

PAKISTANI MEAN CEPHALOMETRIC SOFT TISSUE VALUES AS DESCRIBED BY HOLDAWAY ANALYSIS

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ABSTRACT:

Objective: Soft tissue values in Pakistani population as described by Holdaway analysis

Material and Method: Lateral cephalometric radiographs for 92 adults with normal occlusion were used.

Result: Soft tissue values of Pakistani population as calculated from this research is same as Holdaway norms except in the skeletal profile which is greater indicating a more convex profile.

Discussion: The changes that occur in the soft-tissue profile during orthodontic treatment have played a significant role in the diagnosis and treatment planning process. Norms and mean values of different ethnic groups according to geographic location of people is different in different parts of the world

Conclusion: Pakistani mean cephalometric soft tissue values as described by Holdaway analysis is same in many values but there is a difference present in skeletal profile convexity, H angle, basic upper lip thickness, and soft tissue chin thickness. These values should be kept in mind in treating orthodontic patients in Pakistan

Key words: Pakistani mean cephalometric soft tissue values



INTRODUCTION:

Goal of Cephalometric Analysis To evaluate the relationships, both horizontally & vertically, of the five major components of face.^[3] the cranium & cranial base the skeletal maxillae . The skeletal mandible, the maxillary dentition and alveolar process. The mandibular dentition and alveolar process i.e. to estimate the relationships, vertically & horizontally, of the jaws to the cranial base & to each other & the relationship of the teeth to their surrounding bone.

Facial balance is determined by the facial skeleton and its soft tissue. Most studies were routinely used to evaluate the position of the teeth in relation to the skeletal components However, sporadic

attempts were made to include an element of soft tissue profile assessment, such as Ricketts aesthetic plane,^[8] Holdaway analysis,^[4] and Burstone's soft tissue analysis.^[3]

Aesthetics has become ever increasingly important during the last decade. Recently, the field of orthodontics has experienced a shift to focus more on aesthetics, with specific emphasis on soft tissues around the mouth. Evaluation of facial aesthetics is considered to be subjective, because balance and harmony of facial components do not necessarily mean an attractive face.

Dental: Holdaway ratio⁴ (LI-NB/Pg-NB) A measurement introduced by R. A.

Holdaway; to evaluate the relative prominence of the mandibular incisors, as compared to the size of the bony chin. It is calculated as the ratio of the linear distance from the labial surface of the mandibular central incisor to the NB line, over the linear distance of the chin to the same line. If ratio is 2:1 it means that lower incisors are more proclined as compared to chin prominence. If discrepancy is 2mm=acceptable 3mm=less desirable 4mm=correction indicated its importance lies in teeth extraction & genioplasty of the chin. Any discrepancy in the ratio indicates either dental proclination or chin protrusiveness / retrusiveness. If extraction is indicated thick lips move half the value of teeth (50:100) , while thin lips move the same value as teeth

Holdaway^[4] emphasized that “understanding how important is the psychological development of young persons and how their social development is related to attractiveness and favourable self-image, it is imperative that we take very seriously the matter of giving our patients the best possible balance . Several attempts have been made to investigate the differences in the faces of various ethnic groups including Caucasian, Mexican American, Chinese, Japanese, Korean, Puerto Rican, and Turkish.

The purposes of this study were (1) to study soft tissue facial profile for Pakistani adults using the Holdaway analysis, (2) to compare Pakistani soft tissue values with Holdaway norms,

MATERIALS AND METHODS:

Lateral cephalometric radiographs were taken from 92 non growing Pakistani adults (60 women and 32 men). The average age of the women was 20 years, with a standard deviation of 0.5 year, and for the men 22 years with a standard deviation of 0.8 year. All subjects were selected from the dental students of DOW University of Health Sciences on the basis of the following criteria:

- a. Pakistani native
- b. Balanced facial profiles with competent lips
- c. Class I occlusion with minimum or no crowding.
- d. Normal overjet and overbite.
- e. No history of previous orthodontic treatment.

All cephalometric radiographs were taken with the lips in light contact and teeth in centric occlusion. Tracings of the radiographs were made on 8” × 10” 0.003” matte acetate sheets. All cephalometric radiographs were traced by hand by a single author to avoid interobserver variability, and were reviewed by other authors for accurate landmark identification. All measurements were taken to the nearest 0.5 mm.

