Original Article

Three-dimensional Facial Morphometry of Attractive Children and Normal Children in the Deciduous and Early Mixed Dentition

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ABSTRACT

Objectives: To identify possible esthetic canons in facial size and shape of Italian children.

Materials and Methods: The three-dimensional coordinates of 50 facial landmarks (forehead, eyes, nose, cheeks, mouth, jaw, ears) were collected in 220 healthy reference children (4–9 years old) and in 89 ''attractive'' children of a similar age group selected by a commercial casting organization. Soft-tissue facial angles, distances, and volumes were computed. Comparisons were made with the Student's *t*-test.

Results: Attractive children had a larger face than the reference children, with a larger maxilla and forehead; overall, their faces were wider and deeper, but less vertically developed. Lips were more voluminous in attractive children, with a higher mouth. The nose was larger in attractive children than in reference children. The soft-tissue facial profile was more convex in attractive children, with a more prominent maxilla relative to the mandible.

Conclusions: Overall, considering that in the analyzed ages body growth and dental changes are very fast and individually determined, all the measurements appeared sufficiently homogenous, and the quantitative characteristics of an ''attractive'' face well defined. Esthetic reference values can be used to determine optimal timing and goals in orthodontic treatment.

KEY WORDS: Face; Children; Attractiveness; Soft tissues

INTRODUCTION

The face plays a key role in communication and interaction with the environment.[1–3] This part of the body has been extensively studied by scientists, clinicians, artists, and many who have tried to measure and reproduce some of the facial characteristics, not the least of which has been beauty.[4,5]

Esthetic criteria appear to have been defined in almost all cultures,[2,5–8] but the actual presence of codified facial dimensions, angles, and ratios in attractive people is still a matter of debate. Scientific research on the quantitative, measurable bases of facial attractiveness is, therefore, still in progress.[2,4,9–13]

Attractiveness is also becoming a matter of concern during childhood. Currently, children are widely employed in cinema and television, in the fashion industry, and in advertising. Children with a nonattractive face are considered less intelligent, and are more likely to be isolated and underscored than children with an attractive face, even by their peers.[1,14] A beautiful face is often considered the key to success, and parents and children look for medical modifications of nonattractive dentofacial physiognomies.[8,13]

Orthodontists, therefore, face an increasing demand for treatments mainly based on esthetic requests,[15] and should approach the problem with the most advanced instruments and methods for diagnosis and treatment planning. Indeed, while technology today offers very advanced methods for treatment, orthodontic

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diagnosis still remains an art, widely relying on subjective evaluations of the facial soft tissues. Conventional two-dimensional measurements based on photographs or on radiographic profile projections[16,17] should be supplemented by three-dimensional analyses.[17–22] Facial three-dimensional imaging is a novel field for dentistry, and it is becoming a useful tool for both clinicians and researchers.[17]

For a fruitful clinical application, patient data should be complemented with normal, reference data. Indeed, conventional two-dimensional measurements cannot be completely applied to the novel methods; additionally, in the field of facial esthetics, the cultural background seems to partially determine what is considered "attractive" and "beautiful,"[2,6,8] and new esthetic norms should be defined in an ever changing society.

In the current investigation, the three-dimensional facial characteristics of children considered "attractive" were obtained. Data were compared to those collected in healthy children of the same ethnicity, selected using criteria of dentofacial normality.[2,6,8] The presence of measurable esthetic characteristics was assessed. If esthetically pleasing faces possess codified facial dimensions, angles, and ratios, these measurements could be used by orthodontists and maxillofacial surgeons as a reference for dentofacial modifications.

MATERIALS AND METHODS

Subjects

Two groups of white, Northern Italian children aged 4–9 years, all with a complete deciduous dentition or an early mixed dentition (first permanent molars; incisors in various stages of exfoliation and eruption),[23] were analyzed. All children had no previous craniofacial trauma, orthodontics, surgery, or congenital anomalies. The healthy, "reference" children included 121 boys and 99 girls; they had normal dentofacial dimensions and proportions. They were attending several schools in Milan and the surroundings.[3]

Forty-two boys and 47 girls were "beautiful," "attractive" children selected by a commercial casting agency. The agency was asked to provide children with a "beautiful," "attractive" face, considered "positive" and "acceptable" for cinema, television, advertising, and the fashion industry.[15]

All the analyzed children and their parents/legal guardians gave their informed consent to the experiment. All procedures were noninvasive, did not provoke damages, risks or discomfort to the subjects, and were approved by the local ethics committee.

