Journal of Cardiovascular Disease Research
ISSN: 0975-3583, 0976-2833 VOL 14, ISSUE 03, 2023

Original Research

Interdependence Of Yen¸ W Angle And Wits In Assessing Maxillary And Mandibular Sagittal Relationships In UP Population: A Cephalometric Study.

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ABSTRACT

The current study's goal is to determine how the Yen angle interacts with other sagittal divergence parameters in order to find more stable and consistent parameters for anterior-posterior cephalometric analysis. 450 participants had lateral cephalograms taken, which were then traced for three different sagittal discrepancy criteria. This study showed that the most evenly distributed metric for determining anterior-posterior sagittal divergence is the Yen angle. Other metrics, such as W angle and WITS, had a uniform distribution and variability. Because all of the parameters used in the study have statistically significant correlations with one another, it is advisable to investigate and correlate additional parameters with clinical data rather than relying solely on one.

Keywords: Lateral Ceph¸ YEN angle¸ W-angle¸ WITS appraisal

INTRODUCTION

An important first step in skeletal malocclusion diagnosis and treatment planning is the assessment of the antero-posterior (AP) jaw relationship.

The anterior surfaces of the basal section of the jaws with the teeth in occlusion were palpated, and an overall profile image of the patient was used to analyse the skeletal pattern before (Doshi et al. 2012)1.

To evaluate the sagittal mismatch between the maxilla and mandible, numerous angular and linear metrics were developed in cephalometry. Jacobson2 first presented WITS assessment in 1975. This method of determining the degree or amount of jaw disharmony involves tracing perpendicular lines

from points A and B on the maxilla and mandible, respectively, onto the occlusal plane on a lateral cephalometric head film. Cephalometric analysis now includes it as a fundamental component.
Neela et al.3 in 2009 based on the landmarks point M (the middle of the anterior maxilla), point G (the bottom of the symphysis), and point S (the middle of the sella turcica). YEN angle measured at point M is formed by a set of reference points. Not using points A and B, which are impacted by local conditions, in this measurement remodeling as a result of orthodontic therapy.

Bhad et al.4 created the alternative measurement known as the W angle in 2013. The three skeletal markers point M, G, and S are also used as reference points in this angle. Since it is independent of functional occlusal planes or unstable landmarks, this measurement overcomes some of the drawbacks of earlier measurements.

Numerous investigations have been conducted to assess and contrast various sagittal and other hard tissue parameters. However, the results were contradictory, and there was no obvious indication for clinical usage. In this context, the study anticipates evaluating the interdependence of the mentioned available sagittal discrepancy parameters, including the YEN angle, W angle and WITS appraisal.

MATERIALS AND METHOD

The Saraswati Dental College in Lucknow's Institutional Research and Development Committee (IRDC) and Institutional Human Ethical Committee (IHEC) gave their approval for the study. It was held at the Saraswati Dental College in Lucknow's Department of Orthodontics and Dentofacial Orthopaedics and Department of Oral Medicine and Radiology. The population of North India that was willing to receive orthodontic treatment from the Department of Orthodontic and Dentofacial Orthopaedics served as the study's sample. They all gave their agreement after being fully informed. According to the inclusion and exclusion criteria, the patients were included in the study.

EXCLUSION CRITERIA include

-Congenital defect
-prior history of orthodontic treatment
-history of facial deformity.
- history of craniofacial trauma

CRITERIA FOR INCLUSION

-Age between 18 and 30 years; born in Uttar Pradesh;
-no prior face cosmetic surgery
-no history of facial trauma
-no congenital facial deformity
-no prior orthodontic therapy

Pre-treatment digital lateral cephalograms were conducted on 450 patients between the ages of 18 and 30 who had never previously had orthodontic treatment (n=450). With the teeth in place, radiographs were taken in natural head posture and occlusion. 100% magnification, the same apparatus, and the same exposure parameters (KVP - 80, mA-10 exposure period 0.5 sec) were used.

Each cephalogram was recorded using a Kodak 8000C Digital and Panoramic System Cephalometer Rochester. The teeth were evenly spaced while taking lateral positions in the Frankfort Horizontal

plane, which was parallel to the ground. The x-rays were printed using the Fujifilm Dry Pix Plus printer and Fujifilm Medical Dry Imaging film, which is 8x10 inches in size.

To remedy the lateral cephalographs' magnification errors, a fixed metallic cross with a length of 2 inches was added to the radiographs. Study participants were not allowed to use cephalographs that displayed magnification in the metallic cross measurement. These cephalograms were manually drawn on acetate tracing paper using an X-ray viewer and a sharp 4H pencil. Every significant building and landmark were marked. Angles were measured to the nearest 0.5 degree and scale was used to measure linear lengths to the nearest 0.5 mm.
For evaluation, numerous reference points, planes, and angles were created and documented.

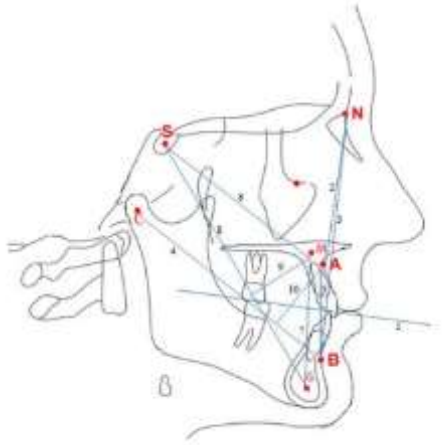

Figure 1: Various cephalometric reference planes & lines used in this stud

To identify anteroposterior dysplasia, the following characteristics were measured for each patient, WITS evaluation, YEN angle and W-angle. The data were validated and statistically examined for the relationship between the different sagittal dysplasia indicators employed in this study.

RESULTS

Parameters	Parameters YEN angle	
	Correlation of coefficient	p-value
W angle	0.71	0.0001*
WITS	- 0.56	0.0001*

*Significant
Table-1: Correlation of YEN angle with various study parameters

DISCUSSION

This research is important because a vital orthodontic decision depends on correct assessments. Treatment objectives and plans are deeply driven by cephalometric information. If diagnosis is incorrect, treatment plan can be inadequate and treatment time might be extended and or results may vary. It will lead to other consequences like patient and parental disappointment which in turn affects the practice of the clinician.

The calculation of the correlation between each of the measures revealed a substantial correlation (p 0.001), indicating that all three parameters can be utilised to evaluate the sagittal jaw discrepancy.

The results of Mittal et al. (2015)5, Doshi et al. (2012)1, Trivedi et al. (2015)6, and Alam et al. (2014)7 are all in agreement with this one.

With r = 0.71 and r2 = 0.51, the Yen angle and W angle displayed a strong positive correlation with one another. This result also agrees with Mittal et al. (2015)5, Trivedi et al. (2015)6, and Kapadia et al. (2017)8, who discovered a strong association between Yen angle and W angle (r = 0.735, 0.894, and 0.735, respectively).
With r-value -0.56, the current study did, however, find a weak negative correlation between the YEN angle and the WITS appraisal.

CONCLUSION

Our study's findings include the following:
-YEN angle shown favorable correlation with W angle but negative correlation with ANB angle and WITS assessment.
-The parameter that best represented antero-posterior dysplasia had a YEN angle with the lowest coefficient of variance.

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