

Brazilian adolescents' perception of the orthodontic appliance: A qualitative study

Anderson Barbosa de Almeida, Isabel Cristina Gonçalves Leite, and Girlene Alves da Silva
Juiz de Fora, Brazil

Introduction: Orthodontic treatment has a significant impact on the quality of life and self-esteem of adolescents, with emotional and behavioral implications. The objective of this research was to understand Brazilian adolescents' perception of the orthodontic treatment. **Methods:** A qualitative research study was carried out through content analysis of data collected from 142 adolescents using the word-association technique (WAT), followed by 8 focus groups with 71 of these students. **Results:** The most recurrent words on the WAT demonstrated a positive esthetic impact of the orthodontic appliance, both for the adolescents' self-assessment and in the assessment of friends. Several themes were identified in the qualitative analysis, with the esthetic benefit of orthodontic treatment and the esthetic impact of the appliance being the most relevant positive points. The most-cited negative aspect in the study was the pain associated with the treatment, followed by the discomfort and trauma caused by the fixed appliance. **Conclusions:** Orthodontic treatment has a positive esthetic impact for Brazilian adolescents, with improvement of their self-image. Fixed orthodontic appliances have an immediate positive impact on appearance and are an important factor in behavioral relationships among Brazilian adolescents, particularly owing to their association with social status. The understanding of the sociobehavioral aspects involved in orthodontic treatment is of fundamental importance for the clinical relationship between patient and professional. (*Am J Orthod Dentofacial Orthop* 2019;155:490-7)

Malocclusion is one of the most frequent oral health problems in the world, behind only dental caries and periodontal disease.¹ Malocclusion has a negative impact on children's, adolescents', and adults' self-esteem and quality of life, with significant consequences in their psychosocial, affective, and professional relationships.²⁻⁴ Orthodontic treatment has shown improvements in quality of life and self-esteem, demonstrating its influence on emotional and behavioral aspects.⁵⁻⁸

The perception of the need for orthodontic treatment and its impact on quality of life have been evaluated mainly with the use of quantitative research methods.^{6,9-11} However, particularities related to the

use of an orthodontic appliance in the imaginations of adolescents may go unnoticed by such research methods, raising the importance of complementarity between the approaches of quantitative and qualitative research.

Evidence-based dentistry has its roots in epidemiology, whereas qualitative methods have their foundations in social sciences and therefore have had a limited impact on dental literature. However, implementation of an evidence-based practice will depend critically on the circulation of knowledge among research centers, professionals, and the population, a process that can be positively influenced by qualitative research.¹² Although qualitative research is increasingly used in the health area, there are still few studies that have explored its potential in the various medical and dental specialties.¹³

The word-association technique (WAT) is a projective technique that allows the apprehension of mental projections of a social group in a spontaneous way, and gives evidence of unconscious elements through manifestations of behavior in reactions or evocations.¹⁴ On the other hand, the focus group is a method that helps in understanding how different perceptions and

Department of Collective Health, Faculty of Medicine, Federal University of Juiz de Fora, Juiz de Fora, Brazil.

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Address correspondence to: Anderson Barbosa de Almeida, Avenida Barão do Rio Branco 2555/601, Centro, Juiz de Fora, MG, Brazil; e-mail, anderjfalmeida@gmail.com.

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attitudes about a particular object of study are formed.¹⁵ The former allows the identification of important elements related to the object of the study, and the latter allows their deeper exploration. The objective of the present study was to understand the perception of Brazilian adolescents aged from 12 to 15 years regarding the treatment and the orthodontic appliance.

MATERIAL AND METHODS

This study was approved by the Ethics Committee under approval number 347/2011. Adolescents, male and female, from 12 to 15 years of age, enrolled in public and private schools in Juiz de Fora, Minas Gerais, Brazil, participated in the study. All participants in the present study were volunteers, and their adult representatives signed written consent forms. The choice of this age group was due to its being commonly associated with orthodontic treatment and for having a large number of quantitative studies related to the need for treatment and its relationship to quality of life.^{16,17}

Exclusion criteria, in this study, were students who had any type of facial deformity or cognitive and/or neurologic limitations that could compromise understanding and/or communication during the group meetings.

