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Research Article

Sagittal Maxillary Position Detected by Anterior Nasal Spine

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Abstract

Since all the cephalometric measurements can be misleading because of difficulties in locating certain points, an attempt was made to use the anterior nasal spine (ANS) which could be located easily on cephalometric head films instead of A point to demonstrate the anterior limit of the maxillary basal arch.

Lateral cephalometric head films of 134 adults male patients aged (17 - 22 years) represented all forms of malocclusion (70 cases Class I, 50 cases Class II, and 14 cases Class III) were used in this study. The maxillary basal arch to the cranium, upper incisor to N-ANS line, a similar "wits" appraisal, and ANS-BF distance were measured. The results revealed that ANS point is much easier to be located on cephalometric films and it could be used as a real representation of anterior limit of maxillary skeletal base specially in such cases where point A is difficult to be identified.

Keywords: *Sagittal; Anterior Nasal Spine*

Introduction

Since the introduction of cephalometrics in orthodontic diagnosis and treatment planning by Broadbent [1], great importance has been attached to the evaluation of the sagittal jaw relationship.

Downs [2] select point A in the maxilla at the junction of the alveolar bone with the root of the anterior nasal spine(ANS) as a working point for cephalometric purposes and it represent as nearly as possible the anterior limit of the true maxillary basal bone.

Reidel [3] used sella-nasion plane to describe the angles SNA, SNB and ANB angles which represent the sagittal jaw relationship.

The horizontal relationship of the jaws has been defined as the angles or distances between the reference planes of the craniofacial complex and points A and B which represent the anterior limits of denture bases [4-6].

According to Ricketts [7] point A is modifies as the teeth erupt and has been shown to change greatly as the teeth are removed.

Okun [8] reported that point A is subjected to marked change specially in the more radical extraction techniques.

The ANB angle which represent the sagittal jaw relationship is affected by age, spatial position of nasion, rotational effect of the jaw and vertical position of A and B points [9-11].

To avoid these variables, an alternative measurement based on a linear evaluation of the distance point A and point B projected onto the occlusal plane is termed Wits analysis which was introduced by Jacobsson [12].

One of the shortcoming of the Wits appraisal is its evaluating the A-P relationship of the dentition rather than the skeletal jaw relation [13].

To reduce the dependence of the sagittal measurement on the functional occlusal plane, Chang [14] advocated a linear measurement of the distance between A and B points onto FH plane which called AF-BF distance.

This method does not take into account the vertical relationship between points A and B, so Y and Suhr [15].

Introduced a new measurement called FABA which is FH to AB plane angel.

Due to difficulty in locating point A on cephalograms and this point not actually represent the anterior maxillary limit because it lies on the alveolar bone between the central incisors, so in this study the point ANS which is more easier to be seen on the films was used to represent the anterior border of the maxillary apical base. This choice was based on the fact that the ANS is definitely a process from the basal maxillary bone [16].

Aim of the Work

This study was planned to find out a new point and measurement that determine the sagittal jaw relationship by using ANS point as an anterior limit of maxillary basal bone in different classes of malocclusion.

Material and Method

Lateral cephalometric head film for 134 male patients were taken. The sample was consisted of 70 Class I, 50 Class II and 14 Class III. The age was ranged from 17 - 22 years. The ANS point was used as an indicator for the anterior limit of the maxillary apical base. A similar Wits appraisal was measured as the distance between ANS-O and B-O which are drawn from ANS and B point onto occlusal plane.

A distance ANS-F- B.F was measured as a line drawn from ANS and B point onto FH plane.

The following measurements were recorded and tabulated: SNA, SNB, SN-ANS, ANS-NB, ANS.F-B.F, similar wits appraisal, upper incisor in relation to N.ANS line in degrees and mm.

