

# Psychosocial impact of anterior dental esthetics on periodontal health, dental caries, and oral hygiene practices in young adults

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This study sought to determine whether the self-perceived image of a young adult's anterior dental esthetics is linked with periodontal health, dental caries, and oral hygiene practices. Two hundred subjects were assessed via a clinical examination, including intraoral photographs. The subjects were questioned about their demographics and oral hygiene practices and given the Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ) to measure their self-perceived variables related to dental esthetics. A high PIDAQ score indicates a negative image of one's own dental esthetics, while a low PIDAQ score

indicates a positive outlook. A self-perceived negative psychosocial impact of anterior dental esthetics was detected in subjects with higher levels of dental caries and visible gingival inflammation in the anterior region of the mouth.

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According to a 2011 report from the US Department of Health and Human Services Centers for Disease Control and Prevention, caries affects 1 in 2 US adolescents aged 12-15 years, and most US adults show signs of periodontal disease.<sup>1</sup> It is surprising that oral disease is so widespread in the United States as the keys to prevention and good oral health—brushing with fluoride toothpaste, daily flossing, and dental visits—are well known and widely publicized by healthcare providers and the media.<sup>2</sup> While nearly all Americans brush their teeth, studies have found that only 10%-40% of Americans report flossing on a daily basis.<sup>3</sup> However, prevention of oral disease requires not only that patients be compliant with healthcare recommendations and advice but also that the clinician understand the reasons for noncompliance and the appropriate interventions to address these deterrents to good oral health.<sup>4</sup> Neglect of oral hygiene has been associated with psychosocial stress, low socioeconomic status, low self-efficacy, low self-esteem, and more recently low dental self-confidence.<sup>5-10</sup>

To identify the differences in the quality of life (QOL) of individuals with varying degrees of dental esthetics and different levels of treatment need, the Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ), a condition-specific, oral health-related QOL measure was developed and

validated in 2006.<sup>11</sup> Subjects with higher PIDAQ scores have a more negative image of their anterior dental esthetics. Studies using the PIDAQ revealed that factors such as excessive display of anterior teeth during smiling, a gingival smile, and increasing degrees of malocclusions can all have a psychosocial impact on the patient.<sup>12-14</sup> Studies have reported that young male adults with self-perceived malocclusion did, indeed, present with inferior oral health conditions compared to their counterparts with straighter teeth.<sup>14</sup> It has also been found that subjects with a more favorable self-concept and former orthodontic patients have more frequent dental visits and better oral hygiene practices.<sup>7,15</sup>

Additional studies have shown, via changes in patients' PIDAQ scores over time, an improvement of subjects' self-assessment of their dental esthetics over the course of treatment procedures such as orthodontics and/or implantation of anterior teeth.<sup>16,17</sup> These studies focused only on specific characteristics typically associated with an esthetic smile—such as alignment, malocclusion, or the mere presence of anterior teeth—while other clinical variables such as tooth shade and shape, existing restorations, or any other esthetically displeasing conditions probably play a significant role in the PIDAQ assessment. In addition, most of these previous studies were based on the patients' self-perception of dental esthetics without comparison to

the more objective rating of a clinician. The aim of this study was to determine if individuals who self-report a psychosocial impact from their overall dental esthetics tend to have poorer reported oral hygiene practices and therefore poorer periodontal health and a higher prevalence of caries in the anterior sextants.

## Materials and methods

This cross-sectional study was conducted in a group of 200 overall healthy active duty military personnel at the 87th Dental Squadron, Joint Base McGuire-Dix-Lakehurst, New Jersey. The study was conducted from March 2013 through May 2013, and the participants were subjects who were being seen for their annual dental examination or for their yearly dental cleaning. The human rights of the subjects were protected, and approval was obtained from the institutional review board of the 59th Clinical Research Division.

