Original Article

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Factors influencing dental appearance satisfaction in adolescents: a cross-sectional study conducted in Southern Brazil

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Abstract

The perception of dental aesthetic appearance may affect social interaction and psychological status, influencing dental needs and the search for treatments. **Aim:** To investigate the satisfaction with dental appearance and influencing factors among adolescents. **Methods:** The study was carried out among adolescents aged 14 to 19 years attending a private high school in Brazil. Data on demographic information, the perception of dental appearance, previous aesthetic treatments and wish to perform dental treatments were collected in the school. Data were analyzed using Pearson's chi-square test or Linear Trend. Multivariate analysis was performed using the Poisson regression. **Results:** A total of 531 adolescents (Response rate = 98.3%) answered the questionnaire. The prevalence of dissatisfaction with dental appearance was 17.4%. Almost 65% had history of previous orthodontic treatment and 16% performed dental bleaching. Approximately 45% of children wished to undergo orthodontics and 54.8% to bleach their teeth. Dissatisfaction with dental appearance was associated with individuals unsatisfied with dental color (95% IC[1.73;4.32]), those perceiving poor dental alignment (PR3.16 95% IC[2.11;4.72]) and those wishing orthodontic treatment (PR2.9; 95% IC[1.79; 4.70]). **Conclusions:** The prevalence of dissatisfaction was considerable and was associated with aesthetic concerns such as tooth color, dental alignment and with the wish for orthodontics. In this young population, a large part of adolescents had already performed orthodontic and bleaching treatments and wished to perform those treatments again. Satisfaction with dental appearance could affect the adolescents' behavior regarding search for dental treatment, thus causing possible overtreatment.

Keywords: Patient Satisfaction. Esthetics. Self Concept. Color. Tooth. Malocclusion. Adolescent.

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Introduction

Concerns in relation to esthetics are more present in modern society[1] and have caused an increased demand for aesthetic treatments[2]. Facial aesthetics has been associated with facial and smile harmony[1]. Smile harmony is dependent on several factors such as tooth color, shape, size and position; lip position allowing tooth visibility and gingival disposition[3]. The lack of a proportional and beautiful smile could impact the self-esteem of a person, influencing the psychological and physical health[4]. This

situation can affect socio-emotional aspects of well-being and may influence social interaction[5].

Studies have found that the satisfaction with dental appearance is greatly influenced by tooth color and malocclusion[3-4,6-7]. Those parameters could be affected by psychosocial, cultural and sociodemographic factors[8-10]. White teeth have been associated with higher scores of social competence, intellectual ability, psychological balance and social status[11] and may impact the quality of life of the subject[12]. In adolescence, facial attractiveness is an important social norm among adolescent groups, the dental appearance being the first factor related to attractiveness[13]. The social interactions with negative self-concept and peer-group acceptance have been associated with unacceptable dental appearance[14]. Among adolescents, studies have shown that girls emphasize attractiveness[15]. Age was found to influence the satisfaction with dental appearance and older individuals tend to be more satisfied with dental appearance than the younger ones[8,16]. The presence of untreated caries, stained anterior restorations and missing teeth can lead to dissatisfaction with dental appearance[11].

It seems that individuals with higher socioeconomic level are more concerned in relation to their attractiveness[17] and with aesthetic appearance, and more inclined to undergo aesthetic treatments, like orthodontic appliances, compared with those in deprived situation[18-19]. Moreover, studies reported that the performance of dental treatments, such as orthodontics and tooth bleaching, could improve the satisfaction with dental appearance, perception of attractiveness and the quality of life of patients[7,20-21].

The aim of this study was to investigate the self-reported satisfaction with dental appearance and the association with demographic factors, self-perceived dental problems and the wish to undergo aesthetic treatments among adolescents from a private school in Southern Brazil.

Material and methods

The present study had approval of the Ethics Committee, Federal University of Pelotas (nº 196/96). Formal permissions were obtained from the School's Director Board. Parents or legal guardians of the adolescents received and signed an informed consent form allowing the adolescents' participation.

This cross-sectional study was carried out in Pelotas, an affluent city (350,000 inhabitants), located in Southern Brazil. According to the Department of Education of Rio Grande do Sul State, Pelotas has 19 states, 1 municipal and 9 private schools offering secondary education. The number of children enrolled in secondary schools of the city was 9,237 in public and 1,711 in private schools. The study population consisted of a sample of adolescents 14-19 years old, attending a private school.

This population was selected due to the high number of children attending the school, considering that sample size can influence the presence of studied outcomes[22]. There were 540 students in this age range attending the school in 2012, the year when the fieldwork was carried out.