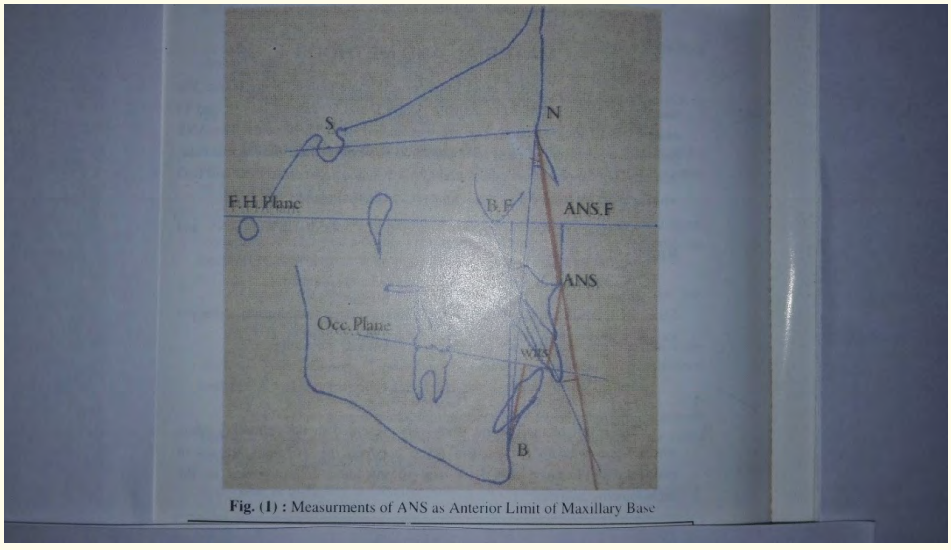

Figure 1: *Measurement of ANS as anterior limit of maxillary base.*

Results

The result of the present study was presented in the following table, where there was no comparison made between the different classes of malocclusion because this is a trial to introduce a new measurement to the cephalometric analysis.

	Class I		Class II		Class III	
	Mean	SD	Mean	SD	mean	SD
SNA	82.41	1.22	81.5	2.21	81.11	2.13
SN-ANS	87.55	1.87	86.7	1.56	86.87	1.42
SNB	79.21	2.76	75.42	3.22	84.31	2.46
ANS-NB	8.43	1.56	12.4	2.85	2.51	1.98
Wits	6.95	2.11	14.4	1.62	-1.23	1.88
ANS.F-B.F	16.55	2.22	21.31	2.33	-2.11	1.88
1to N.ANS	14.67	1.85	15.89	2.45	13.31	2.66
1 to N.ANSmm	4.43	1.32	3.12	1.9	4.93	2.11

Table 1: *Measurement of sagittal jaw relationship in different classes of malocclusion.*

Discussion

Since the introduction of cephalometric in orthodontics, the antero posterior relation of the maxillary and mandibular basal bone to each other and to the cranial base was of prime importance to locate the site of abnormality and formulate the treatment plan.

The importance of correctly identified the A-P jaw relation cannot be overemphasized because the clinician use this relation to establish detailed treatment goals and proper treatment mechanics.

Different method were designed to describe this relation but due to shortage in one method another method was present.

The most popular point to locate the anterior limit of the maxilla is the supraspinale (A) point of Downs. But this point does not represent the skeletal relation of the maxilla and it is subjected to changes produced by either tooth eruption or treatment mechanics.

After more than 15 years of practicing the cephalometric tracing, it was observed that point A is very difficult to be clearly seen or located in a great number of cases.

Therefore correct location of the maxilla to the cranial base and other structures of craniofacial complex are questionable and query.

In this study to avoid this shortcoming the point ANS was used as an indicator of anterior maxillary limit because it is definite process of the maxilla and very easy to be seen or located on cephalometric films.

Relation of the maxilla and mandible to the cranial base, upper anterior teeth to N.ANS plane, relation of F, H plane to both jaws, and new wits appraisal were measured in different classes of malocclusion to find out a new method of evaluation of an orthodontic case where point A is poorly defined.

From the result of the present study it was observed that there was no difference regarding the maxillary apical base among the different classes of malocclusion denoting that Class II cases were due to mandibular retrusion and Class III cases were due to mandibular prognathism.

From the data of the present study it could be safely said that the ANS point can be used instead of A point to determine the anterior birder of the maxillary apical base and the normal values of different measurement regarding this point were available and could be used during formulating of treatment plan of the orthodontic cases.

Conclusion

Anterior nasal spine is much easier to be located in cephalometric film, so it could be used as an alternative to A point to detect the maxillary position specially when A point is very difficult to be located or in cases of cleft palate patients.

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