Original Article

Cephalometric Standards for Polish 10-Year-Olds with Normal Occlusion

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ABSTRACT

Objective: To establish gender-specific normative data for Polish children at the age of 10 years.

Materials and Methods: Thirty-nine boys and 34 girls (mean age 10.37, SD = 0.52) of Polish ethnicity were selected based on the following criteria: Class I molar relationship, lack of crossbite or scissor-bite, positive overjet and overbite less than 5 mm, adequate amount of space in both dental arches, no visible asymmetry, and good facial proportions. Lateral cephalograms of each subject were scanned and analyzed with the use of NemoCeph NX2005 software. Descriptive statistics (mean and standard deviation) were calculated for all measured variables. Independent *t*-tests were performed to assess the intergender differences. The results were compared to the published norms of other white populations. Normative data were presented in the tables.

Results: Intergender differences included anterior cranial base length (sella-nasion), total and lower anterior facial height (nasion-menton and ANS-menton, respectively), posterior facial height (sella-gonion), SNA angle, point A to nasion perpendicular distance, pogonion to nasion perpendicular distance, and facial axis.

Conclusions: Polish 10-year-old boys had a larger anterior cranial base, and larger total anterior, lower anterior and posterior facial heights than girls. The maxillae and chin protrusion were more pronounced in girls.

KEY WORDS: Cephalometrics; Cephalometric standards; Normal occlusion; Polish population

INTRODUCTION

The planning of orthodontic treatment often includes comparison of craniofacial structure of a patient to the norm. However, populations demonstrate differences regarding various details of facial morphology. These differences are easily discernible when individuals with different ethnic background are compared.[1–4] Wu et al[1] found that Chinese subjects were more protrusive dentally, had a shorter midfacial length, and steeper mandibular plane than their British white counterparts. Huang et al[2] compared Americans of African and European descent living in Birmingham and demonstrated a greater bidentoalveolar protrusion in an African American sample. Behbehani et al[3] and Hassan[4] examined differences between an Arab population from Kuwait[3] and Saudi Arabia[4] and whites and found an increased ANB and mandibular plane angle in Arabs as compared with European-Americans with a Class I skeletal relationship.

Studies by Trenouth et al[5] and El-Batouti et al[6] demonstrated that differences exist also among populations of the white race. Trenouth et al compared craniofacial morphology in Dutch, English, and American samples and concluded that the greatest differences were observed between the English and Dutch groups. The Dutch group was skeletal Class II relative to the English group and had a higher inclination of the lower incisors. El-Batouti et al longitudinally followed Norwegian and Iowan samples and found that Norwegians had significantly greater maxillary and mandibular protrusion, and a greater proclination of the upper and lower incisors than the Iowans.

It seems possible that the craniofacial morphology of a Polish population may show traits that differentiate it from other populations. However, there is a lack of data about facial morphology of Poles. No study has been published in English language journals so far. With an increasing expatriate community living in North America and Europe, the need for information

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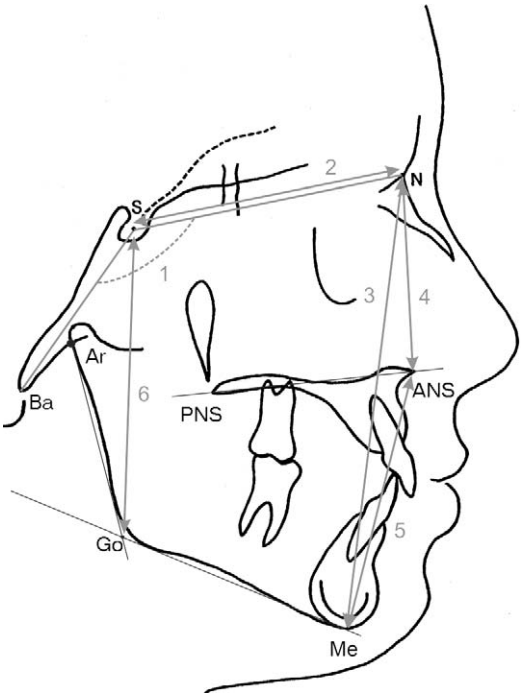

Figure 1. Cranial base and vertical measurements. (1) Cranial angle (NSBa). (2) Anterior cranial base length (SN). (3) Total anterior facial height (TAFH). (4) Upper anterior facial height (UAFH). (5) Lower anterior facial height (LAFH). (6) Posterior facial height (PFH).