Data Collection and Analysis

The procedure took place in two separate steps,[18] and it was followed by off-line calculations. For each child, a single experienced operator located and marked 50 soft-tissue landmarks by inspection and/or palpation.[3] During landmark marking, the children sat relaxed with a natural head position. For each child, this phase lasted less than 5 minutes.

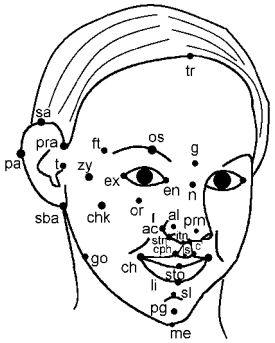

Figure 1. Digitized facial landmarks. Midline landmarks: tr, trichion; g, glabella; n, nasion; prn, pronasale; c′, columella; sn, subnasale; ls, labiale superius; sto, stomion; li, labiale inferius; sl, sublabiale; pg, pogonion; me, menton. Paired landmarks: ex_r, ex_l, exocanthion; en_r, en_l, endocanthion; os_r, os_l, orbitale superius; or_r, or_l, orbitale; ft_r, ft_l, frontotemporale; chk_r, chk_l, cheek; zy_r, zy_l, zygion; t_r, t_l, tragion; al_r, al_l, alare; ac_r, ac_l, nasal alar crest; itn_r, itn_l, inferior point of the nostril axis; stn_r, stn_l, superior point of the nostril axis; cph_r, cph_l, crista philtri; ch_r, ch_l, cheilion; go_r, go_l, gonion; pra_r, pra_l, preaurale; sa_r, sa_l, superaurale; pa_r, pa_l, postaurale; sba_r, sba_l, subaurale.

Three-dimensional coordinates of the facial landmarks were then obtained with a computerized electromagnetic digitizer (3Draw, Polhemus Inc, Colchester, Vt). During data collection, the children sat in a natural head position in a chair with a backrest, where a cephalostat fixed the child's head. The children remained motionless, with closed eyes and the mandible in rest position. The digitization of landmarks took approximately 1 minute. Duplicate data collections gave random errors corresponding to 1.2% of nasion-mid tragion distance, without differences between reference and attractive children. Files of the three-dimensional coordinates were obtained, and computer programs were used for all subsequent off-line calculations.

The facial soft-tissue landmarks collected are shown in Figure 1. The coordinates of the landmarks were used to estimate several linear distances, angles, and facial volumes,[18,19,21] as follows:

distances (unit, mm): facial height (n-pg); anterior upper facial height (n-sn); anterior lower facial height (sn-pg); upper facial width (ex-ex); middle facial width (t-t); lower facial width (go-go); middle facial depth (sn-t); mandibular corpus length (pg-go); mouth width (ch-ch); vermilion height (ls-li)

angles (unit, degrees): facial convexity including the nose (n-prn-pg); mandibular convexity (go-pg-go); maxillary prominence, soft-tissue analog of skele-

Table 1. Soft Tissue Facial Linear Distances Measured in 42 ''Beautiful'' and 121 ''Reference'' Boys[a]