The number of participants, both for the first stage of the study with the WAT and for the second with the focus group, was defined by the recurrence of information, that is, the number of participants was defined when the information obtained met the objectives of the study and became repetitive.¹⁸

Thus, 142 adolescents (91 female and 51 male) from 8 schools (4 private and 4 public) participated in the first phase of the study (WAT). The schools were chosen intentionally according to their location and students' social class. The private schools were located in the central region and attended by students of higher social class, whereas the public schools were located in areas of intense social vulnerability with students of lower social class.

The second phase of the study was performed with the same adolescents who had participated in the first phase. By the same criterion of recurrence of information, 8 focus groups were carried out with 71 students (23 male and 48 female), equally divided between public and private schools.

In the WAT phase, all were invited to respond with 3 words or short sentences to 2 inducing stimuli offered by the researcher: (1) "What comes to your mind when you think of braces?" and (2) "What comes to your mind when you imagine a friend of yours wearing braces?" The data were collected in rooms previously prepared

inside the schools to receive the participants. The answers were analyzed and organized to group those with the same meaning, generating a database that was processed with the use of Tri-Deux-Mots software, version 2.2,¹⁹ which allows graphic visualization of both fixed variables (gender and school type) and non-fixed variables (the practical knowledge expressed by the participants before the stimulus inducer) and analysis by means of factorial matching analysis. For the purposes of analysis and treatment of the information obtained, the responses with repetition frequencies of at least 4 and evoked in relation to each inducer stimulus were considered.

Focus groups were also carried out in the school environment, in appropriately prepared rooms, using guiding questions predefined by the researchers based on the data generated in the WAT and evidence found in the literature. The groups were conducted by 2 previously trained researchers. A moderator introduced and led the specific topics, and a second researcher performed the role of external observer, capturing the reaction of the participants and possibly acting as a second moderator.

RESULTS

In the WAT phase, a total of 860 words were given by 142 adolescents who constituted the sample, comprising 191 different words.

As shown in [Figure 1](#), factor 1 (F1) is characterized by the opposition between the 2 school types and is represented on the graph by the words in bold in the horizontal position, on the x axis. [Figure 1](#) shows the most significant representations, accounting for 74.4% of the total variance of responses. On the right side, F1+, are representations of the public school adolescents and on the left side, F1-, those of the private school adolescents. In factor 2 (F2), on the y axis, the opposition is in relation to gender, as highlighted with the words in italics, with a percentage variance of 25.6%. In the upper part (F2 +) are the representations of the female students, and in the lower part (F2-) those of the male students. Some answers appear in bold italics because they had a double contribution in the construction of both factors. After each word, there is a number corresponding to the stimulus inducing the response (1 or 2). The words in the graph written in capital letters refer to fixed variables (school type and gender).

For both stimuli 1 and 2, the adolescents expressed words that positively associated the orthodontic appliance with physical appearance, such as "cool," "beautiful," and "color," demonstrating the positive impact that the appliance can exert on their imaginations. Such