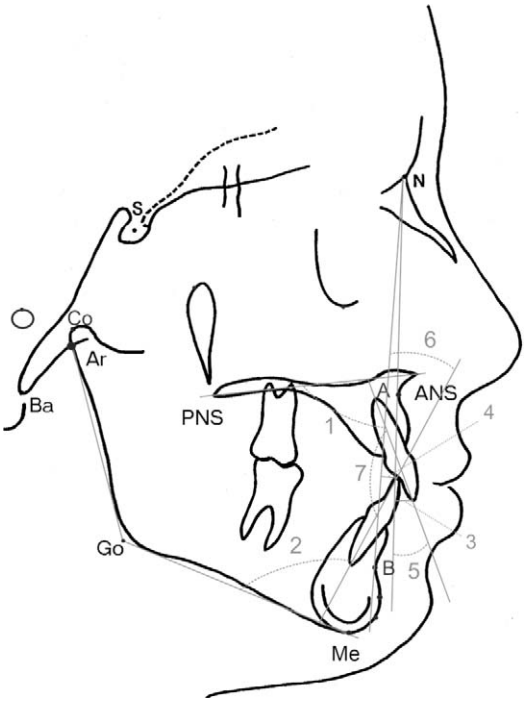

Figure 3. Dental measurements. (1) Upper incisor inclination (ILs/PP). (2) Lower incisor inclination (ILi /MP). (3) Edge of upper incisor to NA line distance (Is-NA). (4) Edge of lower incisor to NB line distance (Ii-NB). (5) Axis of upper incisor to NA line angle (ILs-NA). (6) Axis of lower incisor to NB line angle (ILi- NB). (7) Interincisal angle (ILs/Ili).

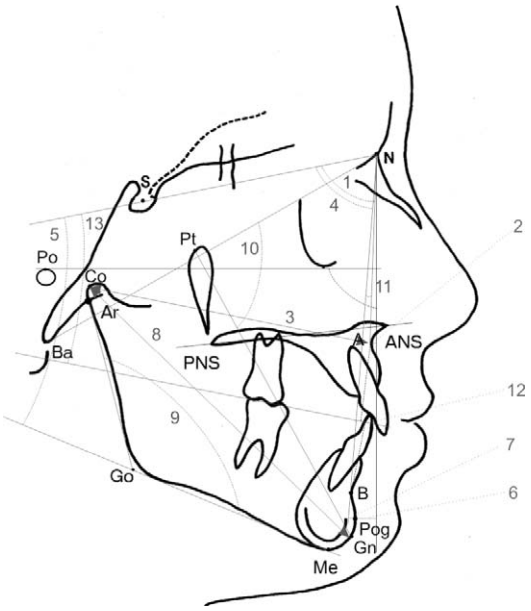

Figure 2. Maxillary, mandibular, and Mx/Mn measurements. (1) SNA angle. (2) Point A to nasion perpendicular (A-N perp.). (3) Maxillary length (Co-A). (4) SNB angle. (5) Mandibular plane angle (SN/MP). (6) Pogonion to nasion perpendicular (Pog-N perp.). (7) Pogonion to nasion-point B line (Pog-NB). (8) Mandibular length (Co-Gn). (9) Gonial angle. (10) Facial axis (BaN/PtGn). (11) ANB angle. (12) WITS appraisal. (13) Occlusal plane inclination (SN/OcclPl).

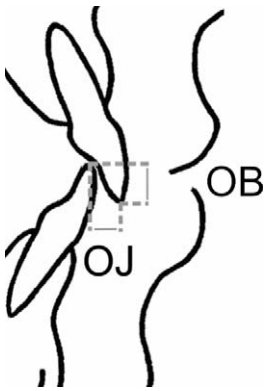

Figure 4. Overbite (OB) and overjet (OJ).

Table 1. Stages of Sample Selection

Number of Subjects	Group
703	4th and 5th grade children selected for examination
614	Examined at the school
107	Met initial inclusion criteria
83	Signed an informed consent and arrived at the Institute for examination
73	Final sample

about the craniofacial structure of the Polish population published in an international scientific journal gains importance. Therefore, the purpose of the present study was to establish gender-specific normative data for Poles at the age of 10 years.

