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**ORIGINAL ARTICLE**

# Evaluation of Children's and Adolescents's Anxiety Previously Dental Treatment: A Cross-Sectional Study

Nilton Cesar Nogueira dos Santos[1], Rafaela Gomes de Oliveira[2], Leandro Almeida Nascimento Barros[3]

[1]Department of Pediatric Dentistry, School of Dentistry, University State of Southwest of Bahia, Jequié, BA, Brazil. 0000-0002-9799-8764
[2]School of Dentistry, University State of Southwest of Bahia, Jequié, BA, Brazil. 0000-0003-2483-1549
[3]Post-Graduate Program, School of Dentistry, Federal University of Goiás, Goiânia, GO, Brazil. 0000-0002-1220-0101

Author to whom correspondence should be addressed: Leandro Almeida Nascimento Barros, Dental School, Division of Orthodontics, Federal University of Goiás, Avenida Universitária Esquina com 1ª Avenida, s/ número, Goiânia, GO, Brazil. 74605-220. Phone: +55 62 9344-1075. E-mail: leandrobarros_10@outlook.com.

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**Abstract**

**Objective:** To evaluate levels of anxiety in children and adolescents related to age and experience of visits to the dentist using the modified Venham Picture Test (VPTm). **Material and Methods:** This is a quantitative cross-sectional study with convenience sample. Children and adolescents of both sexes, subdivided into age groups of 6-9 years (A1 and A2) and 10-13 years (B1 and B2), in the waiting room of a Dental Clinic, were grouped according to the experience of visits to the dentist (have been to the dentist / have never been to the dentist). Descriptive statistics were mean, standard deviation and frequency of cases. The Kolmogorov-Smirnov (K-S) was used for normality analysis, with 95% significance level. Inferential statistics was performed using the Chi-Square and Mann-Whitney tests, with $p<0.05$. **Results:** In total, 60 children and 60 adolescents were evaluated, 65 (54.16%) males and 55 (45.83%) females. No differences were observed between genders in groups A1 and A2 ($p=0.30$) and B1 and B2 ($p=0.94$). The highest means of the VPTm scale were observed in groups A2 and B2 ($2.87 \pm 2.30$ and $2.13 \pm 1.29$) and the lowest in groups A1 and B1 ($1.13 \pm 1.45$ and $1.20 \pm 1.29$), respectively. Statistical differences were observed for the mean VPTm scores between age groups A1 and A2 ($p=0.004$) and B1 and B2 ($p=0.018$). **Conclusion:** The level of anxiety was inversely proportional to age, so younger children were more anxious; it was also observed that children and adolescents who had never been to the dentist tended to be more anxious.

**Keywords:** Behavior and Behavior Mechanisms; Dental Anxiety; Manifest Anxiety Scale.

## Introduction

In pediatric dentistry, it is well known that anxiety represents a great barrier to clinical practice, being a precursor to the main non-cooperative events [1]. The success of treatment aimed at children and adolescents is be based on the clinician's ability to deal with the patient's psychological problems, reflecting on the appropriate choice of behavioral management techniques [2].

There is a considerable interest on knowing the main aspects related to anxiety and fear in children and adolescents who, frequently, cannot clearly express what they feel on a frightening situation [3]. Several instruments have been developed and used to measure the anxiety of children and adolescents when facing the dental surgeon / pediatric dentist and in the dental environment, among which the Dental Anxiety Scale (DAS) [4], the facial image test (FIS) and the Venham Picture Test (VPT), developed in 1977 [6] and adapted to the Brazilian reality, entitled modified VPT [7].

Previous studies have evaluated the level of anxiety in children and adolescents through the original version of the VPT test [8-11,]. However, there is lack in literature of studies that evaluate the modified VPT test in the Brazilian culture [1,2,3,12-14]. There seems to be a gap in the evaluation of anxiety prior to dental treatment correlated with the age of patients, establishing comparatives in age groups in childhood and adolescence, especially among those who have had contact with the dental environment and those who have never had such experience [15].

Therefore, the aim of the present study was to evaluate the level of anxiety of children and adolescents prior to dental treatment regarding to age and experience of visits to the dentist with the application of the modified Venham Picture Test (VPTm).