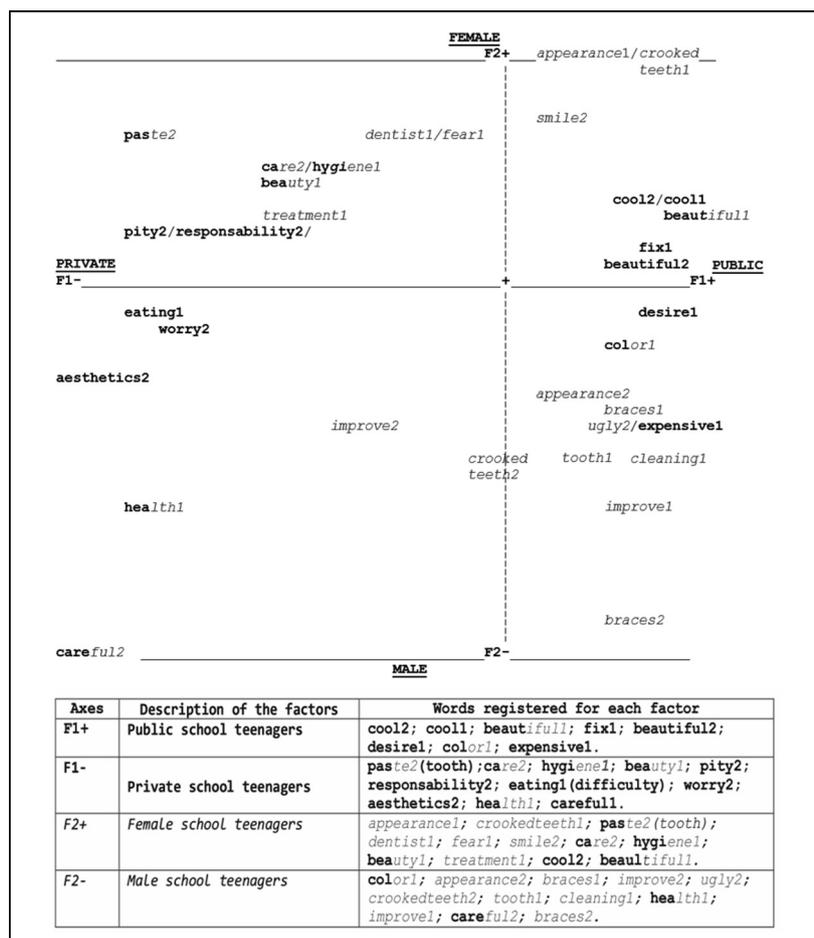


Fig 1. Tri-Deux-Mots chart with legend for WAT representations.

impact was more relevant for public school students (F1+). The word “desire” reaffirms the positive connotation attributed to the appliance. An economic constraint was identified in the word “expensive.” The word “fix” was the only one that demonstrated an association, on the part of the adolescents, with the initial unfavorable condition of the teeth.

For students in private schools (F1–), the most frequently expressed words for stimulus 1 showed that the appliance is associated not only with “beauty,” but also with relevant implications for “health,” in terms such as “careful,” “improve,” and “hygiene.” The only negative aspect highlighted by these participants was the difficulty in “eating.” For stimulus 2, “esthetic” was brought up again, but the other words showed that the orthodontic appliance of a friend is seen as “care” by a person who shows “concern” and “responsibility” for health. The word “pity” appeared for stimulus 2, probably because of the association with pain, which was later seen in the focus groups.

The findings showed a predominantly esthetic view of the appliance for the 2 stimuli, through words such as “beauty,” “appearance,” “cool,” “smile,” “crooked teeth.” The word “fear” was recurrent only for female adolescents in relation to stimulus 1. The word “ugly” was important for male adolescents in public schools and it was the only time that the orthodontic appliance had a negative esthetic connotation.

The thematic categories identified in the focus groups were computed according to the frequency of appearance, not to do a quantitative analysis, but rather to use the numbers to rank the subjects more and less commented on by the subjects (Table I).

The esthetic benefit of orthodontic treatment was the most frequent category in all focus groups. These benefits were differentiated, in the present study, from those attributed to the orthodontic appliance. This is because, although at first, they may appear as similar through the participants’ discourse, the dissociation of the ideas developed for the 2 themes was clear. Therefore, the

Table I. Orderly frequency of focus group themes

Positive aspects of orthodontic treatment	
Esthetic benefit of orthodontic treatment	42
Esthetic impact of the orthodontic appliance	
Social relations	34
Esthetic impact of orthodontic ligatures	28
Identification with other people	20
Functional benefit of the orthodontic treatment	11
Negative aspects of orthodontic treatment	
Pain associated with orthodontic treatment	41
Difficulty of access due to cost	33
Discomfort and trauma related to the orthodontic appliance	23
Difficulty in eating	12
Difficulty in cleaning	11
Association between orthodontic appliance and social status	10

positive changes in appearance resulting from orthodontic therapy were recorded as “esthetic benefit of orthodontic treatment” and immediate positive changes in appearance related to installing the orthodontic appliance, without necessarily being linked to professional treatment, were recorded as “positive esthetic impact of the orthodontic appliance.”