MATERIALS AND METHODS

This investigation is the first part of a longitudinal evaluation of craniofacial growth of a Polish population. Commencement of the observation period at the age of 10 years has been planned to secure that all circumpubertal growth changes would be recorded. The Bioethics Committee of the Institute of Mother and Child issued an approval for this investigation (reference 37/2005).

Subjects

Seven randomly selected elementary schools from Wegrow County (70 miles east of Warsaw) were contacted, and their headmasters were informed about the planned investigation. All schools agreed to participate in the study, and lists of 4th and 5th grade children that were assumed to be approximately 10 years of age were formed. Individuals from the lists were examined by two investigators (BO and PF) at the school nurse's room during four trips to Wegrow County. The initial inclusion criteria were: (1) Class I molar relationship, (2) lack of crossbite or scissor-bite, (3) positive overjet and overbite less than 5 mm, (4) adequate amount of space in both dental arches, (5) no visible asymmetry, and (6) good facial proportions. Selected individuals and their parents were subsequently sent letters explaining the reason, methodology, and risks involved in the investigation. Children whose parents consented to participate were invited for examination at the Center for Craniofacial Disorders at the Institute of Mother and Child in Warsaw.

Intraoral examination, study models, extraoral and intraoral photographs, panoramic and lateral cephalograms were obtained from 83 participants. Table 1 demonstrates the details of the selection process.

Table 2. Age Characteristics of Male and Female Groups[a]

	Boys (N = 39)	Girls (N = 34)	Pooled (N = 73)	Boys vs Girls *P* value
Age, years	10.38	10.36	10.37	.842
SD	0.53	0.52	0.52	—
Min	9.25	9.25	9.25	—
Max	11.20	11.22	11.22	—
Median	10.47	10.37	10.47	—

[a] Min indicates minimum; Max, maximum.

Table 3. Error of Measurements

Measurement	Error
Cranial base	
SN, mm	0.46
NSBa, degrees	1.75
Vertical relationship	
N-Me (TAFH), mm	0.76
N-ANS (UAFH), mm	0.83
ANS-Me (LAFH), mm	0.42
S-Go (PFH), mm	0.63
S-Go/N-Me (PFH/TAFH), degrees	0.79
Maxilla (Mx)	
SNA, degrees	1.05
A-N perp., mm	1.10
Co-A (Mx length), mm	0.97
Mandible (Mn)	
SNB, degrees	0.76
SN/MP, degrees	1.33
Pog-N perp., mm	1.68
Pog-NB, mm	0.38
Co-Gn (Mn length), mm	1.32
Gonial angle, degrees	1.52
Facial axis (BaN-PtGn), degrees	0.92
Mx/Mn relationship	
ANB, degrees	0.61
WITS, mm	0.81
SN/OcclPl, degrees	1.15
Dental relationship	
ILs/PP, degrees	1.73
ILi/MP, degrees	1.35
Is-NA, mm	0.74
Ii-NB, mm	0.37
ILs-NA, degrees	1.55
ILi-NB, degrees	1.39
ILs/Ili, degrees	2.25
OB, mm	0.42
OJ, mm	0.31

Methods

All lateral cephalograms were taken under standard conditions with the subjects standing with their head positioned in the cephalostat and teeth in the maximal intercuspation. The distance from focus to the midsagittal plane (MSP) of the child's head, and from the midsagittal plane to the film was identical for each subject. Cephalograms carried magnification of 9.5%, and the adjustment for enlargement factor has been made in the linear measurements reported in the Results section. All cephalograms were scanned with PowerLook III (UMAX) scanner. Cephalometric analysis was carried out twice with NemoCeph NX 2005 program (Nemotec, Madrid, Spain) by one investigator (BO). The identified landmarks, and angular and linear measurements are presented in Figures 1 to 4.

Error of Method

The measurement errors were calculated from the equation:

$$S_x = \sqrt{\frac{\sum D^2}{2N}}$$

with D representing the difference between corresponding first and second measurements on all (N = 73) cephalograms made at least 1 week apart.

