

# Does malocclusion influence the adolescent's satisfaction with appearance? A cross-sectional study nested in a Brazilian birth cohort

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Abstract - Objectives: To test whether malocclusion had an impact on adolescents' appearance satisfaction regardless of other physical aspects. Methods: A cross-sectional study nested in a birth cohort study was carried out in Pelotas, Brazil. A random sample of 900 15-year-old adolescents was selected. WHO criteria were used to define malocclusion and a questionnaire was administered including self-reported skin colour and appearance satisfaction. Dental caries were assessed. Height and weight were measured and body mass index calculated. Data concerning gender and socioeconomic characteristics were obtained from the cohort's perinatal study. Adjusted analyses including all confounding variables investigated were performed using Poisson regression with robust variance in order to identify the potential risk factors for appearance dissatisfaction. All analyses were carried out separately by gender. Results: The sample included 867 individuals, 54.1% men. The prevalence of moderate or severe malocclusion was 30.6% (95% CI: 26.5-34.7) among boys, and 32.8% (95% CI: 28.2-37.4) among girls (P = 0.524). Dissatisfaction with appearance was reported by 29.8% of the boys and by 46.5% of the girls (P < 0.001). A positive association between malocclusion and appearance dissatisfaction, controlling for other physical, dental caries and socioeconomic characteristics was observed only in girls [prevalence ratio = 1.4 (1.3-1.7)]. Conclusions: Malocclusion is a common condition and is positively associated with appearance dissatisfaction in adolescent girls. The effect of different types of malocclusion on appearance dissatisfaction should be the focus of further investigation.

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Key words: adolescents; appearance; malocclusion; prevalence; self-perception

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Adolescents tend to be strongly concerned about their faces and bodies because they wish to present a good physical appearance. Moreover, self-esteem is considered to play an important role in psychological adjustment and educational success (1). Studies have shown a positive association between less physically attractive adolescents and bullying at school (2, 3), while several physical characteristics have been shown to influence the adolescent's appearance satisfaction such as body weight (4, 5), height (6) and also dental aesthetics (7).

Body appearance satisfaction has often been studied during adolescence because of its significant role in predicting depression, eating disorders and low self-esteem (5, 8, 9). Body mass index (BMI) seems to be the most often biological characteristic related to body appearance satisfaction (9–13). A study based upon a nationally representative sample in the USA found that obesity in adolescence is linked with lower quality of life (12). An epidemiological investigation carried out in a community sample of young women in southern Brazil found abnormal eating behaviours to be significantly more prevalent in the 16–19 year age group and also more prevalent among overweight or obese women than older and normal weight women (10).

Studies have shown that pleasing dental appearance is an important factor for psychosocial well-being (14, 15). Among dental disorders, malocclusion is regarded as a set of growth and developmental anomalies that affect jaws and teeth resulting in a variation of teeth position (16).

Malocclusion is not a disease but rather a set of dental deviations which in some cases can influence quality of life (17). It has been associated with low appearance self-esteem in adolescents and young adults in several international (18, 19), and Brazilian studies (20, 21). These studies showed that dental aesthetics have a direct effect on oral health-related quality of life, with a strong concern about social appearance, reflecting how bothered children and adolescents were by the alignment of their teeth, and how upset they would be if they could not receive orthodontic treatment (18, 19). In addition, some authors have found that adolescents who had completed orthodontic treatment had fewer oral health-related impacts compared with those currently under treatment or those who had never had treatment (21). Severe malocclusion such as incisor crowding and severe overjet perceived as an aesthetic problem (7, 20, 22).

Despite evidence that appearance dissatisfaction is associated with body and dental status, epidemiological studies that investigated different physical aspects in the same population were not found in the literature in a Pubmed (National Library of Medicine) search covering the years between 1995 and 2005. Accordingly, the aim of this study was to test whether malocclusion had an impact on adolescents' appearance satisfaction, controlled for other physical characteristics that were investigated.

# Methods

## Data source

This study was developed in Pelotas, Rio Grande do Sul state, a city with approximately 320 000 inhabitants located in the far South of Brazil. In 1982, the first Brazilian population-based birth cohort study was initiated in Pelotas and its main objectives were to assess perinatal and infant health (23). Samples of live-born children were followed up (23). Precoded standardized questionnaires were given to mothers in each period, covering family income according to Brazilian Minimum Wages, demographic variables, maternal characteristics, pregnancy, delivery, environmental characteristics, mother's and child's health care and morbidity characteristics. In addition, mothers' and children's anthropometric characteristics were registered.