	n-pg	n-sn	sn-pg	sn-(t-t)	pg-(go-go)	ex-ex	t-t	go-go	ch-ch	ls-li
Boys, 4–5 y										
Beautiful (n = 8)										
Mean	77.59	38.30	40.69	87.99	64.71	85.70	123.99	94.48	39.55	14.64
SD	6.27	3.95	3.98	3.28	3.91	2.49	3.30	4.73	3.98	2.46
Reference (n = 19)										
Mean	76.86	36.08	42.25	82.27	58.00	82.71	120.49	88.99	39.82	12.75
SD	3.70	2.74	2.77	3.68	4.33	3.99	3.18	4.78	4.96	2.44
P (Student's *t*)	NS	NS	NS	.001	.001	NS	.020	.014	NS	NS
Boys, 6–7 y										
Beautiful (n = 21)										
Mean	81.26	39.12	43.25	91.10	66.77	84.40	125.12	95.61	41.41	14.84
SD	5.95	2.90	4.36	2.60	4.20	3.80	4.28	5.10	3.25	2.51
Reference (n = 47)										
Mean	84.69	40.06	46.12	91.29	66.59	83.46	123.94	90.57	41.68	13.43
SD	4.66	2.92	3.74	4.05	5.74	4.65	4.66	7.34	4.51	2.49
P (Student's *t*)	.015	NS	.009	NS	NS	NS	NS	.007	NS	NS
Boys, 8–9 y										
Beautiful (n = 13)										
Mean	86.53	42.71	45.25	97.56	71.48	87.93	129.72	99.14	44.92	15.54
SD	4.20	3.14	4.11	3.40	4.58	4.93	2.98	4.64	5.03	2.96
Reference (n = 55)										
Mean	89.02	43.03	47.25	94.56	68.58	84.74	127.40	94.70	43.34	14.11
SD	5.75	3.08	4.67	3.75	5.70	4.73	5.03	7.85	3.83	2.39
P (Student's *t*)	NS	NS	NS	.011	NS	.036	NS	NS	NS	NS

[a] All values are mm. NS indicates not significant, $P > .05$.

tal ANB angle (sl-n-sn); nasolabial (prn-sn-ls); mentolabial (li-sl-pg); interlabial (sn-ls ∧ sl-li)

volumes (unit, mm^3): total facial volume (all facial structures from the external cutaneous surface up to a plane passing through trichion, tragi, and gonia); facial upper third volume (forehead), measured between the plane passing through trichion, frontotemporale landmarks, and tragi, and a plane passing through tragi and exocanthia; facial middle third volume (maxilla), comprised between the plane passing through tragi and exocanthia, and a plane connecting cheilion landmarks and tragi; facial lower third volume (mandible), comprised between the cheilion-tragi plane and a plane drawn between pogonion and gonia; nasal volume; lip volume (subdivided into the upper and lower lip)

Statistical Calculations

''Reference'' and ''attractive'' children were divided into three age groups: 4–5 years, 6–7 years, and 8–9 years; ages were rounded to the nearest 6 months. The mean ages did not differ within each sex and age group. Descriptive statistics were computed for each group and comparisons were performed within each sex and age group using independent Student's *t*-tests with two-tailed distributions. Significance was set at 5% ($P < .05$).

RESULTS

In both groups of children and in both sexes, all linear distances increased as a function of age (Tables 1 and 2). Overall, boys had larger facial dimensions than girls of the same age and group. A notable exception was anterior upper facial height (n-sn) that was somewhat larger in girls than in boys on almost all occasions.

When compared to ''reference'' children, ''attractive'' children had a reduced total facial height (n-pg); the difference was statistically significant in the 6- to 7-year-old children. The difference was mainly found in the facial lower third that was always larger in the reference children, but the differences did not reach statistical significance.

Attractive children had deeper (middle facial depth, sn-t; mandibular corpus length, pg-go) and wider (in all facial thirds, upper, ex-ex; middle, t-t; and lower, go-go) faces than reference children (Figure 2).

Overall, these differences in the linear dimensions gave larger facial volumes in attractive children than in reference children (Tables 3 and 4). Total facial volume and the upper and middle thirds were significantly

Table 2. Soft Tissue Facial Linear Distances Measured in 47 "Beautiful" and 99 "Reference" Girls[a]