Statistical Analyses

Descriptive statistics (mean, standard deviation, minimum, and maximum) were calculated for all measured variables. Independent *t*-tests were performed to assess the intergender differences in measurements. If no intergender difference regarding a given measurement was detected, the sample was pooled and descriptive statistics were recalculated.

RESULTS

Subjects

Seventy-three subjects (39 boys and 34 girls) of 83 that were examined at the Institute of Mother and Child were finally selected. Ten subjects were excluded for the following reasons: cephalograms of four boys and four girls were of inadequate quality, one boy was diagnosed with an impacted canine, and one girl demonstrated dental midline asymmetry. Age characteristics of the groups are shown in Table 2. Male and female groups demonstrated a mean age of 10.4 years at the time of the collection of records. Additionally, standard deviation, median, minimum, and maximum values were also similar in the groups.

Method Error

Error for the angular measurements was from 0.61° for ANB angle to 2.25° for the interincisal angle. Linear measurements demonstrated error from 0.31 mm for overjet to 1.68 mm for the pogonion-nasion perpendicular variable (Table 3).

Cephalometric Analysis

Results of the cephalometric analysis are presented in Table 4. Intergender comparison demonstrated that boys and girls differed regarding some measurements. Linear measurements such as sella-nasion distance, total and lower anterior facial height, and posterior facial height were larger in boys (P = .046, .009, .003, and .018, respectively). Position of point A and pogonion relative to the nasion perpendicular line was more retrusive in boys, and the difference was statistically significant (P = .02 and .018, respectively). Additionally, a few angular variables (SNA, facial axis) showed statistically significant intergender differences (P = .031 and .040, respectively). Other variables, including all dental parameters, were similar in both sexes ($P >$ .05).

DISCUSSION

Validity of the Sample

Reduction of selection bias is of primary importance when norms for populations are to be established. In some studies records of individuals from university clinics[7] or other institutions[8] were used to set cephalometric standards. This may pose a risk of introducing selection bias by limiting to the subjects that sought orthodontic treatment. The population of individuals seeking treatment may differ from the whole population living in a particular area; hence, the results may not be representative. In order to overcome this difficulty the sample was selected from the randomly chosen elementary schools. No contacted school refused to participate in the study. In site screening process included mostly objective criteria as Angle classification, positive overjet, or lack of crossbite and scissorbite. The only subjective criterion used was a good facial profile.

Ethnic homogeneity was achieved by selecting the sample from a population living outside of the Warsaw metropolitan area where current migration is high. Wegrow County is a rural area with stable demographic structure. The majority of the subjects were born in the county hospital. All individuals had Polish family names.

Intergender Comparison

Only few variables showed differences between sexes. The length of the anterior cranial base (sella-nasion) was found larger in boys. This is in agreement with the results of Ursi et al[9] who longitudinally followed 23 male and 28 female subjects from 6 to 18 years of age. They concluded that anterior cranial base length was the only measurement examined that showed significant dimorphism over the entire 12-year span. Similar conclusions were arrived at by Bhatia and Leighton[10] who found highly significant intergender difference occurring from 4 to 20 years of age.

Posterior, total, and lower anterior facial heights demonstrated significant intergender difference. Posterior facial height was larger in males by approximately 2.2 mm, whereas total anterior facial height was larger by about 3.5 mm. This corroborates findings of Drevensek et al[11] who examined 42 boys and 46 girls with ideal occlusion at the age of 9.31 years (SD = 1.52) and found highly significant intergender

Table 4. Skeletal and Dental Cephalometric Standards for Polish Boys and Girls. All Linear Measurements Adjusted for 9.5% Enlargement Factor[a]