The 1997 follow-up included a cross-sectional oral health study. A simple random sample of 900 was selected. This sample size was considered adequate to test the association between malocclusion (exposure) and appearance dissatisfaction (outcome) considering the following parameters: a prevalence of appearance dissatisfaction of 35% among the unexposed, a relative risk of 1.4;  $\alpha$  type 1 error of 5%, and power of 80%.

A fieldwork team of eight dental students was trained and calibrated to perform the dental examinations that included malocclusion and dental caries. The WHO criteria (24) were used to define the indexes as follows: occlusal status (normal occlusion; mild malocclusion: discrete anomalies such as rotation in one or more teeth, dental crowding or spacing; and moderate/severe malocclusion: presence of overjet equal to or greater than 9 mm, cross bite, open bite, diastema  $\geq$ 4 mm, crowding or spacing  $\geq$ 4 mm), and DMFT. Prior to the field work, the observers were trained and calibrated in a population with age similar to the sample. Inter and intra examiner reliability was calculated using Kappa statistics on a tooth-bytooth basis for dental caries and for the malocclusion classification adopted. The lowest value was 0.65. The oral examinations were carried out at the adolescent's home. At the same time, a questionnaire was administered to the adolescents including questions about self-reported skin colour (white, mixed, black), and appearance satisfaction (yes, no). Adolescents were weighed using a portable UNICEF scale with accuracy of 0.1 kg and measured with a portable stadiometer with accuracy of 0.1 cm. The adolescents were weighed and measured wearing light clothes, without shoes, and their heads in the Frankfurt plan. Inter- and intra-examiner reliability errors were calculated and remained within international pattern (25). The BMI was assessed, calculated as weight in kilograms divided by height in meters squared. Obesity was defined as a BMI equal to or greater than the age and gender specific 85th percentile (26). Data concerning socioeconomic characteristics (family income, maternal schooling) were obtained from the birth phase of the cohort study, as several studies have emphasized the influence of socioeconomic childhood conditions on health outcomes later on in life (27, 28). The questionnaire and dental examinations were previously tested in a pilot study.

#### Data analysis

The analysis was performed by gender because it was hypothesized that there would be a different impact of dental and body appearance in boys and girls. Descriptive statistics were calculated and bivariate analyses between the outcome and each of the independent variables were obtained and prevalence ratios (PRs) calculated with 95% confidence intervals. To analyse the presence of malocclusion as a potential risk factor for appearance dissatisfaction, the Poisson regression model with robust variance rather then a logistic regression was used because in initial analyses a prevalence higher than 20% was found (29).

All variables that presented P < 0.20 in the bivariate analysis and the socioeconomic controlling variables were included in the multiple analyses to control for possible confounding factors. Plausible interactions between malocclusion and weigh height, BMI and untreated dental caries were tested using the Wald test for heterogeneity. The analyses were performed using Stata 9 (Stata Corp., version 9).

The adolescents' parents were informed of the objectives of the study and written informed consent was obtained for interviews and dental examinations. The study protocol was approved by the Ethics Committee of the Federal University of Pelotas Medical School prior to the start of the study.

#### Results

The response rate achieved was 96.3% (867 adolescents were successfully interviewed about their appearance satisfaction from 900 eligible individuals). The main reason for nonresponse was refusal by the family. The sample was composed of 480 (54.1%) boys and 408 (45.9%) girls.

#### Malocclusion and adolescent's appearance satisfaction

Table 1 shows that more than half of the adolescents presented a family income between 1.1 and 3 times the Brazilian Minimum Wage at birth, more than 70.0% had a mother who studied

Table 1. Demographic, socioeconomic, anthropometric, dental status and appearance satisfaction among male and female adolescents, Pelotas, Brazil, 1997