	n-pg	n-sn	sn-pg	sn-(t-t)	pg-(go-go)	ex-ex	t-t	go-go	ch-ch	ls-li
Girls, 4–5 y										
Beautiful (n = 14)										
Mean	78.06	38.40	40.98	87.30	64.14	82.59	120.74	92.48	40.58	13.36
SD	3.27	2.38	2.54	3.45	4.50	3.02	3.47	6.26	3.07	1.75
Reference (n = 11)										
Mean	78.14	36.75	42.67	82.14	59.17	81.43	116.76	85.63	36.88	12.36
SD	3.82	1.62	3.29	4.20	6.53	4.38	5.02	6.46	3.57	2.89
P (Student's *t*)	NS	NS	NS	.004	.041	NS	.035	.018	.014	NS
Girls, 6–7 y										
Beautiful (n = 18)										
Mean	78.46	39.95	42.66	90.90	66.64	84.30	124.70	98.79	45.47	14.03
SD	10.27	2.18	4.44	3.24	2.55	4.04	4.73	8.27	10.84	2.40
Reference (n = 45)										
Mean	82.87	40.40	43.70	88.60	64.48	82.64	119.92	89.21	40.92	13.71
SD	5.49	3.23	4.10	3.70	4.71	3.94	4.36	6.28	4.94	2.70
P (Student's *t*)	.035	NS	NS	.027	.075	NS	.005	<.001	.028	NS
Girls, 8–9 y										
Beautiful (n = 14)										
Mean	86.76	44.09	44.18	95.17	68.43	87.39	126.66	96.83	44.27	16.21
SD	5.45	3.25	3.77	3.42	5.53	3.12	4.73	5.11	2.83	4.28
Reference (n = 43)										
Mean	87.12	42.50	45.89	92.01	66.52	85.63	123.60	93.28	42.42	15.06
SD	6.10	3.19	4.28	4.17	5.21	5.25	6.15	9.37	3.74	3.08
P (Student's *t*)	NS	NS	NS	.016	NS	NS	NS	NS	NS	NS

[a] All values are mm. NS indicates not significant, $P > .05$.

larger in both sexes and in all ages ($P < .05$). The mandibular/maxillary volume ratio was significantly smaller in the attractive children than in the reference age group (relatively larger maxilla together with a relatively smaller mandible). The difference was particularly significant in the youngest children, with an approximate 20% reduction. The mean facial volumes were larger in boys than in girls of the same age, and increased as a function of age.

At all ages and in both sexes, attractive children had larger nasal, upper, and total lip volumes than reference children. The larger lip volumes could be explained by a trend in a larger vermilion height (ls-li); in girls, the additional contribution of mouth width (ch-ch) should be considered (Figure 3).

In the attractive children, the modifications in facial dimensions were coupled with some variations in the arrangement of facial features that were sometimes different in the two sexes at the various ages (Tables 5 and 6). For instance, in the sagittal plane, facial convexity including the nose (n-prn-pg) was similar in attractive and reference boys, but it was reduced (more acute) in attractive girls. The nasolabial angle (prn-sn-ls) was reduced in attractive boys, but it was increased (more obtuse) in attractive girls. In the first two age groups, the interlabial angle (sn-ls ∧ sl-li) was reduced in attractive boys, but increased in attractive girls.

Other profile angles had similar trends in the two sexes: the maxillary prominence relative to the mandible (sl-n-sn) was significantly larger in the 8- to 9-year-old attractive children (more prominent maxilla); in girls, there was a trend toward larger values at all ages. The mentolabial angle (li-sl-pg) was more acute (reduced) in attractive children when compared to reference children (statistically significant in 6- to 7- and 8- to 9- year-old children).

In the horizontal plane, the mandibular convexity angle (go-pg-go) was significantly larger (more obtuse) in the 6- to 7-year-old attractive boys and girls than in their reference age group.

Overall, within group variability was similar in attractive and reference children, with comparable coefficients of variation (the percentage ratio of standard deviation to mean). Notable exceptions were maxillary and nasal volumes (more homogenous in attractive children).

DISCUSSION

The analysis of facial soft tissues, from both a quantitative and a qualitative (esthetic) point of view, is an essential part of orthodontic and maxillofacial diagnosis, treatment planning, and evaluation of results.[16,23] While classical cephalometric assessments allow the