## Material and Methods

### Study Design and Sample

This is a cross-sectional and quantitative study. In all, 120 children and adolescents were evaluated before the beginning of dental treatment at the Dental Clinic of the State University of Southwestern Bahia (UESB), in the city of Jequié, state of Bahia, Brazil, during the first and second semester of 2017. Children and adolescents aged 6-13 years of both sexes were included, who were scheduled for attendance at the pediatric dental clinic accompanied by parents / guardians. Those with cognitive, mental and/or vision problems were excluded from the study.

### Data Collection

Participants who fulfilled the eligibility criteria were allocated as follows: groups A1 and A2, composed of children aged 6-9 years who have been or have never been to the dental environment, respectively; and, B1 and B2, composed of adolescents aged 10-13 years who have been or have never been to the dental environment, respectively. Evaluation was duly standardized with the purpose of performing the test in the waiting room before the procedure with individual approach for each child

and adolescent, without any interference of the child and adolescent's choice To analyze anxiety with dental treatment, the modified Venham Picture Test (VPTm) was used, which identifies and measures anxiety in children and adolescents through the presentation of figures, representing emotional reactions of participants. The VPTm consists of 4 characters: 2 boys and 2 girls, each having a black and white ethnic character. The set has 8 figures numbered from 1 to 8, printed separately on an A4 paper [7]. All characters have the same amount of figures and emotional reactions: neutral (little anxiety), cheerful (absence of anxiety), fear (presence of anxiety), distress-crying (presence of anxiety), sadness (presence of anxiety), anger (presence of anxiety) and panic (presence of anxiety), and only one character per participant was chosen [2] (Figure 1).

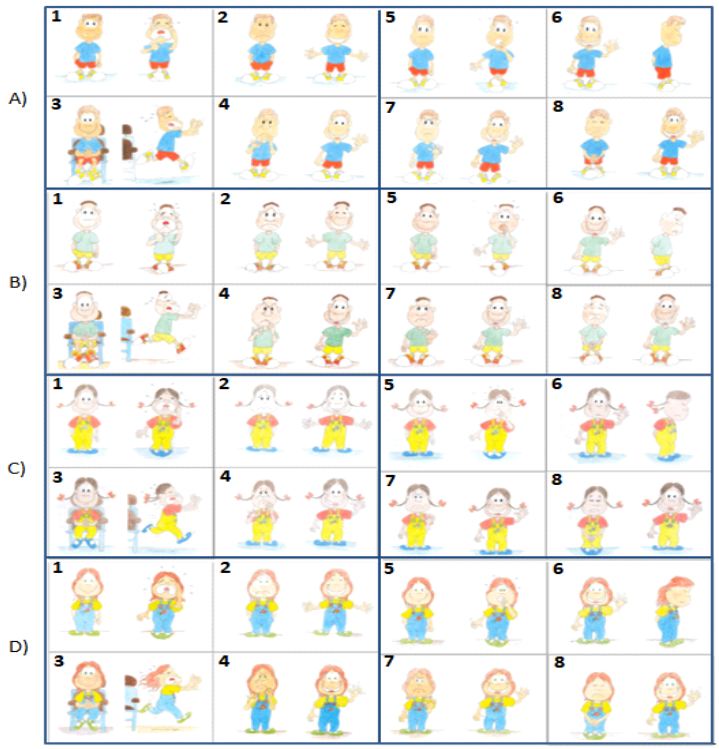


**Figure 1. Modified VPT scale: A and C) white ethnicity; B and D) black ethnicity [7].**

Before the modified Venham Picture Test (VPTm) cards were presented, a standardized question was asked, "Between the two drawings, which is similar to what you feel?" [2,13]. If the question was not understood, an easier one was asked: "Which image most resembles you?" [6,7]. In sequence, 1 card was presented at a time, in total and the value referring to each chosen image. The cutoff point was established according to previous study [8], which was chosen to classify individuals according to the level of anxiety, where 0 is defined as absence of anxiety, 1 to 3, mild anxiety and from 4 to 8, anxiety.

