation of nasal bridge to right side in Jat males.

KEYWORDS: Nasion, Sub-nasale, Pronasale and Alare.

INTRODUCTION: Anthropometry is a method of estimating the length, breadth, height, depth, thickness or circumference of segments of human body [Jamison P et al, 1939]. Anthropometric studies have been found useful in craniofacial surgery, otolaryngology [Farkas 1996],

This Farkas 1996 is for otolaryngology or orthodontics. The author should clear this. Farkas is before and or after Orthodontics and in reconstruction of face from skull in medico legal cases. Facial measurements are affected by various parameters including age, sex, ethnicity, socioeconomic factors and environment. According to categorization of various facial indices was introduced by Broca in 1875.

Ergonomics is defined as a design of working system in which human being interact with machines. It is the science of fitting the workspace to the worker not the worker to workspace. By virtue of this ergonomic study the design industry can also benefit and provide better and more comfortable mask, spectacles, nasal specula, etc.

The present study was undertaken to observe the midline nasal ergonomics of [Meena and Jat] above 18 years of age and difference in nasal parameters of Meena and Jat.

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MATERIAL AND METHOD: The study was conducted on the subjects from the two ethnic communities Meena and Jat of Rajasthan. A random sample of people above 18 years of age was chosen for examination [50 Meena and 50 Jat] landmark were selected as given below.

1. Nasion
2. Sub-nasale
3. Pronasale
4. Alare

NASION: a point in the midline of naso-frontal suture and nasal route was felt by palpating index finger tip.

SUB- NASALE: it is point on the junction between the apex of the angle formed by the lower border of the nasal septum and the surface of upper lip.

PRONASALE: The most prominent point on the nasal tip indentified in lateral view.

ALARE: on the living end point of the nasal breadth, the mutual in most distant points of the ala of the nose where medial movements of both limbs of spreading caliper were arrested.

The following projective measurements (shortest distance between two points were taken with the help of co-ordinate caliper.

- Nasal breadth (NB)
- Nasal length (NL)
- Nasal height (NH)
- Nasal depth (ND)

For measurement of deviation the subject was kept in rest position with vertical orientation of facial midline. The geometric protector was used to measure the deviation of nasal bridge from midline and deviation of columella from perpendicular.

The following nasal indices were calculated for each community

Nasal index = $NB \times 100 / NH$

Nasal elevation Index = $ND \times 100 / NB$

OBSERVATION: The present study reveals characteristic ethnic marker of each community examined and brings forth some striking features.

The nasal index and nasal elevation index were both found to differ most significantly [$P < .001$] showing a more leptorrhine and elevated nose in Jat males than Meena males. The present observation shows that both nasal index and nasal elevation is equally good indicator of ethnicity.

Table 1 illustrates the division of the sample studied in two categories around the mean ,highlighting how depending on the SD and mean of the sample , strikingly different range for the groups concerned for eg. in the very narrow or hyperleptorrhine category for NIX we find Jat subjects with a range of [72.21 to 71.31] in contrast with Meena subjects with range [78.79 to 80.12] in the very same category. Hence, categorization magnifies and illustrates that the two groups are different. Again a

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subject with a value of (75.71) for nasal increase would, according to table 3 be classified wide nosed if he is a Jat but narrow nosed if a Meena subject.

A significant finding emerging from analysis of nasal bridge and columella deviation illustrated in table 4 is the greater degree of deviation of nasal bridge to the right side in Jat males.

TABLE NO. 1 Sample size

	Number of subjects	Average age in years
Jat male	50	(18 -25)
Meena male	50	(18- 25)

TABLE NO. 2 Nasal parameters of Rajasthan (Meena & Jat)

Nasal parameters	Ethnic group	Mean CM	S.D.	Mean +2SD	Mean -2SD	P value
Nasal breadth (NB)	Jat	3.53	0.48	3.626	3.43	>0.05
	Meena	3.66	0.115	3.89	3.40	
Nasal Height (NH)	Jat	4.73	0.144	5.018	4.4	<0.001
	Meena	4.36	0.209	4.778	3.94	
Nasal length (NL)	Jat	4.88	0.172	5.224	4.5	<0.001
	Meena	4.44	0.096	4.632	4.2	
Nasal deviation (ND)	Jat	1.61	0.030	1.67	1.55	<0.001
	Meena	1.52	0.144	1.80	1.23	
Nasal index (NI)	Jat	74.61	2.20	79.01	70.21	<0.001
	Meena	83.91	2.56	89.03	78.79	
Nasal elevation index (NEI)	Jat	45.78	0.953	47.68	43.87	<0.001
	Meena	41.44	3.51	48.46	34.42	

TABLE 3 Nasal index category

Ethnic group	Sex	Mean	SD	Very narrow hyperleptorrhin -2SD to -1.5 SD	Narrow Leptorrhin 1.5 SD to -0.5 SD	Medium Mesorrhin 5 SD to +0.5 SD	Wide Chamaerrhin +5 SD to +1.5 SD	Very Wide Hyperchamaerrhin +1.5 SD to 2SD
Jat	M	74.61	2.2	70.21- 71.31	77.31- 73.51	73.51- 75.71	75.71- 77.91	77.91- 79.01
Meena	M	83.91	2.56	78.79- 80.12	80.12- 82.63	82.63- 85.19	85.19- 87.75	87.75- 89.03

THE AUTHOR SHOULD EXPLAIN THE MEANING OF HYPERLEPTORRHIN, LEPTORRHIN, MESORRHIN, CHAMAERRHIN AND HYPERCHAMAERRHIN.