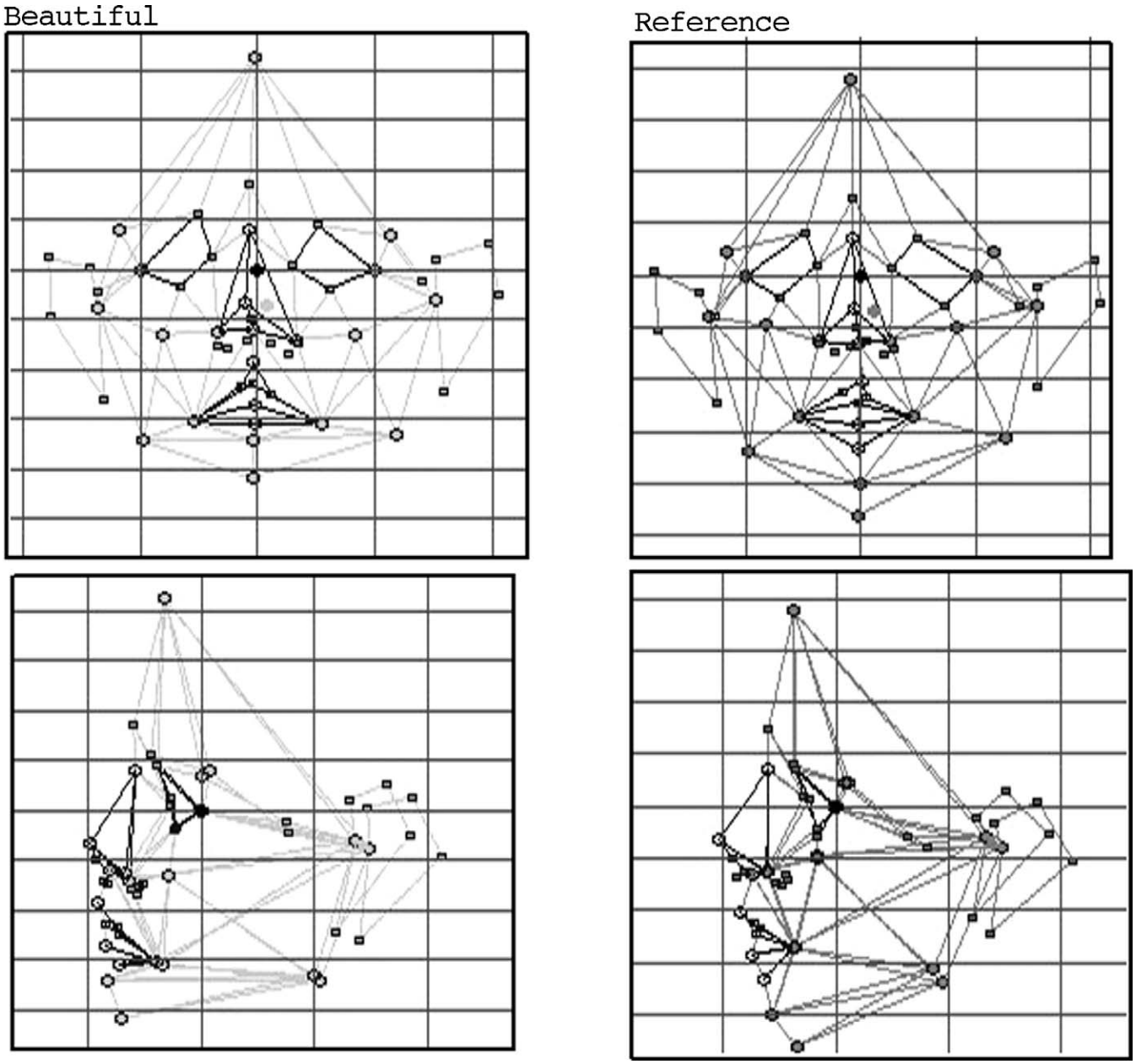

Figure 2. Mean tracings of attractive and reference girls in the 8- to 9-year-old age group.

two-dimensional measurement of soft tissue profile only,[16] the new three-dimensional instruments produce numerical evaluations in all three spatial planes.[17–21] Apparently, only two previous investigations assessed facial esthetic characteristics in three dimensions[7,24]; other studies were limited to two-dimensional photographs or cephalometric films.[6,11,25]

Overall, the current results are in good agreement with previous findings on attractive women,[7] apart from a lack of differences in the volume of the facial lower third (mandible). This could be explained by a reduced vertical dimension (sn-pg) coupled with an increment in the horizontal (go-go) and sagittal (pg-go) dimensions in the attractive boys and girls. The composite three-dimensional volume gave similar results in the two groups of children.