Statistical Analysis

Data were analyzed using the IBM SPSS Statistical Package for Social Sciences (version 24.0; IBM Corp., Chicago, IL, USA). Descriptive statistics was applied to evaluate dispersion and

central tendency of demographic data, as well as to evaluate the modified VPT scale. The Chi-square test was used to evaluate possible differences between sexes in the groups of children and adolescents.

The Venham Picture Test modified score was analyzed by summing the respective scores of each participant. The Kolmogorov-Smirnov test was applied to analyze sample distribution. Due to non-normality, the non-parametric Mann-Whitney test was used to compare levels of anxiety. For all inferential tests, the significance level was set at 95%. The VPT score was also analyzed by categorizing the total score of each participant in: anxiety-free, mildly anxious and anxious.

Ethical Aspects

The present study was approved by the Ethics Research Committee of the State University of Southwestern Bahia (Protocol No. 2.346.433) respecting all recommendations and norms of Brazilian Resolution CNS 466/2012.

## Results

In all, 120 children were evaluated, 65 (54.16%) males and 55 (45.83%) females. Tables 1 and 2 show the characterization of age groups of 6-9 years and 10-13 years. Statistical differences were observed in the mean VPTm scores between groups A1 and A2 (p = 0.004) and B1 and B2 (p = 0.018). There were no significant differences between sexes in both groups: (p = 0.30) and (p = 0.94). The highest means of the VPTm scale were observed in groups A2 and B2 (2.87 ± 2.30 and 2.13 ± 1.29) and the lowest in groups A1 and B1 (1.13 ± 1.45 and 1, 20 ± 1.29), respectively.

**Table 1. Assessment of the level of anxiety in children through the VPTm scale among those who have already been or have never been to the dentist.**

| | Children Aged 6-9 Years | | |
|---|---|---|---|
| **Variables** | Group A1 (N = 30) | Group A2 (N = 30) | **p-value*** |
| VPTm | 1.13 (± 1.45) | 2.87 (± 2.30) | 0.004* |
| Age | 7.80 (± 1.21) | 7.10 (± 1.21) | |
| Sex | | | |
| Male | 16 (53.3%) | 13 (43.3%) | 0.303** |
| Female | 14 (46.7%) | 17 (56.7%) | |

For variable sex, values are: Frequency (%); VPTm and age: mean (standard deviation); *p-value based on Mann-Whitney rank test; **Chi-square with significance level at 0.05.

**Table 2. Assessment of the level of anxiety in adolescents through the VPTm scale among those who have already been or have never been to the dentist.**

| | Adolescents Aged 10-13 Years | | |
|---|---|---|---|
| **Variables** | Group B1 (N = 30) | Group B2 (N = 30) | **p-value*** |
| VPTm | 1.20 (±1.29) | 2.13 (±1.59) | 0.018* |
| Age | 11.30 (±0.98) | 11.47 (±1.27) | |
| Sex | | | |
| Male | 21 (70.0%) | 15 (50.0%) | 0.940** |
| Female | 9 (30.0%) | 15 (50.0%) | |

For variable sex, values are: Frequency (%); VPT and age: mean (standard deviation); *p-value based on Mann-Whitney rank test; **Chi-square with significance level at 0.05.

In Table 3, it is possible to observe in the age group of 6-9 years that the group A1 presented the highest percentages of mild anxiety (46.6%) and absence of anxiety (43.3%). In group A2, composed of children who have never been in the dentist, higher proportion of individuals with mild (46.6%) and high anxiety (33.3%) can be observed. In the age group of 10-13 years, group B1 presented higher percentage of subjects with mild anxiety (53.3%) and absence of anxiety (40%) and in group B2, higher percentage of mild anxiety (66.6%) was observed.