	Male <sup>a</sup>	Female <sup>a</sup>	Total				
Variables	(n = 480)	(n = 408)	(n = 888)				
Family income at hirth (BMW) <sup>b</sup>							
>10	19 (3.9)	11 (27)	30 (4 3)				
61-10	$\frac{19}{28}(5.9)$	21(5.2)	49(55)				
31-60	106(221)	81(200)	187(212)				
1 1_3	245(512)	212(52.3)	457 (51.7)				
<li>&lt;1</li>	81 (16.9)	80 (19.8)	161(182)				
Family income at 15	vears old (	BMW) <sup>b</sup>	101 (10.2)				
>10	97 (20.6)	73 (18.1)	170 (194)				
61-10	70 (14.8)	78 (19.4)	148 (16.9)				
31-60	154 (32.6)	120 (29.8)	274(311)				
1 1-3	104(02.0) 117(24.8)	107(194)	274 (25.6)				
<1	34(72)	25(181)	59 (67)				
Maternal schooling	01(7.2)	20 (10.1)	0) (0.7)				
>8 years	105 (25.3)	103 (25 3)	208 (23 5)				
<8 years	373(747)	305(747)	678 (76 5)				
Birth weight	575 (74.7)	505 (74.7)	070 (70.0)				
>2 500	456 (95.0)	380 (93.1)	836 (94.1)				
<2 500	24(50)	28 (6.9)	52 (5.9)				
Skin colour	24 (0.0)	20 (0.7)	02 (0.))				
White	331 (70.1)	299(714)	631 (72.1)				
Non-white	141 (29.9)	103(256)	244(27.9)				
Weight at 15 years	old (percenti	le 85)	211 (27.9)				
<pre>cn85</pre>	399 (84 9)	343 (85.1)	742 (85.0)				
<p05 &gt;n85</p05 	71(151)	60 (14 9)	216(150)				
Weight at 15 years	old (percenti	(le 25)	210 (10.0)				
>n25	354 (75 3)	303 (75.2)	657 (73 3)				
>p20	116(247)	100(24.8)	216(247)				
Height at 15 years of	110 (24.7)	100 (24.0)	210 (24.7)				
1 52	448 (95 3)	340 (84.6)	788 (90.4)				
<1 52	22 (47)	62(154)	84 (9.6)				
BMI at 15 years old	$(kg/m^2)$	02 (10.4)	04 ().0)				
Percentile $< 85$	382 (81 3)	318 (79.1)	700 (80 3)				
Percentile>85	88 (187)	84 (20.9)	172 (197)				
Decay component o	f DMFT <sup>c</sup>	01 (20.9)	172 (19.7)				
	117(244)	105 (25.7)	222 (25.0)				
1_3	117(24.4) 186(387)	103(23.7) 177(43.4)	363 (40.1)				
>4	100(30.7) 177(36.9)	177(40.4) 126(30.9)	303(341)				
Missing component	of DMFT <sup>c</sup>	120 (00.))	505 (54.1)				
	387 (80.6)	322 (78.9)	709 (79.8)				
0 >1	93(194)	86 (21.1)	179(202)				
Malocclusion	)) (1).4)	00 (21.1)	17 (20.2)				
Normal or mild	333 (69.4)	274 (67 2)	607 (68.4)				
Severe	147 (30.6)	134 (32.8)	281 (31.6)				
$\Delta ppearance satisfaction$							
Yes $328(70.2) 214(53.5) 542(62.5)$							
No	139 (29.8)	186 (46 5)	325 (37 5)				
110	107 (27.0)	100 (10.5)	525 (57.5)				

<sup>a</sup>Missing values excluded.

<sup>&</sup>lt;sup>b</sup>BMW = Brazilian Minimum Wage (worth of US\$ 100,00).

 $<sup>^{</sup>c}DMFT = Number of decay, missing, filled permanent teeth.$ 

for 8 years or less and 90.0% were born weighing 2500 g or more. Of the total, 70.0% self-reported white skin colour, while around 15.0% presented weight above the 85th percentile and 24.0% below the 25th percentile. The BMI was equal to or greater than the 85th percentile in around 20.0% (19.7% for boys and 20.9% for girls). High levels of untreated dental caries (D  $\geq$  4) totalled 36.9% of boys and 30.9% of girls.

The prevalence of moderate or severe malocclusion was 31.6% (95% CI: 28.5–34.7) in the whole sample, 30.6 (95% CI: 26.5–34.7) among boys, and 32.8 (95% CI: 28.2–37.4) among girls, with no statistically significant difference between genders (P = 0.524). Overall, 37.5% of the adolescents reported dissatisfaction with their appearance, and the prevalences for boys (29.8%) and girls (46.5%) were significantly different (P < 0.001) (Table 1).