Additionally, in the current children other characteristics in the facial middle third were observed, with significantly larger lip volumes (especially the upper lip), an aspect in good accord with literature references.[11] The mouth width was larger in attractive girls than in reference girls, as previously found in attractive women.[7] Farkas[4] also found a larger upper lip vermilion height in esthetically pleasing men, and a larger upper

Table 3. Facial Volumes Estimated in 42 "Beautiful" and 121 "Reference" Boys[a]

	Forehead	Maxilla	Mandible	Total	Mandible/ Maxilla	Nose	Total Lip	Upper Lip	Lower Lip
Boys, 4–5 y									
Beautiful (n = 8)									
Mean	179.85	199.41	141.04	522.34	70.90	2.03	2.45	1.98	0.47
SD	20.98	20.05	25.15	52.90	11.76	0.40	0.57	0.69	0.37
Reference (n = 19)									
Mean	116.61	143.76	131.33	393.53	92.08	1.84	2.40	1.88	0.52
SD	14.55	14.91	11.61	29.28	11.01	0.42	0.97	0.75	0.45
P (Student's *t*)	<.001	<.001	NS	<.001	<.001	NS	NS	NS	NS
Boys, 6–7 y									
Beautiful (n = 21)									
Mean	182.71	216.52	170.43	572.14	79.10	2.47	3.63	2.88	0.75
SD	28.59	18.67	25.75	53.77	12.13	0.71	1.09	0.96	0.42
Reference (n = 47)									
Mean	156.75	192.79	180.85	531.67	94.55	2.07	2.93	2.03	0.90
SD	22.99	24.93	25.47	59.57	13.66	1.28	0.99	0.85	0.32
P (Student's *t*)	<.001	<.001	NS	.011	<.001	NS	.012	.001	NS
Boys, 8–9 y									
Beautiful (n = 13)									
Mean	209.89	242.85	206.72	662.66	81.20	3.20	4.14	2.89	1.25
SD	24.90	21.99	27.86	53.59	15.07	0.77	1.42	1.47	0.52
Reference (n = 55)									
Mean	175.05	217.57	201.87	596.57	93.63	2.07	3.46	2.18	1.28
SD	26.15	27.67	27.44	63.43	13.72	1.90	0.95	0.66	0.58
P (Student's *t*)	<.001	.004	NS	.001	.007	.042	.044	.012	NS

[a] All values are mm^3, except the mandibular to maxillary volume ratio (%). NS indicates not significant, $P > .05$.

vermilion arch with a more protruding upper lip in women, as compared to persons with nonattractive faces.

In the middle and lower third facial profile, other differences from the reference children were observed (nasolabial, interlabial, and mentolabial angles), but the results were different in the two sexes and did not show constant trends. Considering the variations in dental formulas typical of the children of this age[23] and the influence of incisor position on soft-tissue profile,[8] the results relative to these angles should be considered with caution.

The results on nasal volume are contrasting: while the current attractive children had a larger nose than the reference children, the attractive women had significantly smaller nasal volumes.[7] Probably, most of the attractive women underwent surgical corrections of nasal dimensions (no actual anamnesis was collected), while this kind of intervention had not been performed in children. Nevertheless, nasal volume was relatively more homogenous in attractive children than in reference children, as previously found in attractive women.[7] The increment in upper facial height observed in several of the current groups of attractive children may explain the increased nasal volume. This vertical measurement seems to be relatively constant and independent from secular trends in esthetic opinions.[6]

In a previous three-dimensional study performed on attractive children,[24] nonattractive girls had a larger lower facial width, a finding in contrast with the present findings. Indeed, the previous investigation[24] contrasted two esthetic groups selected on the basis of separate frontal and lateral photographs, and cannot be fully compared with the present analysis. According to Ferrario et al,[24] nonattractive girls were on average fatter than attractive girls, and the larger intergonial width was a result of adipose tissue deposition.