The quality of the structured questionnaire based on previous investigations, was previously tested in adolescents with similar ages, not included in the study. Adolescents were asked about their perceptions of tooth color, satisfaction with tooth appearance, tooth alignment, previous or actual use of orthodontic appliances and the wish to carry out treatments like orthodontics and tooth whitening. Also questioned were the presence of tooth pain or impairments in tooth appearance, including tooth crowding, dental caries, misalignment, tooth fractures and gingival bleeding.

Satisfaction with facial, tooth and color appearance was initially recorded as very satisfied, satisfied, unsatisfied and very unsatisfied, later dichotomized in satisfied and dissatisfied. Concern with aesthetics was categorized in never, sometimes, frequently and always.

The questionnaire was conducted in a schoolroom by two trained examiners (post-graduate students) with previous experience in epidemiological studies. Individuals were considered as losses if they could not be found after two times recall.

Data were recorded in the Epi Info 6.0 software and the analyses were carried out in Stata 12.0. Descriptive and bivariate analyses were performed to assess the association between studied factors and satisfaction with tooth appearance, using Pearson's chi-square test or Linear Trend, depending on the type of variable. All variables with p-value < 0.25 in the bivariate analysis were considered potential confounders and included in the multivariate analysis, obtaining prevalence ratios (PR) and 95% confidence intervals for the outcome. Multivariate analysis was performed by the Poisson regression. Explanatory variables were selected for the final models only if they had a p-value ≤ 0.05 after adjustment.

Results

The rate of participation was 98.3% and 531 adolescents participated in the study. Perception and characteristics of adolescents regarding dental aesthetics are described in Table 1; with most of them being female (57.4%). The prevalence of actual or past use of orthodontic appliance was 64.7%. Dissatisfaction with dental appearance was reported by 91 (17.4%) teenagers. The perception of dental protrusion, alignment and crowding were reported by 11.0%, 25.4% and 10.0% of the adolescents, respectively. Tooth pain in the last 6 months, gingival bleeding and dental trauma were indicated respectively by 30.7%, 20.3% and 18.9%. Most of the individuals (54.8%) wished to perform tooth whitening and 45.2% an orthodontic appliance. Sixty-five adolescents (12.6%) were dissatisfied with their appearance and 226 (43.4%) felt unattractive or relatively attractive. Adolescents reported to be concerned about others' opinion regarding their dental appearance sometimes (54%), frequently (9.4%) or always (1.9%).

Bivariate analysis of the association between the satisfaction with dental appearance and the investigated factors is shown in Table 2. The perception of an unpleasant dental appearance was associated with dissatisfaction with dental color and facial aesthetics, perception of dental crowding, dental alignment and tooth pain in the last 6 months, lack of use of orthodontic appliance, wish to carry out orthodontic treatment, tooth bleaching or to perform a corrective facial surgery. It was associated with lack or little perception of attractiveness, while the preoccupation with others' opinion regarding the own adolescent's dental appearance showed a tendency to increase in those unhappier with their appearance.

Table 1 - Dental aesthetic perceptions of schoolchildren from a private school in Pelotas, Brazil, 2012 (n = 524).*

Variables/Category	n	%
Sex	531	
Male	226	42.6
Female	305	57.4
Satisfaction with dental appearance	523	
Yes	432	82.6
No	91	17.4
Satisfaction with tooth color	524	
Very satisfied/ Satisfied	370	70.6
Dissatisfied/ Very dissatisfied	154	29.4
Performed tooth bleaching	523	
No	439	83.9
Yes	84	16.1
Used or is using orthodontic appliances	524	
No	185	35.3
Yes	339	64.7
Perception of dental crowding	522	
No	470	90.0
Yes	52	10.0
Perception of Dental alignment	523	
No	390	74.6
Yes	133	25.4
Perception of Dental protrusion	519	
No	462	89.0
Yes	57	11.0
Wish for orthodontic appliances	518	
No /Don`t know	284	54.8
Yes	234	45.2
Wish for tooth bleaching	520	
No/ Don`t know	236	45.2
Yes	286	54.8
Wish for composites	520	
No /Don`t know	400	76.9
Yes	120	23.1
Tooth pain (last 6 months)	521	
No	361	69.3
Yes	160	30.7
Gingival Bleeding	522	
No	416	79.7
Yes	106	20.3
Dental trauma	523	
No	424	81.1
Yes	99	18.9
Facial satisfaction	517	
Very satisfied/ Satisfied	452	87.4
Dissatisfied/ Very dissatisfied	65	12.6
Perception of attractiveness	521	
No	105	20.2
Relative	121	23.2
Yes	295	56.6
Concerned with others' opinions regarding dental appearance	524	
No	182	34.7
Sometimes	283	54.0
Frequently	49	9.4
Always	10	1.9

*n may vary in difference questions and it is related to the number of each individuals that have answered it.