After each participant gave informed consent, an intraoral photograph was taken with a FinePix S3Pro digital camera (Fujifilm Corporation) with a Sigma EM-140 DG intraoral flash (Sigma Corporation of America). For the photograph, the patient was asked to swallow and occlude on his or her posterior teeth while smiling. Each subject was given a self-administered Patient Questionnaire (PQ) that was developed expressly for this study (Fig 1). The PQ included the

**Table 1. Comparison of mean (SD) scores for oral diseases or conditions among subjects in the lowest (n = 70) and highest (n = 66) PIDAQ tertiles.**

Score	Lowest tertile	Highest tertile	P value <sup>a</sup>
DMFS	0.21 (0.90)	1.35 (3.00)	<0.000
BVGI	3.77 (3.88)	5.45 (3.90)	<0.007
LVGI	2.49 (2.88)	4.02 (3.37)	<0.006
TVGI	6.33 (6.01)	9.50 (6.66)	<0.004

Abbreviations: BVGI, buccal visible gingival inflammation; DMFS, decayed, missing, and filled surfaces; LVGI, lingual visible gingival inflammation; PIDAQ, Psychosocial Impact of Dental Aesthetics Questionnaire; TVGI, total visible gingival inflammation (BVGI plus LVGI).

<sup>a</sup>Chi-square test.

**Table 2. Distribution of esthetic ratings (%) from investigators, averaged panel, and subjects among subjects in the lowest (n = 70) and highest (n = 66) PIDAQ tertiles.<sup>a</sup>**

Esthetic rating	Investigator		Averaged panel		Subject	
	Lowest tertile	Highest tertile	Lowest tertile	Highest tertile	Lowest tertile	Highest tertile
Top 1%	4.3	1.5	1.4	0.0	NA	NA
Top 10%	31.4	6.1	5.7	0.0	24.3	1.5
Above avg	35.7	13.6	24.3	9.1	44.3	1.5
Avg	10.0	15.2	42.9	19.7	31.4	53.0
Below avg	14.3	28.8	24.3	36.4	0.0	33.3
Bottom 10%	2.9	18.2	2.9	34.8	0.0	10.6
Bottom 1%	1.4	16.7	0.0	3.0	NA	NA

Abbreviations: Avg, average; NA, not applicable (category was not given to subjects, as it was deemed to be too difficult to categorize oneself in either extreme); PIDAQ, Psychosocial Impact of Dental Aesthetics Questionnaire.

<sup>a</sup>P < 0.000 (Chi-square test).

PIDAQ as a subsection.<sup>11</sup> At each clinical examination, calibrated general dentists filled out a Dentofacial Anomalies and Oral Health Assessment (DAOHA) form that recorded the periodontal health assessment of each patient (Fig 2). The dentists also filled out a decayed, missing, and filled surfaces (DMFS) index for each subject.

The PIDAQ is a 23-item psychometric instrument for assessing orthodontic-specific aspects of QOL.<sup>11</sup> The QOL is expressed in 4 domains: dental self-confidence (6 items), social impact (8 items), psychological impact (6 items), and esthetic concerns (3 items). This instrument has been previously tested for its validity, reliability, and factorial stability across samples.<sup>11</sup> Each subject was asked to rate how strongly dental

esthetics exerted a positive or negative impact using a 5-point Likert scale ranging from 0 to 4 (0, not at all; 1, a little; 2, somewhat; 3, strongly; 4, very strongly). An overall PIDAQ score was obtained by summing all item scores; the range of scores was 0-92. To ensure the same direction of scoring for all items of the questionnaire, some domains had scores reversed to produce a consistent measure of the impacts so that greater PIDAQ scores represented greater impacts of dental esthetics. The other components of the PQ included questions about oral hygiene practices, self-rating of dental esthetics, and other demographics.

The 2 primary dependent variables, the periodontal health assessment and dental caries (DMFS index), were only collected

from the 12 anterior teeth and recorded on the DAOHA form. Visible gingival inflammation (VGI), bleeding on probing, gingival calculus, presence of gingival probing depths greater than 3 mm, and dental caries were measured by the dentist, who used a manual periodontal probe with a 3-mm marking, a dental mirror, an explorer, and the overhead light of the dental chair.

