SKELETAL FEATURES OF ANTERIOR OPEN BITE: A CROSSSECTIONAL STUDY

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ABSTRACT

The objective of this study was to find out the skeletal features of Anterior Open Bite (AOB) by cephalometric analysis. This cross sectional study was conducted at Department of Orthodontics, de, Montmorency College of Dentistry, Lahore in which records of fifty untreated AOB patient with age range of 15 to 25 (23 Males, 27 Females) were included and patients were considered as having skeletal AOB when SN-MP angle was ≥ 32.5 degree. The results showed significantly increased values of linear and angular measurements. It was concluded that open bite malocclusion is largely due to the changes in the skeletal pattern.

Key Words: Anterior open bite; Skeletal; SN-MP.

INTRODUCTION

Anterior open bite (AOB) is an absence of vertical overlapping between upper and lower anterior teeth when the teeth are in centric occlusion.1 There are various causes of this malocclusion, including thumb sucking, tongue thrusting, temporal joint involvement, and amelogenesis imperfecta.2,3 Link between cervical vertebral column morphology and craniofacial posture in cause of AOB is already proven.4 Different treatment methods to correct AOB have been reported.5-10 Another term used in describing AOB is apertognathia.11 Open Bite malocclusion is classified as dental or skeletal, anterior or posterior and unilateral or bilateral. It may classify as simple or complex.12 The implication of an AOB irrespective of its cause include aesthetic issues, speech and phonetic issues, lingual interposition during deglutition and difficulty in biting from front teeth.13,14 Severity grades of AOB are: Moderate (0-2 mm), Severe (3-4 mm) and Extreme (more than 4 mm).15

The craniofacial morphology of orthodontic patients with skeletal AOB is characterized by vertical disproportions in vertical plane caused by imbalance between anterior and posterior facial heights (AFH/PFH) and between upper and lower anterior facial heights (UAFH/LAFH). A decreased size of ramus, increased mandibular plane, large LAFH and a steep gonial angle are key features of high vertical skeletal pattern.

Cephalometric standards are available for different AOB samples.16-20 Very few reported attempts have so far been made to study skeletal characteristics of AOB individuals in Pakistani population; therefore objective of this study was to evaluate the morphologic characteristics of skeletal open bite in Pakistani orthodontic patients and to establish population norms of facial patterns for AOB sample.

METHODOLOGY

This study was conducted after taking informed consent from patients and institutional approval at the Department of Orthodontics, de, Montmorency College of Dentistry, Lahore. Fifty Cephalometric radiographs of untreated AOB patients (23 males, 27 females) who visited department of Orthodontics, during May 2016 to May 2017 were included.

Inclusion Criteria: All teeth present except wisdoms, patients with AOB as evident on clinical examination (Fig 1). Good quality Pre-treatment records. Age Range: 15-25 years.
Exclusion Criteria: Craniofacial syndromes, history of trauma and any systemic or metabolic disease.

The cephalometric radiographs of the study sample were traced on .003 inches thick and 8 by 10 inch acetate paper with 4h lead pencil. Cephalometric landmarks used were identified and reference planes were drawn on tracing of lateral cephalogram. Linear and angular measurements were recorded for individual patients. The amount of AOB was confirmed by measuring interincisal distance with standardized digital vernier callipers on plaster models. Dental history sheets were used to rule out any systemic disease and history of dental trauma.

Following skeletal linear measurements/Angular measurements were taken (Fig 2).

Posterior face height: Sella to gonion.
Anterior face height: Nasion to menton.
Upper face height: Nasion to Anterior nasal spine.
Lower face height: Anterior nasal spine to menton.
SN-MP: Angle formed by the sella nasion line and mandibular plane.
Gonial Angle: Angle formed by the posterior border of ramus of mandible (Ramal plane) and the mandibular plane.
SN-PP: Angle formed by the sella nasion line and palatal plane.
PP-MP: The angle formed by the palatal plane and the mandibular plane.

Statistical Analysis

The data were analyzed in Statistical Package for the Social Sciences software package (SPSS) 19. The descriptive statistics for cephalometric measurements included arithmetic means, mode, minimum, maximum, standard deviation and range for all the quantitative measurements. Males and female values were also compared by using the independent Student’s t-test.

RESULTS

The mean measurement of anterior open-bite in the sample was 2.71 mm with the range of 1.5 to 7 mm. It was found that the males in general had similar mean linear and skeletal cephalometric values as compared to females in the study sample.

Mean value of SN-MP was 45.45 of SN-PP was 8.80, PP-MP was 34.60 and gonial angle was 133.30, PFH was 82.50 and AFH was 130.00. (Table 1 & 2)

(Anterior face height: Nasion (N) to menton (Me),
Upper face height: Nasion to Anterior nasal spine (ANS), Lower face height: Anterior nasal spine to menton.)

DISCUSSION

Without a population cephalometric norm, the use of cephalometric analysis to diagnose and manage orthodontic cases with dentofacial issues is limited, as these norms are required to determine the normality, abnormality, site and extensions of dentofacial deformity for that particular population group. There have been many studies of different population groups showing that skeletal and dental patterns can, and do, vary.

Richardson concluded that there was significant greater lower facial height (LFH) and increased mandibular plane angle in AOB patients. He found that the etiology of AOB from seven to ten years of age is slow vertical development of upper facial part and increased LFH, combined with lack of development of dento-alveolus. He believed that, with catch up growth of face will self correct itself but that vertical develop-
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Ratios of PFH to AFH and UFH to LAFH also confirmed that LFH and TFH is more in our population than the Caucasian population. Comparing the values of vertical analysis with local study we found similar values of all the skeletal vertical measurements. The MPA, Gonial and PP-MP angle are larger in our AOB cases and these results are in accordance with Cangialosi24 and Nahoum.25

The limitation of this study is small sample size; further large scale studies are suggested. We did not investigate etiological causes of AOB. We will focus on these aspects in the future studies.

CONCLUSION

The results showed significantly increased values of linear and angular measurements in AOB patients. It was concluded that open bite malocclusion is largely due to the changes in the skeletal pattern.

REFERENCES


CONTRIBUTIONS BY AUTHORS

1 Muhammad Burhan Hayat: Title, abstract, & approved the final version.

2 Muhammad Azeem: Corresponding author, conceiving and designing the study, data recording, analysis and interpretation of data

3 Arshad Mehmood: Analysis and interpretation of data.

4 Waheed Ul Hamid: Main supervisor, critically reviewed the manuscript & final editing

CORRIGENDUM

Reference article on "Oral Hygiene of Orthodontic patients (Vol. 37, June 2017) read:
Page 279 Methodology 5th line males 35
Page 282 author number 2, Rabia Awan