Table 2 shows the bivariate analysis for each independent variable and appearance dissatisfaction at 15 years of age among boys. The only variable positively associated with appearance dissatisfaction was a BMI above the 85th percentile (P = 0.007); whilst black skin colour (P = 0.076), and height < 1.52 m (P = 0.086) exhibiting a borderline association. Malocclusion was not associated with appearance dissatisfaction among boys (P = 0.318).

Among girls, malocclusion exhibited a significant association with appearance dissatisfaction (P = 0.001) and the variables included in the model as potential confounders were family income (P = 0.041), weight (P = 0.158), BMI (P = 0.063), and the decay component of DMFT (P = 0.050) at 15 years of age (Table 3).

The final model of association between appearance dissatisfaction and malocclusion for girls, after adjusting for the selected variables is shown in Table 4. A positive association was found between the presence of moderate/severe malocclusion and appearance dissatisfaction in adolescent women [PR = 1.4 (1.3-1.7)], after adjusting for physical and socioeconomic characteristics. Table 4 showed an association between appearance dissatisfaction and the lowest family income category [PR = 2.1 (1.1-4.1)] and a borderline association between appearance dissatisfaction and high levels of untreated dental caries [PR = 1.4 (1.0-1.8)]. The association between appearance dissatisfaction and height at aged 15, weight at age 15 and BMI at 15 years old were not statistically significant  $[PR = 1.2 \quad (0.9-1.7), \quad PR = 1.0$ (0.7 - 1.5)and

Table 2	2. Prevale:	nce of	appeara	nce	dissa	tisfaction	in
male ac	dolescents	and ci	rude PRs	for	each	independe	ent
variable	e in relatio	n to th	e outcom	ne, Pe	elotas,	, Brazil, 19	97

	Appearance dissatisfaction					
Variable	п	п	%	PR (CI <sub>95%</sub> )	$P^{\mathbf{b}}$	
Family Income at birth (BMW)						
>10	18	4	22.2	1.0	0.641	
6.1–10	28	7	25.0	1.2(0.8–1.9)		
3.1-6.0	100	34	34.0	1.4(0.9-2.2)		
1.1–3	239	73	30.5	1.0(0.5-2.1)		
<1	81	20	24.7	0.9(0.3-2.3)		
Family Income at	15 vea	ars old	(BMV	V)		
>10	97	29	29.9	1.0	0.691	
6.1–10	69	16	23.2	1.0(0.5 - 1.7)		
3.1-6.0	151	50	33.1	1.1(0.6-1.9)		
11-3	117	.34	29.1	0.8(0.4-1.5)		
<1	33	10	30.3	10(0.5-1.8)		
Maternal schooling	y (vea	rs)	00.0	1.0(0.0 1.0)		
>8 years	102	24	23.5	10	0 143	
<8 years	363	113	31.1	1.0 1.3(0.9-1.9)	0.110	
Birth weight (g)	000	110	01.1	1.5(0.9 1.9)		
>2500	111	13/	30.2	1.0	0 487	
≥2.500 <2.500	22	5	21.7	0.7(0.3, 1.6)	0.407	
Skip colour	23	5	21.7	0.7(0.3-1.0)		
White	220	106	22.2	1.0	0.076	
VVinte Nam subite	320 120	100	32.3	1.0	0.076	
Mainh at 15	139		23.7 . 1:1 - 05	0.7(0.3-1.0)		
weight at 15 years		percer	$\frac{100}{20}$	)) 10	0.101	
<p85< td=""><td>395</td><td>112</td><td>28.3</td><td>1.0</td><td>0.121</td></p85<>	395	112	28.3	1.0	0.121	
≥p85	71	, 27	38.0	1.3(1.0–1.9)		
Weight at 15 years	old	percer	tile 25	)) 1 0	0.704	
>p25	352	107	30.4	1.0	0.724	
≤p25	114	32	28.1	0.9(0.7-1.3)		
Height at 15 years	old					
≥1.52	445	129	29.0	1.0	0.086	
<1.52	21	10	47.6	1.6(1.0–2.6)		
Body Mass Index (	(kg/n	n²)				
Percentile $< 85$	378	102	27.0	1.0	0.007	
Percentile $\geq 85$	88	37	42.1	1.6(1.2–2.1)		
Decay component	of D	ИFТ <sup>а</sup>				
0	114	29	25.4	1.0	0.495	
1–3	181	55	30.4	1.1(0.9–1.3)		
≥4	172	55	32.0	1.3(0.9–1.8)		
Missing componer	nt of I	<b>DMFT</b> <sup>a</sup>				
0	376	115	30.6	1.0	0.523	
≥1	91	24	26.4	0.8(0.6-1.3)		
Malocclusion						
Normal	327	100	30.6	1.0	0.318	
or mild						
Moderate/	140	39	27.9	0.9(0.7-1.2)		
severe				. ,		

<sup>a</sup>DMFT = number of decayed, missing, filled permanent teeth.