The averaged panel esthetic ratings were obtained from a panel composed of 3 general dentists who rated the overall esthetics of each subject's anterior teeth from the intraoral photographs presented via a PowerPoint presentation for 30 seconds. The smiles were rated using a nonnumerical scoring system: in the top 1%; in the top 10%; above average; average; below average; in the bottom 10%; or in the bottom 1%.

Primary data analysis consisted of a comparison of those subjects who scored in the upper tertile on the PIDAQ (subjects who self-reported a significant psychosocial impact from the dental esthetics of their anterior teeth) to the subjects who scored in the lower tertile on the PIDAQ (subjects who did not self-report a significant psychosocial impact from the dental esthetics of their anterior teeth). Chi-square testing was used for statistical analysis.

## Results

Of 240 potential subjects who were approached, 83.3% (n = 200) participated by completing all questionnaires and undergoing a complete oral examination. The 16.7% (n = 40) subjects who declined did so mostly due to time restrictions. The mean age of the sample was 30.2 (SD, 7.5) years, and the range was 18-50 years. Among the participants, 20.5% (n = 41) were women, and 79.5% (n = 159) were men. The mean overall PIDAQ score was 21.7 (SD, 16.5); scores ranged from 0 to 89.

The mean DMFS scores for the 12 anterior teeth in subjects in the upper PIDAQ tertile were 6.4 times those recorded for subjects in the lower tertile, a statistically significant difference (P < 0.000; Table 1). The total VGI score (the sum of the buccal and lingual VGI scores) for subjects in the upper PIDAQ tertile was 1.5 times that reported for subjects in the lower tertile (P = 0.004). The buccal VGI (P = 0.007) and lingual VGI (P < 0.006) were also significantly different in the upper and lower PIDAQ tertiles.

Thank you for participating in our dental health survey. All information will stay 100% confidential and totally anonymous. We are interested in your oral hygiene practices and how you perceive the way your teeth look. (For the next questions, please check ONE best answer)

- How would you rate your current daily oral hygiene practices?
  - Excellent  Good  Fair  Poor
  - I refuse to answer
- How often do you brush your teeth?
  - I brush more than twice a day
  - I brush twice a day
  - I brush once a day
  - I brush every other day
  - I brush once a week
  - I never brush
  - Other. Please specify: \_\_\_\_\_
  - I refuse to answer
- What kind of toothpaste do you use?
  - Fluoridated toothpaste
  - Nonfluoridated toothpaste
  - I don't know if my toothpaste is fluoridated, but the brand that I usually use is: \_\_\_\_\_
  - I do not use toothpaste, just water
  - I do not use toothpaste, just mouthwash
  - Other. Please specify: \_\_\_\_\_
  - I refuse to answer
- How often do you floss?
  - I floss more than twice a day  I floss twice a day
  - I floss once a day  I floss every other day
  - I floss once a week  I never floss
  - Other. Please specify: \_\_\_\_\_  I refuse to answer
- When did you start flossing your teeth regularly?
  - Before age 6  Between ages 6 and 13
  - Between ages 14 and 19  I haven't started to floss yet
  - Other. Please specify: \_\_\_\_\_ years ago  I refuse to answer
- On days that you don't brush your teeth, what are your reasons for not brushing? (Check all you find applicable in your case)
 

(Please circle all that are applicable.)

  - I find brushing too time consuming/I am too lazy/I am too tired
  - I forget to brush
  - I have a substitute for toothbrushing. Please specify: \_\_\_\_\_
  - I find brushing useless
  - I don't have money for brush or toothpaste
  - I don't like the way my teeth look and so I don't brush them
  - Other. Please specify: \_\_\_\_\_
  - I never skip brushing my teeth
  - I refuse to answer
- On days that you don't floss, what are your reasons for not flossing?
 