	Boys (N = 39)				
Measurement	Mean	SD	Min	Max	Median
Cranial base					
SN, mm	63.98	2.67	57.9	70.6	64.1
NSBa, degrees	134.91	5.40	125	144.8	134.9
Vertical relationship					
N-Me (TAFH), mm	103.05	5.53	92.1	115.6	102.6
N-ANS (UAFH), mm	45.82	2.43	40.3	51.9	45.8
ANS-Me (LAFH), mm	58.23	4.10	49.7	67	58.1
S-Go (PFH), mm	67.67	3.55	61.4	76.7	67.8
S-Go/N-Me (PFH/TAFH), degrees	65.76	3.40	59.9	71.3	66.0
Maxilla (Mx)					
SNA, degrees	80.08	3.73	74.7	89.0	79.9
A-N perp., mm	−3.26	3.09	−10.3	4.7	−3.4
Co-A (Mx length), mm	78.42	3.79	71.7	88.6	77.4
Mandible (Mn)					
SNB, degrees	77.53	3.07	72.2	83.0	77.3
SN/MP, degrees	32.94	4.35	25.0	44.2	32.7
Pog-N perp., degrees	−10.43	5.85	−23.7	4.6	−11.2
Pog-NB, mm	0.34	1.44	−2.5	3.7	0.0
Co-Gn (Mn length), mm	101.37	5.58	92.4	116.1	99.7
Gonial angle, degrees	123.36	5.32	113.9	133.8	122.0
Facial axis (BaN-PtGn), degrees	89.17	3.86	80.5	98.6	88.8
Mx/Mn relationship					
ANB, degrees	2.55	2.10	−2.1	7.0	2.5
WITS, mm	−0.96	2.12	−6.8	3.1	−0.5
SN/OcclPI, degrees	17.83	3.35	11.5	23.7	17.6
Dental relationship					
ILs/PP, degrees	109.03	5.39	96.8	117.9	109.5
ILi/MP, degrees	94.04	5.45	81.3	105.9	93.1
Is-NA, mm	3.78	2.30	−1.0	11.8	3.5
Ii-NB, mm	3.68	1.83	−0.2	7.2	3.8
ILs-NA, degrees	21.88	5.51	10.9	35.5	22.0
ILi- NB, degrees	24.60	5.71	13.3	39.4	25.5
ILs/Ili, degrees	130.98	8.22	107.2	147.1	130.5
OB, mm	1.97	1.30	−1.8	4.3	2.0
OJ, mm	3.42	0.76	1.6	4.7	3.5

[a] Min indicates minimum; Max, maximum.

difference. Also, El-Batouti et al[8] following examination of 35 boys and 29 girls at the age of 9 years concluded that both posterior and lower anterior facial heights were significantly larger in boys than in girls. Similar findings were presented Bhatia and Leighton.[10] However, they found that posterior facial height in boys was larger than in girls from 4 to 10 years of age. In 11-, 12-, and 13-year-old individuals, the difference was not present. It reoccurred at the age of 14 and lasted until the end of observation period. The phenomenon of lack of intergender difference from 11 to 13 is likely attributable to the earlier onset of growth spurt in girls.

Maxillary protrusion, as represented by SNA and A-N perpendicular measurements, differed between genders. The maxilla in females was more protruded, the SNA angle was larger by approximately 1.8°, and the distance from point A to nasion perpendicular line was diminished by 1.8 mm. This finding disagrees with the results of Ursi et al[9] who could not detect any difference in maxillary protrusion.

On the other hand, El-Batouti et al[8] demonstrated that in a Norwegian population the maxilla was more protruded in boys and the difference increased with age. Also, mandibular protrusion, as measured with the position of pogonion relative to nasion perpendicular line, was found more in Polish girls as opposed to no intergender difference demonstrated in an American population.[9]