Overall, when measured in three dimensions, attractive faces of Italian children with deciduous and early mixed dentition as well as young Italian women, appear to share several characteristics, notwithstanding the age differences, and the time span (approximately 10 years). Indeed, time-related modifications of esthetic canons have been reported by several investigators, as reviewed by Auger and Turley,[6] who found that in the first 90 years of the last century American female models were preferred with more and more prominent and full lips. Apparently, in these last few decades, attractive faces have maintained similar lip characteristics.[11]

The cultural background of the observer seems to

Table 4. Facial Volumes Estimated in 47 "Beautiful" and 99 "Reference" Girls[a]

	Forehead	Maxilla	Mandible	Total	Mandible/ Maxilla	Nose	Total lip	Upper lip	Lower lip
Girls, 4–5 y									
Beautiful (n = 14)									
Mean	163.64	185.92	140.24	491.88	75.73	2.07	2.41	1.74	0.67
SD	16.53	12.50	19.10	33.15	11.18	0.71	0.79	0.76	0.37
Reference (n = 11)									
Mean	116.97	134.53	128.58	381.65	95.77	1.57	2.26	1.49	0.75
SD	12.69	14.75	17.50	35.69	9.93	0.38	0.80	0.75	0.37
P (Student's *t*)	<.001	<.001	NS	<.001	<.001	NS	NS	NS	NS
Girls, 6–7 y									
Beautiful (n = 18)									
Mean	171.16	211.27	160.72	545.90	76.40	2.73	3.35	2.52	0.82
SD	19.61	16.93	20.00	42.86	10.11	0.51	1.16	0.99	0.42
Reference (n = 45)									
Mean	144.49	181.48	162.37	489.65	90.65	2.00	2.80	1.83	0.96
SD	24.25	22.32	20.39	47.82	14.94	1.31	0.83	0.69	0.43
P (Student's *t*)	<.001	<.001	NS	<.001	.001	.027	.042	.003	NS
Girls, 8–9 y									
Beautiful (n = 14)									
Mean	194.58	244.15	184.78	626.78	75.66	3.26	4.47	2.98	1.50
SD	32.09	27.05	30.38	79.34	8.84	0.60	1.44	1.01	0.66
Reference (n = 43)									
Mean	166.47	199.14	180.99	548.55	91.75	1.95	3.34	2.17	1.17
SD	32.91	30.39	31.30	82.17	14.42	1.77	0.78	0.82	0.31
P (Student's *t*)	.007	<.001	NS	.003	<.001	.008	.001	.004	.016

[a] All values are mm^3, except the mandibular to maxillary volume ratio (%). NS indicates not significant, $P > .05$.

influence esthetic choices in the dentofacial region[1,2,6,8]: in particular, dental and surgical professionals appear to be more critical in their assessment of facial esthetic than nonprofessionals.[1,8,15,17] Additionally, it is felt that esthetics should be evaluated by the laypersons who actually seek orthodontic or maxillofacial treatment.[13,17] The use of a panel of judges seemed to be the only scientific means of measuring facial beauty,[9,12] but the process is very complex and time consuming for its actual application in clinical practice.[12,24]

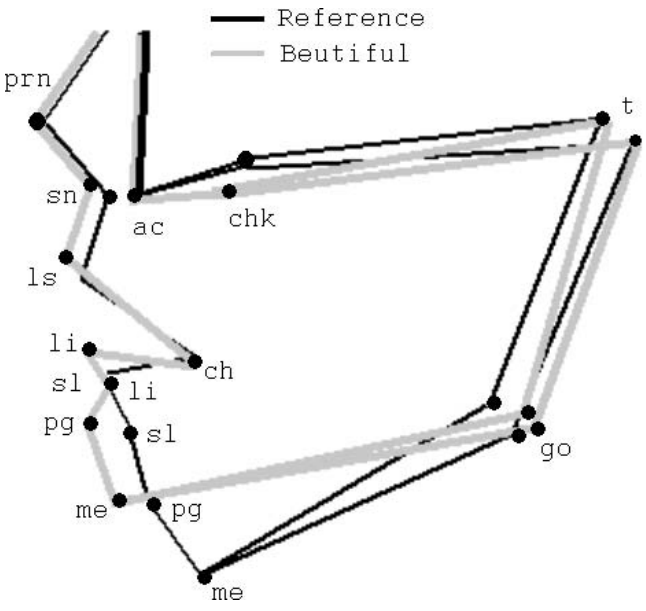

Figure 3. Middle and lower facial thirds, profile view. Attractive and reference girls in the 8- to 9-year-old age group.