(Check all you find applicable in your case)

  - I find flossing too time consuming/I am too lazy/I am too tired
  - I forget to floss
  - Floss is not available
  - I don't know how to floss properly so I don't floss
  - I have a permanent retainer and therefore I don't floss under the wire
  - I don't understand the point of flossing
  - My gums bleed when I floss
  - I don't have money to buy floss
  - I don't like the way my teeth look and so I don't floss them
  - The floss doesn't fit. Please specify: \_\_\_\_\_
  - Other. Please specify: \_\_\_\_\_
  - I never skip flossing
  - I refuse to answer
- How would you rate the overall "looks" or esthetics of your teeth as compared to other people you have seen? (Please choose ONE best answer)
  - In the top 10%  Above average
  - Average  Below average
  - In the bottom 10%  I refuse to answer
- Is there anything about the way your overall teeth look that you would like to change?
  - Yes  No
  - If you answered YES, please explain: \_\_\_\_\_
- Do you think the way your teeth look has an effect on your self-esteem?
  - Yes  No
- How satisfied are you with the overall color of your teeth? (Please choose ONE best answer)
  - Very satisfied  Satisfied
  - Somewhat satisfied  Somewhat dissatisfied
  - Dissatisfied  Very dissatisfied
  - I refuse to answer
- How satisfied are you with the way your overall teeth are positioned/aligned? (Please choose ONE best answer)
  - Very satisfied  Satisfied
  - Somewhat satisfied  Somewhat dissatisfied
  - Dissatisfied  Very dissatisfied
  - I refuse to answer
- Dental esthetic questionnaire\* (Please circle ONE best answer for each statement)
 

I am proud of my teeth.	Not at all	A little	Somewhat	Strongly	Very strongly
I like to show my teeth when I smile.	Not at all	A little	Somewhat	Strongly	Very strongly
I am pleased when I see my teeth in the mirror.	Not at all	A little	Somewhat	Strongly	Very strongly

Fig 1. Patient questionnaire.

For all 3 esthetic ratings (the investigator's esthetic ratings, the averaged panel esthetic rating, and the self-reported esthetic rating) statistically significant ( $P < 0.000$ ) inverse associations were observed between subjects in the upper and the lower PIDAQ terciles;

that is, higher esthetic ratings were given to subjects in the lower PIDAQ tercile for all 3 types of esthetic rating (Table 2). On the other hand, no statistically significant differences were found between subjects in the upper and lower PIDAQ terciles for the

variables of sex, age, bleeding on probing, gingival calculus, or periodontal probing depths greater than 3 mm.

Similarly, a statistically significant ( $P < 0.000$ ) inverse relationship was detected between the self-reported

My teeth are attractive to others.	Not at all	A little	Somewhat	Strongly	Very strongly
I am satisfied with the appearance of my teeth.	Not at all	A little	Somewhat	Strongly	Very strongly
I find my tooth position to be very nice.	Not at all	A little	Somewhat	Strongly	Very strongly
I hold myself back when I smile so my teeth don't show as much.	Not at all	A little	Somewhat	Strongly	Very strongly
If I don't know people well, I am sometimes concerned what they think about my teeth.	Not at all	A little	Somewhat	Strongly	Very strongly
I'm afraid other people could make offensive remarks about my teeth.	Not at all	A little	Somewhat	Strongly	Very strongly
I am somewhat inhibited in social contacts because of my teeth.	Not at all	A little	Somewhat	Strongly	Very strongly
I sometimes catch myself holding my hand in front of my mouth to hide my teeth.	Not at all	A little	Somewhat	Strongly	Very strongly
Sometimes I think people are staring at my teeth.	Not at all	A little	Somewhat	Strongly	Very strongly
Remarks about my teeth irritate me even when they are meant jokingly.	Not at all	A little	Somewhat	Strongly	Very strongly
I sometimes worry what members of the opposite sex think about my teeth.	Not at all	A little	Somewhat	Strongly	Very strongly
I envy the nice teeth of other people.	Not at all	A little	Somewhat	Strongly	Very strongly
I am somewhat distressed when I see other people's teeth.	Not at all	A little	Somewhat	Strongly	Very strongly
Sometimes I am somewhat unhappy about the appearance of my teeth.	Not at all	A little	Somewhat	Strongly	Very strongly
I think most people I know have nicer teeth than I do.	Not at all	A little	Somewhat	Strongly	Very strongly
I feel bad when I think about what my teeth look like.	Not at all	A little	Somewhat	Strongly	Very strongly
I wish my teeth looked better.	Not at all	A little	Somewhat	Strongly	Very strongly
I don't like the way my teeth look in the mirror.	Not at all	A little	Somewhat	Strongly	Very strongly
I don't like to see my teeth in photographs.	Not at all	A little	Somewhat	Strongly	Very strongly
I don't like to see my teeth when I look at a video of myself.	Not at all	A little	Somewhat	Strongly	Very strongly