The reports of students regarding the esthetic benefits of orthodontic treatment were generic and referred to the alignment of the teeth through expressions such as “straightening,” “organizing,” and “fixing” the teeth, demonstrating that the highest expectations regarding treatment results were related to appearance, as can be seen in the following statements.

Oh, I'm trying to straighten my teeth and get a beautiful smile because I care about my appearance. (E3F)

I think it's positive to know that you're getting [braces] and later you will have good results, because when you go to remove them the esthetics will improve your self-esteem. (E9F)

The positive esthetic impact of the orthodontic appliance was clearly shown in 3 distinct thematic units, which were frequently addressed in the groups. They were improvement in social relations, identification with other people who wear braces, and the esthetic impact of the elastic ligatures, particularly associated with their colors.

The statements also show a strengthening in group relations.

... the girl in my class, she came to school with a big smile on her face. She used to laugh at almost nothing. And so, she came up close to others, looking at them and laughing [to show she was wearing braces]. (A2F)

Some people get along better with people with braces. (B7F)

Probably, as a consequence of a positive significance given to the orthodontic appliance, it proved to be an important factor in determining identity links, behavior, and motivation for orthodontic treatment in adolescents, as can be seen in the following statements.

I was in love with braces ... I don't know, everyone was wearing them, so I wanted to wear them too. (G8F)

There are people who get them on because of envy. They see a friend wearing them and want to get them too. (H6F)

In the present study, this motivation was often independent from the initial condition of the teeth.

It's like this, there's a girl who's a friend of my aunt. When my aunt started to wear them, she didn't even need braces, but she bought them. (C4F)

The term “bought” suggests that the desire for the orthodontic appliance is not necessarily linked to treatment with a professional, which it not the first priority. This was reinforced in the words of subject D1M:

I always wanted to get braces. But it's not because I had something wrong with my teeth, no. I always wanted to wear them because I thought they were cool, I saw others getting them put on, it makes you feel like getting them. (D1M)

Among the characteristics of the orthodontic appliance that have esthetic impact, the colored elastic ligature was the most frequently mentioned accessory in the group discussions, demonstrating its importance in the imaginations of the study subjects:

When my mother says that she is going to have braces put on me and my brother, I am looking forward to knowing the color, to know who I will become after I have them on. (A3F)

I don't know, everyone was wearing them, so I wanted to wear them too. They were colorful, they looked beautiful. It was kind of a trend. There were even people who had fake braces ... (G8F)

In some reports, adolescents admit the changing of them without professional follow-up, as described by the following participants.

When they want the next color they change them themselves. (B2M)

I know a girl who had braces and she would change the bands at home. She just went to the dentist to have braces put on and then she kept changing the bands at home. (C4F)

The negative impact of the appliance on esthetics appeared only 3 times during the study, as in the words of subject B3M:

You may feel a little embarrassed that you wear braces. (B3M)

In other reports, the negative impact has always been associated with external appliances, such as the head-gear appliance and the face mask.

From the start it was very different (referring to wearing the facemask) both for me and for others. So everywhere I went wearing it, people would look at me and it was very embarrassing. You see? (F7M)

Fixed braces are very common nowadays, so you see someone wearing them and you consider it normal. Now, you see a person wearing a face mask or head-gear, for example, they're more noticeable. (F6M)

The functional benefits of orthodontic treatment were identified in the study less frequently than the esthetic benefits. Improvement of mastication was the main functional gain reported.