HYPERLEPTORRHIN: having a very long narrow nose,

LEPTORRHIN: long narrow nose

MESORRHIN: having a moderately broad and high-bridged nose,

CHAMAERRHIN: broad nose,

HYPERCHAMAERRHIN: very broad nose.

TABLE 4 Nasal Bridge and Columella deviations found in Jat and Meena Males with P values of comparison

Nasal parameters	n(%)	R>L p	deg.	P	n(%)	L>R	deg.	P	n(%)	p
Nasal Bridge										
Jat	11(22)	J v/s M	3.9	J v/s M	3(6)	J v/s M	3.66	J v/s M	14(28)	J v/s M
Meena	6(12)	>0.05	2.5	<0.05	3(6)	>0.05	4.00	>0.05	9(18)	>0.05
Columella										
Jat	1(2)	J v/s M	2	J v/s M	5(10)	J v/s M	3.00	J v/s M	6(12)	J v/s M
Meena	3(6)	>0.05	0.81	>0.05	0(0)	>0.05	0.00	>0.05	3(6)	>0.05

R: Right, L: Left, deg: Degree of deviation , n: number, M: Meena , J: Jat

DISCUSSIONS: Gloria Staka et al in 2011 studied the Nasal Index of Kosouo Albamian population, value of Nasal Index for Male Kosovo Albamian was 67.06 and for female it was calculated as 63.87.

Oladiipo G. S. Eroje M.A. et al in 2009 observed the value of nasal index of Andoni and Okrita tribes of River state, Nigeria. They observed the NI of Andoni male and female as 79.83 and 83.77 while NI of Okrita male and female as 86.23 AND 86.46 respectively. Mean value of nasal index of Okrita Tribe was significantly higher than mean value of NI of Andoni population, $p < 0.005$.

In our study the mean nasal breadth of Jat and Meena males are 3.53 and 3.66 cm respectively showing the p value as $P > 0.05$. Uzam A, Bilgic S et al in 2006 observed the nasal anthropometric measurements in young Turkish males and observed nasal length and nasal bridge length; it was calculated as 56.92 and 55.26 mm respectively. Mean value observed for nasal breadth was 33.63mm.

N. V. Emelike, S.M. Garva et al in 2012 established anthropometric values for lip nose complex of Igbo males and females in Maiduguri, Male subject presented the value of nasal width and height higher than females, showing the significant relationship, $p < 0.05$.

Bae TH, YGY, Kimws, Kimtik et al in 2009 observed the nasal anthropometry of Koreans. Mean calculated value of breadth of nose for males was 37.63mm and for females it was 34.77mm.

Omotose, DR, Oludrian O et al in 2011 evaluated the nasal anthropometry of adult bini tribe in Nigeria. The calculated nasal breadth for male and female was 4.64cm and 4.42cm.

In our study the calculated mean nasal height for Jat and Meena males is 4.73 and 4.36 cm. P value is $p < 0.001$ showing significant relationship. Otutu et al in 2009 observed the nasal indices and bialar angle of Ibo and yourba ethnic group of Nigeria. The observed mean value of nasal height for male and female was 4.87cm and 4.40 cm respectively. Bae TH, YG Y, Kim WS, in 2009 observed the anthropometric study of nose in Koreans and calculated mean value of height of nose as 60.50mm and 59.14mm for male and female respectively.

Calculated mean value for nasal length for Jat and Meena males in our study is 4.88 and 4.44 cm respectively in our study. P value is $< .001$, shows significant relationship. Battacharya S, Jha N et al in 2009 observed the anthropometric relationship of Rai and limbo ethnic group showing the significant relationship, having the p value $< .001$. Oladiipo G.S. et al in 2009 studied the anthropometric study of facial and nasal aspect of adult Igbo ethnic group of Nigeria and calculated the nasal length for igbo males as 4.87cm and for females it was 4.40 cm.

By virtue of this ergonomic study the design industry can also benefit and provide better and more comfortable mask, spectacles, nasal specula etc.

In our present study the mean value for nasal deviation of nose for Jat and Meena males is 1.61 and 1.52 cm, highlighting that Meena male nose is to be less narrow, less elevated and less deviated than jat males.

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Mean Values of Nasal Index & Nasal Elevation Index In Male subjects of Meena & Jat

Meena values of Nasal Parameters of Meena & Jat