\*©Oxford University Press. From Klages U, Claus N, Wehrbein H, Zentner A. Appendix. Development of a questionnaire for assessment of the psychosocial impact of dental aesthetics in young adults. *Eur J Orthod.* 2006;28(2):103-111.<sup>11</sup> Reprinted with permission.

14. If your teeth were perfectly straight/bright, would you take better care of them (brush or floss more)?

- Definitely                       Probably  
 No difference                       Probably not  
 Definitely not                       I am not sure either way  
 I refuse to answer

15. Have you ever received orthodontic treatment such as braces, bands, or removable appliances to straighten teeth?

- Yes as a child or as an adult (*Please circle*)       No

16. What is your sex?

- Male                       Female

17. In what year were you born? \_\_\_\_\_

18. What is your military branch? \_\_\_\_\_

19. What is your marital status?

- Now married                       Widowed  
 Divorced                       Separated  
 Never married                       I refuse to answer

20. What is your current rank?

- Enlisted \_\_\_\_\_       Officer \_\_\_\_\_

21. What is the highest degree or level of school you have completed? If currently enrolled, mark the previous grade or highest degree received.

- Less than 12th grade  
 12th grade, no diploma  
 High school graduate—high school diploma or the equivalent (for example GED)  
 Some college credit, but less than 1 year  
 1 or more years of college, no degree  
 Associate's degree (for example: AA, AS)  
 Bachelor's degree (for example: BA, AB, BS)  
 Master's degree (for example: MA, MS, MEng, MBA)  
 Professional degree (for example: MD, DDS, DVM, LLB, JD)  
 Doctorate degree (for example: PhD, EdD)  
 I refuse to answer

22. Please specify your ethnicity

- Hispanic or Latino                       Not Hispanic or Latino  
 I refuse to answer

23. Please specify your race

- American Indian or Alaska Native  
 Asian  
 Black or African American  
 Native Hawaiian or Other Pacific Islander  
 White  
 I refuse to answer

rating of oral hygiene practices and the subjects' PIDAQ tercile. Subjects in the lower PIDAQ tercile reported better oral hygiene practices. When queried as to reasons for not brushing their teeth, subjects in the upper tercile reported that they

were too tired, too lazy, or found brushing too time consuming ( $P = 0.012$  for all 3 specific reasons).

When asked if they ever skipped flossing their teeth, subjects in the lower PIDAQ tercile were 4.8 times more likely

to report never skipping flossing than their counterparts in the upper PIDAQ tercile ( $P = 0.021$ ). On the other hand, when subjects in the upper PIDAQ tercile were asked, "Is there anything about the way your overall teeth look that

Gender:  Male  Female

Age: \_\_\_\_\_ Date of last dental cleaning: \_\_\_\_\_

Periodontal health assessment:  
(Place 1 for yes or 0 for no in the appropriate boxes)

	Tooth No.											
	6	7	8	9	10	11	22	23	24	25	26	27
Buccal surface of tooth												
Visible gingival inflammation												
Bleeding on probing												
Gingival calculus												
Presence of gingival pocket >3 mm												

  

	Tooth No.											
	22	23	24	25	26	27						
Lingual surface of tooth												
Visible gingival inflammation												
Bleeding on probing												
Gingival calculus												
Presence of gingival pocket >3 mm												

DMFS assessment: For D, F, M place 1 for yes, or 0 for no in the appropriate boxes. If surface is normal, place 0 for yes, and 1 for no

Surfaces	Tooth No.											
	6	7	8	9	10	11						
Decayed												
Filled												
Normal (if yes, 0)												
Missing												

  