<sup>b</sup>Fischer exact test.

PR = 1.2 (0.9–1.7), respectively] The only statistically significant interaction was between malocclusion and high prevalence of the D component of DMFT (P = 0.03).

Malocclusion in adolescent men was not associated with appearance dissatisfaction after controlling for other related variables.

Table 3. Prevalence of appearance dissatisfaction in female adolescents and crude PRs for each independent variable in relation to the outcome, Pelotas, Brazil, 1997

		Appearance dissatisfaction			
Variable	п	п	%	PR (CI <sub>95%</sub> )	$P^{\mathbf{b}}$
Family income at	birth	(BMW	r)		
>10	11	42	53.9	1.0	0.244
6.1–10	21	93	45.2	0.8 (0.6–1.1)	
3.1-6.0	81	38	46.9	0.9 (0.6–1.2)	
1.1–3	212	9	42.9	0.8 (0.5–1.4)	
<1	80	2	18.2	0.3 (0.1–1.2)	
Family income at	15 yea	ars old	I (BMV	V)	
>10	72	7	28.0	1.0	0.041
6.1–10	78	60	57.1	2.0 (1.1-3.9)	
3.1-6.0	119	56	47.1	1.7 (0.9–3.2)	
1.1–3	105	35	44.9	1.3 (0.7-2.8)	
<1	25	28	38.9	1.3 (0.7–2.8)	
Maternal schooling	g (yea	rs)			
>8 years	102	48	47.1	1.0	0.909
≤8 years	298	138	46.3	1.0 (0.7–1.3)	
Birth weight (g)					
≥2.500	373	171	45.8	1.0	0.425
<2.500	27	15	55.6	1.2(0.8-1.7)	
Skin colour				(,	
White	296	137	46.3	1.0	0.909
Non-white	102	48	47.1	1.0(0.8-1.3)	
Weight at 15 years	s old	(percei	ntile 8	5)	
<pre><pre>cn85</pre></pre>	342	154	45.0	10	0 155
<pre>&gt;p85</pre>	58	32	55.2	1.0 1 4 (0 9–2 3)	0.100
Weight at 15 years	s old i	nerce	ntile 2	5)	
>n25	301	138	45.9	10	0 728
>p20	901	130	48.5	1.0 1.1 (0.8 - 1.3)	0.720
Height at 15 years	old	40	40.0	1.1 (0.0 1.0)	
>1 57	3/0	153	15.3	1.0	0 212
≥1.52 <1.52	62	33	<b>5</b> 4 1	1.0 1.1(0.0, 1.4)	0.212
RMI (lcg/m <sup>2</sup> )	02	33	54.1	1.1 (0.9–1.4)	
Divil (kg/ill)	217	140	44.2	1.0	0.062
Percentile < 65	317	140	44.Z	1.0	0.065
$\Gamma$ ercentule $\geq 60$	02 a ( D)	40 4077a	36.1	1.5 (1.0–1.0)	
Decay component	01 DI	VIF I 40	20 0	1.0	0.050
0	105	40	30.0 4E 1	1.0	0.050
1-3	1/3	10	45.1	1.2(0.9-1.6)	
≥4 \	124	68 20 (ET	54.8	1.4 (1.1–1.9)	
Missing componer	it of I		47 (	1.0	0.005
0	315	150	47.6	1.0	0.395
≥1	85	36	42.4	0.9 (0.7–1.2)	
Malocclusion					
Normal	269	109	40.5	1.0	0.001
or mild	101		-0.0		
Moderate/	131	11	58.8	1.5 (1.2–1.8)	
severe					

<sup>a</sup>DMFT = Number of decayed, missing, filled permanent teeth.

<sup>b</sup>Fischer exact test.

