

## Establishing Downs Cephalometric Norms among the South Indian Population: A Cross-Sectional Study

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### ABSTRACT

**Aim:** Focus to study the normal dento-facial relationship of south Indian population with the aid of Downs Cephalometric analysis.

**Materials And Method:** The present study comprised samples of lateral cephalograms taken in natural head position of Total of 30 participants, with 15 males and 15 female candidates. Each cephalograms was traced, analyzed and interpreted using the landmarks and values given in Down's analysis. The student's t test, standard deviation and mean deviation were calculated to compare between two groups.

**Results:** The present study showed a Persuading result, that majority of the south Indian population have a class 1 skeletal pattern with Angle of convexity 2.19°. With Angle of convexity mean value among females 2.24 and among male 2.14. The study also highlights that Mandibular plane angle 21.05° indication horizontal growth. The south Indian population also manifest Proclined incisors with Inter incisal angle of about 116.04° and flatter occlusal plain

**Conclusion:** Mild significant differences were found between South Indian men and women when compared with Caucasians parameters. The study concludes that different set of cephalometric norms for different ethnic groups should be formulated so as to guide the orthodontist and surgeon to optimize the treatment plan based on local norms.

**Key Words:** Cephalometric norms, Down's analysis, South Indian, Ethnic norms, Racial groups, Indian population.

### INTRODUCTION

Cephalometry merely means "head measuring". The cephalometric analysis is the study of dental and skeletal relationships of the head. With the aid of cephalometric, absolute measurements, both linear and angular are obtained. However, There are three controlling factors in cephalometrics which is 1) The patient's position, 2) The film, and 3) The position of x-ray tube, they render important difference from conventional x-ray techniques. [1] Moreover, Various studies that have been conducted during the past year derive standard values of human facial measurements. These standard measurements values are exploited to measure the craniofacial dimensions, assessment of facial deformities and to monitor the postoperative results.

The University of Illinois used the skeletal and facial proportions of a reference group which consists of twenty-five untreated white adolescents and developed the down's cephalometric analysis, which became popularized after World War II. [2] According to Downs, the norms presented in the down's analysis are predominantly favouring the Caucasian population. Which are used only as guides and not as absolute values for every patient. [3] Even though various Studies have been conducted of the cephalometric norms in Indian population majority are with the Burstone's Analysis. The down's cephalometric norms among the south Indian population are concealed.

Although there are wide norms available, it is not mandatory that all the ethnic groups fall under the same norms. Hence the current study was undertaken to develop cephalometric norms of the south Indian population using Down's cephalometric landmarks, dental and skeletal measurements.

## MATERIAL AND METHOD

The study was conducted with a total sample 30, in which 15 were female subjects and 15 were male subjects belonging to south india. The subjects fell into the age group between 18 and 25 years. A lateral cephalogram in occlusion were recorded. While talking the radiographs the patients were advised to occluded the teeth and not forcefully close the lips. After each cephalogram was obtained they were traced with lead acetate sheets using an extra

smooth finish HB pencil with a diameter of 0.3 mm. Inorder to minimize errors, the films were traced manually twice by operator to minimize observer's error. Two other observers also traced each cephalogram in order to assess any error.

The inclusion criteria are as follows:

1. Class I molar and canine relationship
2. Straight facial profile
3. No previous history of orthodontic and prosthodontic treatment
4. No crowding
5. No rotations
6. Well aligned arches
7. Ideal overjet and overbite

The exclusion criteria:

1. Class II molar relation
2. Class III molar relation
3. Any missing teeth
4. Increased overjet and overbite

## RESULT

The results for down's analysis norms in male and female south indian population is tabulated separately in Table 1 and Table 2.

**Table 1: Down's Cephalometric value for South Indian men population.**

S.NO	PARAMETERS	MEAN VALUE	STANDARD DEVIATION	P VALUE
1.	FACIAL ANGLE	90.15	3.25	0.06
2.	ANGLE OF CONVEXITY	2.14	0.33	0.43
3.	MPA	21.63	2.47	0.23
4.	AB PLANE	3.90	0.44	0.45
5.	Y- AXIS	54.77	3.31	0.30
6.	CANT OF OCCLUSION	3.91	0.40	0.79
7.	INTER INCISAL ANGLE	115.40	6.09	0.54