Surfaces	Tooth No.											
	22	23	24	25	26	27						
Decayed												
Filled												
Normal (if yes, 0)												
Missing												

Maxillary overbite:  
 Edge-to-edge to 2/3       2/3 to 3/3  
 >3/3                               Mandibular overbite

Fig 2. Dentofacial Anomalies and Oral Health Assessment form.

you would like to change?” and “How satisfied are you with the overall color of your teeth?” and “How satisfied are you with the way your overall teeth are positioned/aligned?” they tended to be more critical of their teeth ( $P < 0.000$ ) than did subjects in the lower PIDAQ tercile. When asked, “If your teeth were perfectly straight/bright, would you take better care of them (brush or floss more)?” subjects in the upper PIDAQ tercile were more likely to report that they would take better care of their teeth than were subjects in the lower tercile ( $P = 0.013$ ).

No differences in PIDAQ by either sex or age were noted.

### Discussion

This study of a sample of young adults in military service clearly demonstrated detectable differences in self-reported image of anterior dental esthetics (as measured by the PIDAQ scale in a comparison of upper vs lower tercile PIDAQ

subjects) for the most visible of dental diseases, treatments, and conditions in the anterior portion of their mouths, while they demonstrated no such differences for less visible dental diseases, treatments, and conditions. Specifically, the highly visible presence of dental caries and restorations in the anterior segment as well as VGI was inversely associated with both a subject’s PIDAQ score—subjects with these highly visible dental conditions held markedly lower esthetic dental scores, indicating a lower esthetic dental self-image—and the quality of self-reported oral hygiene practices. Not only did these subjects report that they “looked worse,” but they also reported that they took “worse care” of their mouths. However, for the less visible dental conditions of calculus presence, periodontal pocket formation, and bleeding on probing, no such differences in dental image were detected in comparisons of the top and bottom PIDAQ tercile groups.

Similar findings were reported in a study on young adults who self-reported frequency of gingival bleeding and caries treatment.<sup>15</sup> In addition, the magnitude of the caries difference between the highest PIDAQ subjects and the lowest PIDAQ subjects was quite marked in the present study, as individuals in the highest PIDAQ tercile were 6.4 times more likely to have caries in the anterior sextants than those in the lowest tercile.

The fact that no association was found between PIDAQ scores and presence of either calculus or periodontal probing depths greater than 3 mm is perplexing, since these conditions should be improved by the better oral hygiene that was reported by the subjects in the lower PIDAQ tercile. One explanation might be the relatively small percentage of subjects in this study who reported flossing; most patients just used a toothbrush, which would correlate with less visible gingival inflammation but not necessarily with shallower periodontal probing depths or less calculus.

- Anterior open bite:  
 None       Present <3 mm       Present >3 mm
- Anterior crossbite:  
 None       Present, Teeth No. \_\_\_\_\_
- Maxillary overjet:  
 Edge-to-edge to <3 mm       3 mm to <6 mm  
 >6 mm       Mandibular overjet
- Mandibular overjet:  
 None       Present \_\_\_\_\_ mm

(If any of the conditions listed below are present, please circle the best answer)

	Mild that you would not consider treatment	Moderate	Severe that you would absolutely consider treatment
Rotated teeth	Mild	Moderate	Severe
Shade/shade discrepancy	Mild	Moderate	Severe
Shape	Mild	Moderate	Severe
Restoration	Mild	Moderate	Severe
Margins	Mild	Moderate	Severe
Staining	Mild	Moderate	Severe
Discoloration	Mild	Moderate	Severe
Crowding	Mild	Moderate	Severe
Spacing	Mild	Moderate	Severe

Gingival zenith	Mild	Moderate	Severe
Supernumerary teeth	Mild	Moderate	Severe
Retained deciduous teeth	Mild	Moderate	Severe
Midline canting	Mild	Moderate	Severe
Exposed root	Mild	Moderate	Severe
Blunted papilla (black triangle)	Mild	Moderate	Severe
Maxillary gingival display	Mild	Moderate	Severe
Axial inclination (buccal-lingual)	Mild	Moderate	Severe
Chipped incisal edges	Mild	Moderate	Severe
Worn incisal edges	Mild	Moderate	Severe
Length of teeth	Mild	Moderate	Severe
Incisal embrasures	Mild	Moderate	Severe
Other: _____	Mild	Moderate	Severe

How would you rate the overall esthetics of this patient's anterior teeth as compared to all other people you have seen? (Please choose ONE best answer)

- In the top 1%       In the top 10%  
 Above average       Average  
 Below average       In the bottom 10%  
 In the bottom 1%

Which are the main characteristics that led to the score that you chose above?