The pain associated with orthodontic treatment was the second most frequent category in the focus groups and the most relevant negative aspect. Most of the time, the pain was reported as a momentary setback that was easily overcome, mainly during days following the placement of the appliance and the monthly treatment appointments, when the arch wires are changed and their activations are carried out. These experiences may commonly influence the decision to wear the orthodontic appliance.

Oh, at the beginning, as soon as you get the braces on, during the first few days it hurts a little or after you change the little bracket that holds the little bands. (B2M)

I have an older brother. He got them on, started to feel pain, then I [thought] ... "Forget it, this is gonna hurt me, I don't know if I should have them put on." (G3M)

Another negative aspect regarding orthodontic treatment was the trouble caused by the appliance, which included discomfort, trauma, ulcerations, and accidents resulting from its use.

When you get them on, the first time, you are not careful when you chew, it can hurt the side of the cheek and the use of the braces can get even worse. (D1M)

Although less frequent than pain and discomfort, difficulty in eating was recalled by the adolescents in the study.

The worst thing is certain things that you can't eat. (B2M)

My friend said that when she got hers put on, she just wanted to eat soup. Because she couldn't chew. She just wanted to have soup ... (D3F)

In our results, a relationship between braces and social status was observed, along with, consequently, the importance of these factors in social relationships and motivation for orthodontic treatment, including the placement of orthodontic appliances by adolescents without professional supervision.

There are people who get braces to have status, because everyone knows that you have to pay for them, so they have braces put on to show off. (E3F)

I think the person who has on "fake" braces, some of them have the mentality that this will give them status, that he or she is rich. (E1F)

Although there was no consensus as to whether orthodontic treatment was expensive or not, the economic aspect was recognized as the main limiting factor for access to treatment, mainly for those students in public schools.

Because sometimes it's too expensive and she can't afford it. (B9F)

The relatively long orthodontic treatment time in this study was one of the reasons presented as a financial obstacle to having access to treatment.

Oh, sometimes the issue is the monthly fee. Many people can't afford it and they quit. (B2M)

Although orthodontic treatment is still considered to be expensive by participants, it has been recognized that access to it has become easier compared with the past:

I think that in the old days, if you had braces on, people would say, "hey, he's rich, he can get them put on ..." And even though there are still few people who can afford them today, it's still more than it used to be. (F7M)

DISCUSSION

The WAT results showed a positive impact of the orthodontic appliance on the adolescents in the study, in relation to both their self-image and the perception of their appearance by their peers. The words associating the orthodontic appliance with health care were more frequent for adolescents in private schools. The associations between orthodontic appliance and facial esthetics occurred for both genders and were more frequent for the lower-income adolescents in public schools located in areas of greater social vulnerability. This may be indirectly related to the culturally established link between orthodontic appliance and social status. The relationship between socioeconomic status and the need for orthodontic treatment has been previously documented.²⁰⁻²²

The positive impact of orthodontic treatment on the quality of life of young and adult patients is well documented in the literature.^{5,8,11} This has led researchers to recommend the use of health measures related to quality of life both to show the need for orthodontic treatment and to propose public oral health policies. In the present study, this impact was mainly associated with esthetic benefits related to changes due to treatment, as well as immediate changes in appearance by installing the appliance.

The simple placement of the fixed orthodontic appliance showed a great impact on the social behavior of the adolescents, in different ways and for both genders, demonstrating the complexity of the meaning of braces in the universe characterized by intense relationships in adolescence. This seems to be related to an improvement in the self-esteem and the esthetic self-perception of these adolescents with the placement of the appliance, which is in line with previous studies.⁵ The socioemotional benefits of orthodontic treatment have been associated with a better acceptance of malocclusion by the adolescent once it is being treated.¹⁶ However, in the present study, the positive esthetic impact of the appliance itself was identified, both by the adolescents who wear braces and by those who have never worn them, suggesting that this benefit was not necessarily related to treatment.

The colored elastic ligatures showed a positive impact on facial appearance according to the adolescents in the study and influenced their desire for the fixed appliance. Rachel-Henzell et al²³ found similar results when evaluating the content of tweets related to orthodontic treatment in social media.