Table 2 - Bivariate analysis between satisfaction with dental appearance and aesthetics-related factors of schoolchildren from a private school in Pelotas, Brazil, 2012 (n = 523).

Variables/Category	Dental appearance						p value
	Satisfied			Dissatisfied			
	n	(%)	Total +	n	(%)	Total +	
Sex			432			91	0.955
Male	179	(82.49)		38	(17.51)		
Female	253	(82.68)		53	(17.32)		
Satisfaction with dental color			432			91	<0.001*
Satisfied	337	(78.0)		95	(22.0)		
Dissatisfied	32	(35.2)		59	(64.8)		
Tooth bleaching			432			91	0.145*
No	357	(81.5)		81	(18.5)		
Yes	74	(88.1)		10	(11.9)		
Perception of Dental crowding			431			90	<0.001*
No	400	(80.4)		69	(14.7)		
Yes	31	(59.6)		21	(40.4)		
Perception of Dental alignment			431			91	<0.001*
No	358	(91.8)		32	(8.2)		
Yes	73	(55.3)		59	(44.7)		
Perception of Dental protrusion			427			91	0.066*
No	385	(83.5)		76	(16.5)		
Yes	42	(73.7)		15	(26.3)		
Use or in use of orthodontic appliances			432			91	0.030*
No	143	(77.7)		41	(22.2)		
Yes	289	(85.6)		50	(14.8)		
Desire of orthodontic appliances			284			233	<0.001*
No /Don`t know	264	(61.8)		163	(38.2)		
Yes	20	(22.2)		70	(77.8)		
Wish for tooth bleaching			235			289	0.002*
No /Don`t know	207	(48.1)		223	(51.9)		
Yes	28	(30.8)		63	(69.2)		
Wish for composites			429			91	0.002*
No /Don`t know	341	(85.5)		53	(14.5)		
Yes	88	(73.3)		32	(26.7)		
Tooth pain (last 6 months)			429			91	0.006*
No	308	(85.56)		52	(14.44)		
Yes	121	(75.63)		39	(24.38)		
Gingival Bleeding			430			91	0.670*
No	344	(82.89)		71	(17.1)		
Yes	86	(81.13)		20	(18.87)		
Dental trauma			432			91	0.271*
No	353	(83.45)		70	(16.55)		
Yes	78	(78.79)		21	(21.21)		
Facial satisfaction			452			65	<0.001**
Very satisfied /Satisfied	386	(90.6)		40	(9.4)		
Dissatisfied/ Very dissatisfied	66	(72.5)		25	(27.5)		
Perception of attractiveness			430			90	0.061**
No	78	(75.0)		26	(25.0)		
Relative	104	(86.0)		17	(14.0)		
Yes	248	(84.1)		47	(16.0)		
Concerned with others' opinions regarding dental appearance			452			65	<0.001**
No	163	(90.6)		17	(9.4)		
Sometimes	252	(90.7)		26	(9.4)		
Frequently/ Always	37	(62.7)		22	(37.3)		

* Chi-square (χ^2) test or Fisher
** χ^2 test for linear trend
+ values lower than 531 due incomplete data

Multivariate analysis showed that adolescents dissatisfied with dental appearance were 2.73 times more unsatisfied with dental color (95%IC [1.73;4.32]) and perceived poor dental alignment (PR 3.16 95%IC [2.11;4.72]). Adolescents wishing to perform orthodontic treatment had 2.9 times more prevalence of dissatisfaction with their dental appearance (95%IC [1.79; 4.70]) (Table 3).

Discussion

The present study showed that the prevalence of dissatisfaction with dental appearance among adolescents from a private school in Southern Brazil was 17.4%. Dissatisfaction with dental appearance was associated with dissatisfaction with dental color and self-reported poor dental alignment. Individuals wishing to undergo orthodontic treatment were more dissatisfied with dental appearance.

