Distribution of the Mandibular Incisor-Mandibular Plane Angle in "Normal" Individuals

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W. B. Downs (*Amer J Orthodont* **34**:812, 1948) presented findings from a study to determine the "normal range of variation" for certain variables that represented components of the dentofacial complex. He studied the distribution of these variables in 20 individuals with "clinically excellent occlusions," who ranged in age from 12 to 17 years and who were about equally divided with respect to sex. Among the components of craniofacial morphology studied by Downs was the mandibular incisor-mandibular plane angle. Earlier investigators include Margolis (*Amer J Orthodont* **29**:571, 1943), Noyes, Rushing, and Sims (*Angle Orthodont* **13**:60, 1943), and Speidel and Stoner (*Amer J Orthodont* **35**:536, 1944), who agreed closely on ranges and on a mean value of 90°. Downs' group yielded a mean of 91.4°; the measurements ranged from 81.5 to 97°. These figures have been accepted generally as representative of "normal variation" despite the fact that they are based on small samples from a special population. We are reporting the findings of a larger study of the distribution of this angle and we note that "normal variation" is considerably different from that reported by Downs.

This investigation is based on cephalometric data from radiographs of children with normal dental occlusion. They were part of a survey of normal growth conducted at the Philadelphia Center for Research in Child Growth between 1948 and 1968 and were selected from a group of 2,500 white elementary and secondary school children. The project director, W. M. Krogman, "took in substance, children who were in 'good medical health' and who had no more than rather so-called mild 'childhood illnesses' . . . 'good dental health' . . . a low DMF index . . . and all four permanent molars in place." The children selected were from what may be termed a middle-class socioeconomic group. Their ethnic distribution was Northern European (German, Scandinavian), Southern European (Italian), and Scotch, Irish, and English. Middle and Eastern Europe was represented by children of Galician, Ukranian, Polish (largely Ashkenazic Jews) and Russian ancestry. Those selected were thought to be "reasonably representative of the [white] children of Philadelphia" during the period studied. The data were processed by use of the mathematical model for craniofacial morphology developed by G. F. Walker (*New Zealand Dent J* **63**:31, 1967); the descriptive statistics for the distribution of the mandibular incisor-mandibular plane angle are given in the table.

It is clear that the distribution of the variable in the population studied is different than the distribution obtained by Downs. The differences may be indicative of the extent of the discrepancy between "excellent" and "normal" occlusion and suggest that diagnostic analyses and treatment goals involving this variable may have to be modified. Further analysis of the data shows no significant dependence of this variable on age and only a slight degree of sexual dimorphism: the variance among males in the younger age groups is considerably higher than that of the females, but the mean values are similar for each age group. Thus the assumptions inherent in Downs' pooling of subjects of both sexes and different ages appear to be tenable.

Additional information available on request to authors.

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DISTRIBUTION OF THE MANDIBULAR INCISOR-MANDIBULAR PLANE ANGLE IN 474 NORMAL MALES AND 630 NORMAL FEMALES

	Males					Females				
Age	N	Mean	SD*	Min†	Max‡	N	Mean	SD	Min	Max
6-8	21	96.23	5.377	90.29	106.6	36	95.48	3.548	90.36	105.3
8-10	73	98.34	6.080	90.35	123.6	104	96.87	3.910	90.04	108.4
10-12	114	97.72	5.747	90.25	124.9	153	98.17	3.918	90.22	111.1
12-14	124	97.79	5.600	90.04	123.3	159	97.96	4.683	90.10	119.4
14-16	85	96.76	5.804	90.03	121.0	106	97.77	5.528	90.30	117.9
16-18	35	96.18	5.938	90.04	111.8	58	98.69	5.878	91.59	118.4
18-26	22	96.39	3.933	90.62	104.5	14	95.17	4.707	90.47	106.5

* SD, standard deviation.
† Min, minimum.
‡ Max, maximum.