The landmarks were located according to the definitions of Holdaway.

Descriptive statistics (mean and standard deviation) were calculated using the SPSS program version 16. The results were tabulated and compared with Holdaway norms.

RESULTS:

| | Holdaway Norms | Mean | SD |
|-------------------------------------|--------------------|--------------|-------------|
| Soft tissue facial angle, degrees | 91 ± 7 | 90.24 | 2.88 |
| Nose prominence, mm | 14 to 24 | 15.42 | 3.54 |
| Upper lip sulcus depth, mm | 3 (1 to 4) | 3.11 | 1.15 |
| Soft tissue subnasale to H line, mm | 5 ± 2 | 6.42 | 2.00 |
| Skeletal profile convexity, mm | 0 | 5.55 | 2.07 |
| Basic upper lip thickness, mm | 15 | 13.78 | 2.44 |
| Upper lip thickness, mm | 13 to 14 | 10.89 | 2.92 |
| H angle, mm | 10 (7 to 14) | 16.33 | 4.21 |
| Lower lip to H line, mm | 0 to 0.5 (-1 to 2) | 1.5 | 1.75 |
| Inferior sulcus to H line mm | No norms | 4.65 | 2.28 |
| Soft tissue chin thickness, mm | 10 to 12 | 10.77 | 4.34 |

Soft tissue values of Pakistani population as calculated from this research is same as Holdaway norms except in the skeletal profile indicating a more convex profile.

DISCUSSION:

Cephalometry is broadly defined as the science of measuring the head of living individuals, although in clinical practice it refers to the analysis of facial form done on a cephalogram. Cephalograms are plain radiographs of the face and cranium taken at a constant distance from the subject with the subject's head stabilized in a cephalostat. The cephalograms can be obtained in the lateral and frontal views. While many different cephalometric analyses have been developed for the lateral view, a few have been developed for the frontal view. They have been used to study facial growth and development, to study deformities, to plan orthodontic

treatment and surgeries, and to evaluate treatment outcomes

A given cephalometric analysis is composed of a series of measurements designed to measure the different geometric parameters of the distinct facial units. Four basic parameters can be measured. They are: size, shape, position and orientation.

Broadbent's introduction of the cephalometer in 1931 began a new period in orthodontics. More stable relationships among teeth, jaws, face, and head structures and more successful treatment were deemed possible. Since then, cephalometric analyses have been used to determine relationships in the dentofacial complex. Cephalograms also can help the orthodontist determine the changes that are associated with growth or orthodontic treatment (or both).

The study of beauty and harmony of the facial profile has been central to the

practice of orthodontics from its earliest days⁵. Because treatment mechanics are becoming more effective, there has been an increased emphasis on the soft tissues, both in diagnostic and treatment results. Holdaway, Spradley et al, Bell et al, Owen, and Park and Burstone are among the many who stress the importance of soft tissues in their diagnoses.

The changes that occur in the soft-tissue profile during orthodontic treatment have played a significant role in the diagnosis and treatment planning process. Although, orthodontists have long recognized that the extraction of premolars often is accompanied by changes in the soft-tissue profile, investigations indicate that the soft tissue does not always respond favorably to hard-tissue retraction.

Lip structure seems to have an influence on lip response to incisor retraction. Oliver found that patients with thin lips or a high lip strain displayed a significant correlation between incisor retraction and lip

retraction, whereas patients with thick lips or low lip strain displayed no such correlation. In addition, Wisth found that lip response, as a proportion of incisor retraction, decreased as the amount of incisor retraction increased. This seems to indicate that the lips have some inherent support.

Several line analyses have been suggested for evaluating lip posture and the esthetic quality of the profile. Rickett's "E" line, is influenced a great deal by the growth of the nose, Steiner's "S" line eliminates half the change in integumental profile due to the growth of the nose, whereas Holdaway's "H" line has the advantage of removing the influence of nasal growth in the evaluation of lip posture.

CONCLUSION:

Pakistani adults have the same values of Holdaway soft tissue norms except for the skeletal profile convexity, H angle, basic upper lip thickness, and soft tissue chin thickness.

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