The possible explanation for these conflicting find-

Table 4. Extended

Girls (N = 34)					*t*-test	Pooled	
Mean	SD	Min	Max	Median	*P* value	Mean	SD
62.61	3.07	57.1	75.8	62.25	0.046	—	—
135.76	4.37	120.8	143.8	135.75	0.466	135.31	4.94
99.56	5.64	90.4	114	98.7	0.009	—	—
45.31	2.73	40.9	56.2	45.05	0.399	45.58	2.57
55.31	4.05	47.4	64.9	55.7	0.003	—	—
65.45	4.32	58.4	75.6	64.9	0.018	—	—
65.82	4.29	57.5	77.9	65.65	0.943	65.79	3.81
81.86	3.06	76.0	87.3	81.65	0.031	—	—
−1.45	3.40	−10.0	7.4	−1.55	0.020	—	—
78.01	4.00	71.4	91.5	77.7	0.658	78.23	3.87
78.80	2.70	72.8	84.5	79.1	0.067	78.12	2.96
31.99	5.04	19.2	44.4	32.0	0.387	32.50	4.67
−7.31	5.03	−16.1	4.9	−7.85	0.018	—	—
0.54	1.28	−3.1	3.5	0.3	0.536	0.43	1.36
100.41	5.86	91.5	121.9	99.5	0.473	100.92	5.69
123.55	5.34	112.0	135.9	123.75	0.879	123.45	5.29
87.27	3.90	80.8	97.7	86.7	0.040	—	—
3.06	1.80	−1.8	6.6	3.05	0.267	2.79	1.97
−0.61	1.99	−4.2	3.6	−0.65	0.468	−0.79	2.06
16.84	3.13	9.3	24.2	16.45	0.196	17.37	3.26
109.84	5.26	98.0	118.8	110.2	0.515	109.41	5.31
95.24	7.11	76.6	109.0	94.55	0.418	94.60	6.26
3.20	1.82	−2.3	6.5	3.1	0.239	3.51	2.10
3.78	1.83	−0.5	7.5	3.85	0.826	3.73	1.82
20.79	5.31	4.6	30.0	21.9	0.394	21.37	5.41
26.46	6.07	10.8	35.6	28.1	0.183	25.47	5.91
129.69	8.64	112.0	155.0	127.3	0.516	130.38	8.38
1.88	1.09	−0.1	4.8	1.85	0.752	1.93	1.20
3.31	0.83	1.7	5.5	3.15	0.562	3.37	0.79

ings may be that more maxillary and mandibular protrusion in girls than in boys is a characteristic trait of a Polish population. However, the level of statistical significance was not very high and ranged from 0.018 to 0.031. In addition, the error of measurement for pogonion-nasion perpendicular exceeded 1.6 mm, and other variables of mandibular protrusion such as SNB angle or pogonion-NB did not show difference between sexes.

Comparison With Other White Populations

Comparison of different white populations based on the published data encounters multiple problems. Despite the use of standardized cephalometric analyses, the definitions of some landmarks are not universally used. Bhatia and Leighton[10] defined condylion as the most superior point of the outer outline of condyle, whereas Riolo et al[12] defined it as the most posterior superior point of condyle. Gonion landmark was defined either as the most posterior inferior point of the mandibular angle,[8,10,12] or as the point at the intersection of mandibular and ramus planes.[8,13] Consequentially, the measurements based on differently defined landmarks cannot be directly compared.

Enlargement of the craniofacial structures may differ when different cephalostats are used. Although information about magnification factor should be clearly stated in the publication, it is not always the case. El-Batouti et al[8] did not mention enlargement. When the statement by Drevensek et al[11] that "magnification of 10% was taken into account" is confronted with linear measurements that are approximately 10% larger than

Table 5. Comparison of Craniofacial Structure Among White Populations

	Polish		Slovenian[a]		Norwegian[b]		Swedish[c]		English[d]		American[e]	
	M	F	M	F	M	F	M	F	M	F	M	F
Cranial base												
NSBa, degrees	134.9	135.8	128.4	131.2	129.8	130.7	130.5	130.9			129.2	129.7
Vertical relationship												
N-Me (TAFH), mm	103.1	99.6	113.0	107.9	100.4	98.6	100.5	96.8	103.0	97.9	105.1	101.9
S-Go (PFH), mm	67.7	65.5	72.9	68.4	61.3	56.3	66.8	64.4			65.2	62.2
S-Go/N-Me (PFH/TAFH), degrees	65.8	65.8	64.4	63.4	61.2	57.2	66.4	66.5			62.0	61.0
Maxilla (Mx)												
SNA, degrees	80.1	81.9	81.1	80.3	82.3	80.8	81.2	82.6	80.8	79.3	80.8	80.7
Mandible (Mn)												
SNB, degrees	77.5	78.8	77.6	76.6	78.9	78.0	78.5	79	77.8	76.3	76.5	76.7
SN/MP, degrees	32.9	32.0	33.2	33.8	33.4	35.0	32.2	31.7	34.3	36.0	34.7	35.3
Co-Gn (Mn length), mm	101.4	100.4									101.4	98.6
Gonial angle, degrees	123.4	123.6	127.3	125.9			126.6	125.4			128.0	127.5
Mx/Mn relationship												
ANB, degrees	2.6	3.1	3.6	3.7	3.4	2.8	2.8	3.6	2.9	3.0	4.3	4.0
SN/Occl. degrees	17.8	16.8							21.1	20.5	18.7	19.6
Dental relationship												
ILs/PP, degrees	109.0	109.8	109.4	111.2			110.4	110.9	112.1	112.2	111.1	113.0
ILi/MP, degrees	94.0	95.2	94.7	97.8	94.6	92.7	91.3	96.0	95.5	95.0	95.8	93.8
ILs/Ili, degrees	131.0	129.7	128.4	131.2	125.8	129.3	130.7	129.2			124.6	125.4