## Discussion

To our knowledge, there has been no study assessing the association between the occurrence of malocclusion and adolescents' appearance dissatisfaction controlling for different types of

Table 4. Poisson regression analysis for malocclusion – female sample, Pelotas, 1997

Model	п	PR (CI <sub>95%</sub> )	Р	
1	400	1.5 (1.2–1.8)	< 0.001	
2	399	1.4 (1.2–1.8)	0.001	
3	399	1.4 (1.2–1.8)	0.001	
4	399	1.4 (1.2–1.7)	0.001	
5	399	1.4 (1.1–1.7)	0.001	
6	399	1.4 (1.1–1.7)	0.002	

Model 1: Crude malocclusion; Model 2: Malocclusion + family income at 15 years old; Model 3: Malocclusion + family income at 15 years old + weight at 15 years old (percentile 85); Model 4: Malocclusion + family income at 15 years old + weight at 15 years old (percentile 85) + height at 15 years old (percentile 25); Model 5: Malocclusion + family income at 15 years old (percentile 85) + height at 15 years old (percentile 25) + BMI at 15 years old; Model 6: Malocclusion + family income at 15 years old + weight at 15 years old (percentile 85) + height 8

physical aspects in the same population. This was a population-based cross-sectional study nested in a birth cohort study and presents a high response rate, practically eliminating the possibility of selection bias.

Despite this study being representative for adolescents in Pelotas, the results cannot be extrapolated to Brazil as a whole, as the country presents important regional differences in terms of ethnicity, overweight, and height that may affect values regarding beauty and attractiveness. In addition, some methodological differences in measuring self-esteem and psychological aspect, as well as other physical aspects, which were not evaluated in this study may have influenced our results.

A stratified analysis by gender was adopted because of the well-known differences in selfperception of physical aspects between boys and girls (11, 30). Dental examiners were unaware of participants' appearance dissatisfaction, and clinical and anthropometric data collection followed international standards to enable comparisons between studies carried out in different places and at different times. Multiple regression analyses controlled other physical aspects, which may have confounded the effect of malocclusion on appearance dissatisfaction. In addition, Poisson regression with robust variance was used in order to provide PR estimates, easier to interpret than odds ratios. In a situation of dissatisfaction prevalence close to 50%, odds ratios would strongly overestimate the PRs (29).

As found in other international and Brazilian investigations with adolescents (31, 32), the prevalence of malocclusion was relatively high. The difference observed among the studies may be attributed partially to the different criteria used to measure malocclusion or, on the contrary, to differences in subject' ages among studies. In addition, ethnic, physical and cultural characteristics are likely to contribute to differences in the prevalence of malocclusion found in the literature.

The high prevalence of dissatisfaction with physical appearance among adolescents is a very relevant aspect of this study. Nearly half of the girls and one-third of the boys were unhappy with their looks. This is in agreement with the characteristic preoccupation of adolescents about body changes that begin with puberty. In addition, the growing interest in relationship and dating makes body and physical attributes especially important in this phase of development. This also seems to reflect the internalization of the cultural body standards and their being linked to their own identities may make adolescents feel shame when they do not meet such standards (33).

Moderate/severe malocclusion was found to have an impact on appearance satisfaction in girls even when other physical characteristics were taken into account. This pattern was not observed among boys. Gender differences were identified in relation to the standards with which girls and boys compare their physical appearance. Boys were concerned with height and body mass, probably because they are under pressure to produce bodies that are sporty and strong (34). On the contrary, girls are worried about a far larger number of physical aspects, for example, malocclusion. This is in agreement with a finding widely known in the literature that women feel less positively towards their bodies than do men (35). One interpretation of these gender differences in physical appearance dissatisfaction is that standards for female attractiveness are much higher than for male attractiveness in a larger cultural context. Accordingly, women, constantly confronted with the media's slender and beautiful renderings of their peers, may aspire to an ideal quite impossible for most of them to attain. Not achieving these ideals, they end up with low self-esteem (36).

It has been suggested that appearance dissatisfaction can lead to feelings of depression, loneliness and low self-esteem among other psychological outcomes (5, 13). These symptoms can persist into early adulthood, leading people to adopt a more submissive role in social interaction, becoming unassertive and rarely initiating prosocial behaviour (37).

According to our results, the appearance of the teeth was found to be important for young women, showing a high impact in appearance satisfaction in girls. An association between teeth appearance satisfaction and gender has been inconsistent in the literature, with some studies reporting greater concern in women (14, 38) and others showing no association (39, 40).

To place our results in a broader perspective, we suggest further research to investigate if correction of malocclusion provides an improvement in the individual's self-esteem and also if identifying preventable malocclusion will contribute to the adolescents' quality of life in adulthood.

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