Dental appearance dissatisfaction can vary in different populations. Studies have reported that the prevalence of dissatisfaction among adolescents 10-18 years old ranged from 11.4% to 42.8%[23-24]. Evaluating the dissatisfaction with dental appearance in a birth cohort at 15 years of age in Pelotas, Peres et al. (2008)[25] observed a prevalence of 29.8% for boys and 46.5% for girls ($p < 0.001$) and the dissatisfaction was associated to the presence of malocclusion. A National Oral Health Survey in Brazil26 demonstrated among adolescents between 15-19 years a negative impact caused by malocclusion in Oral Health related Quality of Life and the impact was more prevalent in girls[27]. However, in our study, there was no significant difference in dissatisfaction between boys and girls. It was found that younger people tend to be less satisfied with their dental appearance[4,8] and considered healthy and well aligned teeth as important factors in facial appearance[28]. Adolescents usually attribute high importance to an attractive dental appearance[3]. Our study was conducted among adolescents from middle and high-income families and probably in these individuals the demands for aesthetics are high, independent of sex.

Cultural factors and individual preferences may determine the perception of aesthetics and dental appearance could influence such perception[6]. This is the reason why perceptions in relation to dental appearance may differ from one population or individual to another[29]. Society dictates the tendency of aesthetics and media is an important form of aesthetic norms dissemination, able to influence satisfaction[11]. Younger people may be influenced more than middle or older aged groups by media and as consequence, their aesthetic awareness can be increased, influencing their satisfaction[8]. On the other hand, dental satisfaction may decrease with some dental conditions such as dental stains, fluorosis, malocclusion, caries, trauma, gingival diseases and missing teeth[4,11].

Tooth color was reported to be an important factor for dental satisfaction and may be considered a proxy for aesthetic value[8]. In our study, dissatisfaction with dental appearance was associated with tooth color dissatisfaction. This result was also previously reported[4,6,30-31]. Younger people preferred whiter teeth[29] and adolescents tended to express dissatisfaction with color specially if someone called their attention to it[31]. The desire for beauty increases the pressure for aesthetics, due to the link between appearance and social status and acceptability[8]. Adolescents dissatisfied with tooth color mentioned constraints for answering questions and interacting with people, had been associated with psychosocial effects produced by problems with tooth color[31]. It was also demonstrated that individuals who underwent tooth bleaching claimed to have an improvement in their OHRQoL[12].

It is important to highlight that despite the young age of the evaluated individuals, 15% had already performed tooth bleaching and 54% wish to perform tooth bleaching, demonstrating the importance of tooth color for these young individuals. However, we should emphasize that individuals exhibiting normal tooth color have higher expectations for tooth color and are potential clients for sometimes unnecessary bleaching treatment[9].

Malocclusion could also determinate dental appearance satisfaction. In our study, children who considered themselves with poor dental alignment were dissatisfied with their dental appearance. Other studies reported similar findings[4,32]. The arrangement of teeth is correlated to a harmonious smile and attractiveness[3]. Negative psychosocial effects were reported by the presence of anterior crowding in adolescents[32]. Adolescents exhibited an aesthetic impact in daily living due to malocclusion[32], which could impact directly on their quality of life[28], interfering with the self-esteem[33]. Studies found that diverse types of malocclusion could produce dissatisfaction with dental appearance[32] severe malocclusions being the most likely to produce higher rates of dissatisfaction with dental appearance[23]. Malocclusion may affect other people's judgment and self-judgments. For instances, it was reported that the arrangement of the teeth may affect teachers' judgments of students[34].

The aforementioned agrees with our findings of positive wish for orthodontic treatment observed in children with higher prevalence of dental appearance dissatisfaction, as similarly observed in other studies[4,6,30]. Children with higher perception of malocclusion tend to wish more frequently orthodontic treatment[35]. Regarding the malocclusion aspects investigated (dental crowding, poor alignment, and dental protrusion), the highest reported problem was poor alignment (25.4%). To note, despite the fact that around 65% of the evaluated individuals had already undergone orthodontic treatment, 45.2% of the sample had the wish to perform orthodontic treatment.

Studies showed that performing some aesthetic treatments may enhance self-esteem and improve the appearance satisfaction and in consequence better results of quality of live are[32,36]. Adolescents completing orthodontic treatments could have social benefits[37].

A longitudinal study reported that the use of orthodontic appliances promoted psychosocial effects due to the improvement of aesthetics, increasing self-esteem and self-confidence, improving social skills, which may influence future behavior[38].

Our sample included children from private schools. In Brazil the type of school is a proxy for socioeconomic level[39], and adolescents from private schools can be also considered in better socioeconomic situation. It was reported that individuals with higher socioeconomic status are more concerned with aesthetics than the ones in lower levels[17]. Also, in private schools dental caries prevalence is lower than among adolescents attending public schools[40] and use more orthodontic appliances compared with those with deprived situation[18]. Thus, it was expected a higher proportion of children satisfied with their aesthetics.

Table 3 - Crude (c) and adjusted (a) Prevalence Ratios (PR) for dissatisfaction with dental appearance in schoolchildren, according to independent variables. Pelotas, RS, Brazil. 2012.