The unbalanced sex distribution of the sample (79.5% male), while not unanticipated in a sample of military recruits, is a potential limitation of this study. However, no significant differences in the findings were noted between the sexes, suggesting that the sample composition did not affect the results.

The PIDAQ scores were aligned with subjects' responses to a separate set of direct questions in which they rated their own dental appearance. Subjects with lower PIDAQ scores had better self-esthetic ratings on these separate questions than did their counterparts with higher PIDAQ scores. These results parallel the findings in a study of adolescents.<sup>13</sup>

To make the ratings in this present study as objective as possible, 3 esthetic ratings were compared: an individual investigator's esthetic rating, recorded while the patient was seated in the treatment chair; an averaged panel esthetic rating, recorded from an intraoral

photograph of the subject's smile; and a self-reported esthetic rating. The overall ratings followed the same trend, suggesting that the subjects' self-rating confirmed the professionals' findings. The results of this study suggest that subjects with highly favorable dental esthetics generally viewed their dentition as such and therefore were more inclined to maintain it through a rigorous oral hygiene regimen; subjects with less favorable dental esthetics (as both self-rated and confirmed by a panel of dentists) seemed to need more motivation to brush regularly.

As was suggested in previous studies on oral health attitudes, individuals with high-ranking dental esthetics may attribute their favorable dental arrangement to their efforts in prevention, which in turn might strengthen their resolve to take further favorable preventive measures.<sup>15</sup> It was interesting to note that when subjects were asked what they could change in their smiles, the most frequent

wishes were whiter and/or brighter teeth and straighter and/or less crowded teeth. When this US sample is compared to a population in Nigeria (where many people, even among the socioeconomic elite, do not appreciate the need for dental or orthodontic treatment), the US subjects seem to be critical of themselves while at the same time well aware of the methods available to improve a smile.<sup>10</sup>

The results of the present study seem to be in agreement with those of other studies reporting that young adults with less favorable dental esthetics exhibit less frequent dental cleaning behavior or—stated conversely—that self-esteem is positively correlated with toothbrushing frequency.<sup>7,16</sup> Although subjects with higher PIDAQ scores attributed their own poor oral hygiene to the fact that their teeth needed esthetic improvement, the design of the present study only provides evidence of an association between the 2 factors; it does not permit the establishment of

a causal relationship between a subject's PIDAQ score and oral hygiene. Given that the subjects in this study with higher PIDAQ scores reported that they would take better care of their teeth if their teeth were perfectly bright and/or straight, this suggests a testable hypothesis in future studies. Additional research, which would study the oral hygiene behavior before and after improvement of the patient's dental esthetics in collaboration with the patient's wishes, would be necessary to establish the presence of a causal relationship.

Long-range clinical implications of the findings from this study include future investigations into educating parents about the importance of a beautiful, healthy smile for their children. An esthetic smile could limit or eliminate any potential negative psychosocial impact of unesthetic dental conditions on those children, positively impact their future adult self-image of anterior dental esthetics, and encourage them to practice better oral hygiene. Clearly, this proposed series of events would need verification, including results from clinical trials.

An immediate (and short-term) clinical implication for the clinician treating the esthetically dissatisfied adult patient is to listen to the patient's esthetic desires (namely whiter and straighter teeth) and involve the patient more in clinical decisions. If the patient perceives current dental conditions as undesirable, he or she may be discouraged from actively participating in oral hygiene procedures.

## Conclusion

Patients with a high negative impact from anterior dental esthetics are at a higher risk of neglecting their oral hygiene in the anterior area.

## Author information

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