Although some studies have reported a high negative impact of the fixed orthodontic appliance on the socioemotional well-being of adolescents,^{10,24,25} our research found that the appliance can be an important aspect in

Brazilian adolescents' social relations and identity among groups. Burden²⁶ found that coexistence between similar groups has a greater influence than gender and social class in adherence to orthodontic treatment.

An improvement in mastication was the functional benefit most recalled by the study subjects. This may reflect significantly on the quality of life of patients with malocclusions,^{6,8} although the physiologic impact of malocclusions on functions such as mastication, speech, and temporomandibular joint are not yet consistent enough to establish a cause-and-effect relationship.²⁷

The pain associated with orthodontic treatment was the most relevant negative aspect in the study. This is in agreement with a large number of previous studies, which found pain to be the main negative impact of orthodontic treatment for patients of different age groups,^{7,8,23} especially in the early stages of treatment.^{9,26,28,29}

Pain can be an obstacle to the placement of the appliance and is commonly influenced by other people's experiences. This reinforces the study by Zhang et al,¹⁶ which concluded that adolescents' expectations regarding pain and discomfort are greater than those they experience during orthodontic treatment.

The trouble reported in the discussions regarding the use of the appliance, such as discomfort, trauma, and ulcerations, are relatively common in the literature and are more related to the adaptation phases of adolescents in orthodontic treatment.^{7,9,26,29}

Although less frequent than pain and discomfort, difficulty in eating was recalled by adolescents in the present as well as previous studies.^{23,30} However, Johal et al³⁰ found no significant impairment in eating behavior except in the first weeks of treatment.

Although there was no consensus as to whether orthodontic treatment was expensive or not, the economic aspect was recognized as the main limiting factor for access to treatment. Thus, for countries where public health systems offer orthodontic treatment, criteria for patient selection that contemplate social and economic aspects, besides those presented by normative indexes, are necessary.³¹

The relatively long orthodontic treatment time has been one of the main reasons for patients' dissatisfaction^{7,24} and, in this study, was one of the reasons presented as a financial obstacle to access to treatment.

The recognition of the drop in orthodontic treatment prices in Brazil may be related to the significant number of professionals and specialization programs in the country, which would have increased access to treatment. Although in a previous study, Germa et al²⁰ found

no positive association between occupational density and access to orthodontic treatment, social, behavioral, and economic aspects may assign a different understanding of this relationship in the present study. In Brazil there are 118 orthodontic training programs registered with the Federal Council of Dentistry.³² The relationship between the professional market, access to orthodontic treatment, and its effects on adolescents' behavior is unclear and should be investigated in future studies.

The results of the present study should be interpreted with caution. It is important to clarify that the qualitative methodology responded to very specific questions, being concerned with a level of reality that can not be quantified, and therefore did not aim to make generalizations about the established relationships.¹⁸ However, by addressing such questions in greater depth, it could determine new directions in knowledge production that can be further reevaluated through the statistical potentials of the quantitative methods. The great variety of qualitatively obtained data makes the analysis of the data the most difficult part of the methodology and means that the researcher must have a high analytic capacity. Thus, the quality assessment criteria of qualitative research are less specific, and, consequently, it is more difficult to identify methodologic errors than in quantitative research.³³

CONCLUSIONS

1. Orthodontic treatment has a positive esthetic impact for Brazilian adolescents, with improved self-image.
2. The fixed orthodontic appliance has an immediate positive impact on the appearance and is an important factor in the behavioral and social relationships of Brazilian adolescents, particularly its association with the social status attributed by them.
3. The association of treatment or orthodontic appliance with appearance was the most relevant in the study, for both genders and both types of schools.
4. The adolescents' perception of the treatment or orthodontic appliance is important owing to the intensity and complexity of the social, emotional, and behavioral relations experienced in this stage of life, and therefore their consideration in the universe of health care becomes imperative.

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