[a] Drevensek et al[11]: 42 male and 46 female subjects; mean age 9.31 (SD = 1.52); <15 points of modified Eismann scoring method qualified for the sample.

[b] El-Batouti et al[6]: 35 male and 29 female subjects; age: 9 years, but detailed data not reported; clinically acceptable occlusion with no facial disharmony.

[c] Thilander et al[13]: 43 male and 56 female subjects; mean age 10.4 years (SD = 0.5); ideal occlusion (Class I molars and canines, overjet and overbite between 1 and 3 mm, no transverse problems).

[d] Bhatia and Leighton[10]: 15 male and 12 female subjects; longitudinal study but no detailed data regarding age range in the 10-year-old group; part of the larger sample (121 subjects) with normal occlusion.

[e] Riolo et al[12]: 46 male and 35 female subjects; age range: 9 years 6 months to 10 years 5 months; all children attending the University school that had cephalograms taken each year; no data about occlusion—likely malocclusions included in the sample.

in other populations (Table 5), one may put in question whether the linear variables were actually adjusted.

Selection of individuals with ideal or almost ideal occlusion vs inclusion of subjects presenting with different types of malocclusion poses a risk of setting two kinds of norms: ideal standards[8,11,13] and population standards[10,12] that are not necessarily comparable.

When the craniofacial structure of Polish and other white 10-year-old boys and girls is compared there are a few distinctive features of Poles. Only the cranial base angle (NSBa) and gonial angle were dissimilar, with the NSBa angle being larger by 4.4° to 6.5°, and the gonial angle being smaller by approximately 2° to 8° depending on the compared population. Total anterior facial height (TAFH) was larger than in Scandinavian populations and smaller than in the American population. However, the differences were rather small, in the range of about ±2.5 mm. Comparison of the posterior facial height (PFH) among populations is limited due to the different definition of gonion landmark. PFH in Poles was larger than in Swedes by about 1 mm and smaller than in Slovenians by about 4 mm. Proportion of the posterior to total anterior facial height (PFH/TAFH·100%) is similar among Polish, Swedish, and Slovenian populations, and substantially larger than in Norwegian and American populations. Maxillary and mandibular protrusion in all compared populations was similar. Small differences ranging ±1.5° may result from variance within the samples rather than from intersample differences.

Comparison of dental relationships reveals that the angle between the upper incisors and palatal plane (ILs/PP) is less than in English and American individuals. Inclination of lower incisors (Ili/MP) is similar to other populations, except for Swedish boys and Norwegian girls (smaller inclination) and Slovenian girls (larger inclination). Interincisal angle (ILs/Ili) in Polish populations is more obtuse than in American and Norwegian male populations and American female populations. Other populations show the interincisal angle similar to the Polish sample. This erratic pattern of interpopulation differences demonstrates that these data

should be interpreted cautiously. To detect true difference between populations, raw data must be used.

This investigation had some limitations that might affect the results. During the selection process 24 subjects (22.4%) that met inclusion criteria did not arrive at the Institute for examination. This might have introduced bias in the sample. Although the investigators attempted to limit subjective criteria while selecting the sample, ''good facial profile'' used in the selection is definitely one of them. Most individuals in the sample were likely ahead of the growth spurt. Therefore, some intergender differences not found in this study may develop provided older subjects are compared.

CONCLUSIONS

- Polish 10-year old males have a larger anterior cranial base, total anterior, lower anterior and posterior facial heights than females.
- The maxillae and chin protrusion are more pronounced in girls.

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