**Table 3. Level of anxiety between children and adolescents.**

| Variables | No Anxiety N (%) | Light Anxiety N (%) | Anxiety N (%) |
|---|---|---|---|
| Children Aged 6-9 Years | | | |
| A1 | 12 (43.3) | 15 (46.6) | 3 (10.1) |
| A2 | 5 (21.1) | 15 (45.6) | 10 (33.3) |
| Adolescents Aged 10-13 Years | | | |
| B1 | 12 (40.0) | 16 (53.3) | 2 (6.7) |
| B2 | 5 (16.7) | 20 (66.6) | 5 (16.7) |

In Figure 2, the highest means of the VPTm test were observed in groups that have never been to the dentist (B1 and B2), with mean anxiety levels inversely proportional to age in these groups.

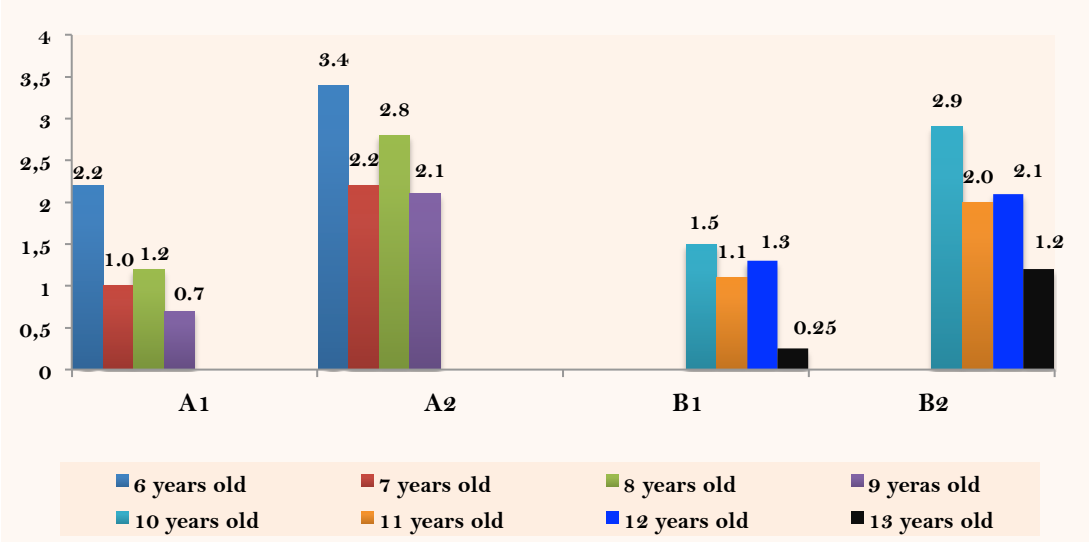


**Figure 2. Level of anxiety in children and adolescents.**

## Discussion

The present study evaluated the level of anxiety in children and adolescents prior to dental treatment using the modified Venham Picture Test (VPTm). It is a matter of great relevance for dentistry when analyzing the relation of anxiety with age, sex and experience of visits to the dentist. As the behavioral analysis is important for dental treatment success, especially in dental clinic, VPTm can be used as a tool for the emotional evaluation of children and adolescents, according to literature.

Previous studies have evaluated the VPT test to determine if there is a relationship between prior dental experience and levels of anxiety in children [6,9,15,16] or associated with Frankl scale [15]. The anxiety of 102 Indian children and adolescents aged 4-14 years was evaluated using VPT, FIS and the Pictorial Scale (RMS) [16]. They were separated into different groups according to methodology in order to compare data, which may have led to biases, since children and adolescents are at different perception stages. In other study, 200 children were evaluated only with VPT test [9] and, as result, it was observed that the experience of visits to the dentist was not a factor to decrease anxiety and there was no statistical significance between groups. However, no data on adolescents have been evaluated and the VPT test was applied in the school environment, unlike recommendation, with application in the waiting room of the dental environment [6,7,15]. However, no data on adolescents have been evaluated and the VPT test was applied in the school environment, unlike recommendation, with application in the waiting room of the dental environment [6,7,15].

Through the evaluation of the modified VPT Picture Test (VPTm), regarding the sample of children and adolescents analyzed in this study, it was observed that anxiety was related to the visit to the dentist. In both age groups (6-9 years and 10-13 years), children that had previous experience in the dental environment obtained lower mean VPTm scores than those who have never had such experience. Due to the limitations observed in studies [9,15,16,17], it was decided to divide groups into experience of visits to the dentist or not, since children and adolescents who have never been to the dental environment may behave differently from those who already have. Groups were also divided in relation to age group, separating children from adolescents, because they are at distinct phases of life, with different perceptions and behaviors [2].