Variables/Category	Dissatisfaction with dental appearance			
	PR^{c} (95%CI)	p* value	PR^{a}(95%CI)	p* value
Satisfaction with dental color		<0.001		<0.001
Satisfied	1.0		1.0	
Dissatisfied	2.75(1.71;4.41)		2.73 (1.73; 4.32)	
Sex		0.143		0.114
Male	1.0		1.0	
Female	0.76 (0.52;1.11)		0.75(0.53; 1.08)	
Tooth bleaching		0.821		-
No	1.0		-	
Yes	0.95(0.53; 1.69)		-	
Dental crowding		0.213		0.098
No	1.0		1.0	
Yes	1.36 (0.85; 2.18)		1.34(0.96; 2.00)	
Dental alignment		<0.001		<0.001
No	1.0		1.0	
Yes	3.18 (2.06;4.92)		3.16(2.11; 4.72)	
Dental protrusion		0.330		-
No	1.0		-	
Yes	0.83(0.56; 1.23)		-	
Use or in use of orthodontic appliances		0.879		-
No	1.0		-	
Yes	0.96(0.64; 1.45)		-	
Wish for orthodontic appliances		<0.001		<0.001
No - Don`t know	1.0		1.0	
Yes	2.76 (1.72; 4.42)		2.90(1.79; 4.70)	
Wish for tooth bleaching		0.222		0.184
No -Don`t know	1.0		1.0	
Yes	0.76 (0.49;1.19)		0.76 (0.50;1.15)	
Facial satisfaction		0.234		0.101
Satisfied	1.0		1.0	
Dissatisfied	1.27(0.86;1.87)		0.76 (0.95 1.87)	
Perception of attractiveness		0.146		0.166
No	1.0		1.0	
Relative	0.86 (0.54; 1.39)		0.85(0.53; 1.35)	
Yes	0.76 (0.50;1.12)		0.77(0.52;1.12)	
Concerned with opinions regarding dental appearance		0.051		0.068
No	1.0		1.0	
Sometimes	1.54(0.96;2.47)		1.43(0.90;2.27)	
Frequently/Always	1.71 (0.95;3.06)		1.64(0.94; 2.89)	
Wish for composites		0.846		-
No/ Don`t know	1.0		-	
Yes	1.04 (0.72; 1.48)		-	
Pain(6 months before)		0.444		-
No/ Don`t know	1.0		-	
Yes	1.17 (0.78; 1.75)		-	

*Heterogeneity test. Variables that presented p>0.25 in bivariate analysis were not included in multivariate analysis model.

This study has some limitations. It was a cross-sectional study, thus the data were collected at a particular moment and causality cannot be established. Our population was a convenience sample and only children from a private school participated. In our study children from low socioeconomic status that generally attend public schools were not included. It has been demonstrated that children from private schools have a lower charge of dental disease compared to those from public school[40], but they could have more concerns regarding aesthetic appearance, therefore our results could overestimate the problem. The external validity of our findings is limited. Finally, even though the instruments for data collection were not previously validated, some questions were posed to be accurate to report dental appearance satisfaction and the perception of dental crowding[23].

The present study was based on perceptions of satisfactions and the presence of some tooth conditions such as malocclusion, dental discoloration and trauma. Perception assessments are subjected to individual judgments and cannot be measured. For instance, subjective self-assessment of tooth color and objective evaluations presented different outcomes between patients and dentists, since patients could report abnormal tooth color when objective measurements indicated the contrary[9]. However, the assessment of self-perception can translate the feelings of a person and individual way of self-evaluation.

Adolescence is a transformational phase, and physical changes and alterations in attitude and self-perception take place, but adolescents' capacity to cope and adapt with these changes often declines during this period. Consciousness of body image increases during childhood and adolescence[24]. On the other hand, peer groups play a major role in adolescents' emotional stability and adolescents may place high value on physical attractiveness under peer influence[34,37].

The understanding of factors collaborating to construct aesthetic perceptions could aid the planning and provision of care that addresses the individual needs and demands. Thus unnecessary services could be discarded, providing more effective ones[9]. However, considering that patients' psychological wellbeing is fundamental, a balance between patient expectations and cosmetic treatment performance are important challenges for dentistry[11]. Dentists should dialogue with patients, taking into account their desires and expectations and considering the functional needs.

The prevalence of self-reported appearance dissatisfaction in adolescents in the present study was 17.4% and it was associated with tooth color, perception of poor alignment and the wish for orthodontics. A large amount of the studied population had already undergone aesthetic treatments (orthodontics and bleaching).

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