The Angle of Axial Inclination of Human Central Incisor Teeth*

HAROLD J. NOYES, B.S., D.D.S., M.D., CHARLES H. RUSHING, D.D.S., M.S.D., AND HUGH A. SIMS, D.D.S., M.S.D.
Chicago, Illinois

IN A STUDY of the relation of certain skeletal structures revealed in the cephalometric X-rays of adult persons, the axial inclinations of mandibular and maxillary incisor teeth were recorded. Because of the current interest in this subject and for the benefit of comparison with other similar contemporary studies, a preliminary report of this investigation is made with no thought of drawing any conclusions from findings based upon so limited samples of human material.

Material for the study included nine adult Indian dry skulls and fourteen white living males between the ages of twenty-two and thirty-four years, both groups having erupted a full complement of permanent teeth which were within normal limits of occlusal relations. Also thirty living white subjects, twenty-one of whom were male and nine female, all over eighteen years of age with all permanent teeth present. Of this group fifteen had dental arch relations in Class II, Division 1, and fifteen in Class III malocclusion. Lateral and frontal cephalometric X-rays of all heads were made by means of the Broadbent-Bolton cephalometer.

Method. The axes of the left maxillary and mandibular incisors were determined by drawing a line that would bisect the greatest diameter of the registration of the crown and apex of each tooth which was identified by means of a wire ligature surrounding the crown. The posterior angular relation of these teeth was determined by extending their axes so that the following readings might be made by means of transparent protractor.

a. Axis of left maxillary central incisor to a line connecting the anterior nasal spine with the posterior nasal spine termed in this study the *Maxillary plane.*
b. The axis of left maxillary incisor to a line connecting one-half the overjet of the central incisor teeth and a point determined by bisecting the overlapping of cusps of the first permanent molar teeth termed the *Occlusal plane.*
c. Axis of left mandibular central incisor to a line drawn tangent to the two most inferior points upon the lower border of the mandible called the *Mandibular plane.*
d. Axis of left mandibular central incisor to the occlusal plane.
e. Axes of the mandibular to those of the maxillary incisor teeth. (Sum of the angles described under b. and d.)

Findings. The mean, range, and average deviation of these angles are given in the following tables.

* From studies conducted in the Orthodontic Section, Northwestern University Dental School.

TABLE I. ANGLE OF AXIAL INCLINATION OF LEFT MAXILLARY INCISOR TO MAXILLARY PLANE

Normal	Mean	Range	Average
Living (14)	113.6°	21.0°	4.6°
Skulls (9)	108.3°	13.0°	3.8°
Malocclusion			
Class II, Div. 1 (15)	113.2°	22.5°	5.1°
Class III (15)	115.9°	30.5°	6.1°

TABLE II. ANGLE OF AXIAL INCLINATION OF LEFT MANDIBULAR INCISOR TO MANDIBULAR PLANE

Normal	Mean	Range	Average
Living (14)	89.4°	23.0°	4.6°
Skulls (9)	92.0°	12.0°	4.2°
Malocclusion			
Class II, Div. 1 (15)	92.0°	20.0°	5.1°
Class III (15)	82.1°	39.0°	8.4°

TABLE III. ANGLE OF AXIAL INCLINATION OF LEFT MAXILLARY INCISOR TO OCCLUSAL PLANE

Normal	Mean	Range	Average
Living (14)	59.6°	13.0°	2.9°
Skulls (9)	63.1°	12.0°	3.2°
Malocclusion			
Class II, Div. 1 (15)	64.5°	33.0°	4.9°
Class III (15)	55.6°	35.5°	7.2°

TABLE IV. ANGLE OF AXIAL INCLINATION OF LEFT MANDIBULAR INCISOR TO OCCLUSAL PLANE

Normal	Mean	Range	Average
Living (14)	70.2°	14.0°	2.9°
Skulls (9)	69.3°	14.0°	8.3°
Malocclusion			
Class II, Div. 1 (15)	68.2°	32.0°	5.2°
Class III (15)	76.4°	41.5°	8.3°

TABLE V. ANGLE OF AXIAL INCLINATION OF LEFT MAXILLARY TO LEFT MANDIBULAR INCISOR

Normal	Mean	Range	Average
Living (14)	129.3°	21.0°	5.37°
Skulls (9)	131.4°	24.0°	7.4°
Malocclusion			
Class II, Div. 1 (15)	132.2°	59.0°	10.1°
Class III (15)	132.0°	51.0°	13.6°

Comment. Without attempt to draw conclusions from these restricted data the following observations seem of interest:

1. An overlapping range and average deviation between similar measurements of teeth in normal occlusion and Class II, Division 1, and Class III malocclusion.

2. A similarity of the mean angle of maxillary incisors in normal and both classes of malocclusion.

3. A similarity of mean angle of mandibular teeth in normal and Class II, Division 1, malocclusion.

4. An increased range and average deviation in malocclusion.

5. A similarity of the mean angle of maxillary to mandibular incisor teeth of all groups suggesting compensatory tendency in the complementary dental arches.

311 E. Chicago Avenue