**Table 2: Down's Cephalometric value for South Indian women population.**

S.NO	PARAMETERS	MEAN VALUE	STANDARD DEVIATION	P VALUE
1.	FACIAL ANGLE	91.92	3.25	0.06
2.	ANGLE OF CONVEXITY	2.24	0.33	0.43
3.	MPA	20.47	2.47	0.23
4.	AB PLANE	3.78	0.44	0.45
5.	Y- AXIS	53.55	3.31	0.30
6.	CANT OF OCCLUSION	3.95	0.40	0.79
7.	INTER INCISAL ANGLE	116.68	6.09	0.54

According to the readings, the south Indian population has a class 1 skeletal pattern, prominent chin, horizontal growth pattern, Proclined incisors and flatter occlusal plain when compared to Caucasian population. The comparison of both the population is given in Table 3. The Wiggle diagram for south Indian population has been shown in figure 1.

**Table 3: Average Value of Down's Cephalometric value, among South Indian Population and Caucasians Population.**

S.NO	PARAMETERS	AVERAGE VALUE SOUTH INDIAN POPULATION	AVERAGE VALUE CAUSASIAN POPULATION
1.	Facial angle	91.03°	87.8°
2.	Angle of convexity	2.19°	0°
3.	Mandibular plane angle	21.05°	21.9°
4.	AB plane angle	-3.84°	-4.6°
5.	Y- Axis	54.16°	59.4°
6.	Cant of occlusion	3.93°	9.3°
7.	Inter incisal angle	116.04°	135.4°

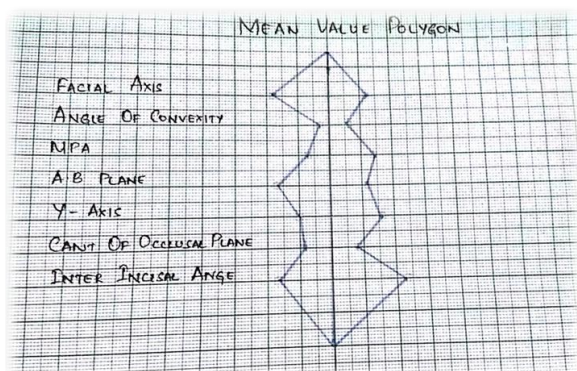


Figure -1; The Wiggle diagram for south Indian population.

## DISCUSSION

The current study was carried out to determine down's cephalometric norms among the south Indian population. The ranges of most of the dimensions were significantly different from the Caucasian population, with mild degree of different within the male and female south Indian population.

Facial Angle is ideally used in down's to measure the degree of retrusion and protrusion of the lower jaw. The magnitude of this angle increases with prominent chin. In the current study the mean facial angle in the current is 91.03 which indicate a prominent chin. Where is study by Kharbanda (1991) [4] among north Indian population it is about mean = 84.09 which indicates retruded chin. With similar results from study by Roy [5] among the Keralites mean = 85. With huge variation in study conducted by Park et al [6] in 1989 which shows a mean of  $89.1 \pm 2.4$ .

Angle of convexity, a positive angle suggests prominence of the maxillary denture base relative to the mandible where as a negative suggest a prognathic profile. The Caucasians have norm of 0 degree where as in the current study the south Indian population have  $+ 2.19^\circ$  which suggest prognathic profile.

The mandibular plane angle in the current study has a mean degree of  $21.05^\circ$  which is suggestive of horizontal growing patient. Where as in the caussian population the mean value is 21.9. However, in study my Karbanda 1991 [4] states North Indian

population to be vertical growers with mean degree of 24.22. A study south Indians among Keralities by Roy [5] also suggest a horizontal growing by 26.7 degree.

Intercisal angle degree shows proclination of the incisors indicates that in the current study among the south Indian, they have proclined incisors with  $116.04^\circ$  in comparison with Caucasian population.  $135.4^\circ$ . The north Indian population also shows some degree of proclination [4] with  $128^\circ$  but however the value is les with compare to the present study.

The cant of occlusion in the present study ( $3.93^\circ$ ) is less when compared to the Caucasian population ( $9.3^\circ$ ). Similar to the study by Park et al when south Indian Keralites population also shows a decreased value of  $7.1^\circ$ . However the value is more when compared to the north Indian population which is about  $11^\circ$ .

## CONCLUSION

The current study concludes that majority of the south Indian population have a class 1 skeletal pattern with proclined incisors and horizontal growing. Although there are few literature in concern with the cephalometric norms, No specific Standardization are yet available. Further studies are to be carried out in order to improve the treatment planning approach for both Orthodontist and for Oral Surgeons.

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