In the current study, an external "panel" of judges was chosen: the children were independently selected by professionals in a casting agency who were unaware of the actual scope of the investigation. They were asked to provide "attractive" children of both sexes within a well-defined age range and ethnicity. These faces were to be considered "positive" and "acceptable" for mass media.[15] This kind of selection appears to have never been used before in the scientific literature for children; similar selections were made for adults only: television actresses[7]; winners in beauty competitions, professional models, and performing actors[25]; and photographs of professional models published in fashion magazines.[6,11]

The procedure may appear unusual, but the selected children are those that appear in television, on magazines, and via the mass media. Their facial characteristics are also likely to be considered "attractive" by laypersons.[5,6]

Table 5. Soft Tissue Facial Angles Measured in 42 "Beautiful" and 121 "Reference" Boys[a]

	n-prn-pg	go-pg-go	sl-n-sn	prn-sn-ls	li-sl-pg	sn-ls sl-li
Boys, 4–5 y						
Beautiful (n = 8)						
Mean	130.12	72.36	11.63	123.41	129.39	123.39
SD	4.09	2.87	2.01	5.58	20.32	16.93
Reference (n = 19)						
Mean	133.35	72.17	10.55	125.92	138.37	127.79
SD	5.25	5.05	2.89	12.33	16.98	17.36
P (Student's *t*)	NS	NS	NS	NS	NS	NS
Boys, 6–7 y						
Beautiful (n = 21)						
Mean	131.42	71.03	10.70	128.15	133.12	130.67
SD	4.11	3.85	2.57	10.09	13.62	13.78
Reference (n = 47)						
Mean	129.80	67.39	11.13	132.87	143.56	137.67
SD	4.19	6.31	2.37	9.60	15.26	17.93
P (Student's *t*)	NS	.027	NS	NS	.019	NS
Boys, 8–9 y						
Beautiful (n = 13)						
Mean	131.37	69.44	11.56	132.37	125.19	131.73
SD	3.66	4.08	2.68	13.95	22.86	17.44
Reference (n = 55)						
Mean	131.31	69.28	9.84	129.90	139.18	129.63
SD	4.39	5.57	2.45	8.04	14.53	13.41
P (Student's *t*)	NS	NS	.040	NS	.014	NS

[a] All values are degrees. NS indicates not significant, $P > .05$.

Table 6. Soft Tissue Facial Angles Measured in 47 "Beautiful" and 99 "Reference" Girls[a]

	n-prn-pg	go-pg-go	sl-n-sn	prn-sn-ls	li-sl-pg	sn-ls sl-li
Girls, 4–5 y						
Beautiful (n = 14)						
Mean	131.95	72.60	10.86	131.63	139.68	135.07
SD	3.53	6.28	2.25	12.47	9.51	11.49
Reference (n = 11)						
Mean	135.98	74.73	9.74	126.21	144.02	131.79
SD	3.94	4.90	2.73	6.00	7.98	8.71
P (Student's *t*)	.018	NS	NS	NS	NS	NS
Girls, 6–7 y						
Beautiful (n = 18)						
Mean	129.09	71.55	12.09	135.59	135.91	136.51
SD	4.42	3.83	3.02	11.15	20.30	18.48
Reference (n = 45)						
Mean	130.95	68.44	10.38	129.57	142.45	132.81
SD	4.75	4.98	2.07	11.36	14.97	17.13
P (Student's *t*)	NS	.031	.028	NS	NS	NS
Girls, 8–9 y						
Beautiful (n = 14)						
Mean	130.60	70.21	10.75	132.63	132.31	130.79
SD	4.13	4.67	3.15	9.06	14.52	21.55
Reference (n = 43)						
Mean	131.81	70.17	9.81	130.00	139.37	129.57
SD	5.26	6.74	2.71	10.84	15.41	15.42
P (Student's *t*)	NS	NS	NS	NS	NS	NS

[a] All values are degrees. NS indicates not significant, $P > .05$.

CONCLUSIONS

When compared to reference, healthy children, Italian attractive children in the deciduous and early mixed dentition had a:

- Larger face, with an increased development of the facial middle (maxilla) and upper thirds (forehead); the face was wider and deeper (dimensions and horizontal convexity), but less vertically developed in the lower third
- Larger lips, with an increased vertical dimension; in girls, also larger mouth width
- Larger nose
- More convex profile, with a more prominent maxilla relative to the mandible

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