After analyzing data, it was verified that the group of children (Group A1) and adolescents (Group B1) who had already visited the dental environment, had lower mean VPTm scores compared to children (Group A2) and adolescents (Group B2) who had never been to a dental office. Therefore, this may be related to the visit to the dentist, the waiting room aimed at the target public and procedures of the oral health team, teachers, students and dental team in the pre / trans / post dental care of patients, whose practice is supported on beliefs, humanization and acceptance, which are prerogatives of humanized health care. In other words, as they are submitted to dental treatment, anxiety and anxious behaviors tend to decrease [18].

When comparing groups of children with adolescents, it was observed that children aged 6-9 years had higher level of anxiety comparing to adolescents aged 10-13 years. Therefore, some studies have reported a tendency for younger children to have higher levels of anxiety in relation to older children [18,20,21]. However, when assessing the anxiety of 50 children aged 4-9 years using VPTm, compared to the anxiety of children aged 4-6 years and those aged 7-9 years, no statistically significant difference was observed between groups, since 52.17% in the first group of children had some level of anxietyt, 44.4% in the second group of children had some level of anxiety, which differs from the present study, since no relationship with age was observed [15].

It was observed that age and regular visits to the dental office are factors predisposing to anxiety in children and adolescents [18]. Thus, when analyzing variable age in the present study, it was possible to observe that children/adolescents with frequent visits to the dentist were less anxious than those who had never visited the dentist, since anxiety tends to decrease with age [12,18,20,21], which corroborates previous study [22], in which 44 children aged 3-12 years were evaluated, comparing the level of anxiety with the use of VPT between individuals aged 3-6 years and those aged 7-12 years. The authors observed that children aged 3-6 years were 11.8 times more likely of having anxiety prior to dental treatment than the group of children aged 7-12 years, which was statistically significant [22].

Regarding data collection, there was resistance from younger children, who were mostly 6 years old and because they were at the beginning of the socialization phase [23], they had difficulty speaking to an unknown person. Therefore, the examiner had to resort to parents / guardians of a small portion of these children to assist in understanding the test, as a result, parents tended to influence their children's responses, consequently leading to bias.

Although sample calculation for 211 children / adolescents was performed for the data collection process, to date, the minimum number of individuals for the study had not yet been reached, thus a sample was collected from 120 children / adolescents, the same amount previously collected [17]. Thus, the results presented here need to be evaluated with caution, since they may not reproduce what is observed among the children and adolescents evaluated, since with low power, the differences that have already been found may or may not be confirmed.

With the intention of reducing the levels of anxiety of pediatric patients, playful activities, dialogues, games, drawing and painting materials, rapport activities in general can be performed in the waiting room. Furthermore, the environment must be designed and decorated for children and adolescents, which may reduce or even eliminate anxiety prior to dental treatment [19].

Another aspect that can influence the anxiety of children and adolescents is the patient-professional relationship, that is, if children and adolescents do not feel comfortable or do not trust their dentist, probably their level of anxiety during dental treatments increase. Therefore, dentists should create bonds with their patients, increasing confidence, as well as seeking and improving their knowledge regarding the etiology and behavioral changes that anxiety can cause in their patients, especially in the youth population.

In this scenario, it is difficult to evaluate the level of anxiety of children and adolescents with only a projective self-analysis test, because there are many variables, such as socioeconomic conditions, cultural issues, level of information of parents / guardians, which the modified VPT is not able to evaluate [24]. Moreover, these feelings are not limited only when children/adolescents are in the waiting room of a dental office, which can influence the results. Thus, further studies should more broadly address external factors that influence the level of anxiety of patients with other scales, tests and questionnaires [25].

Although the modified Venham Picture Test has limitations, it is an excellent test and can be used in several ways, associating it with other techniques and approaches, such as: comparing the level of anxiety of children and adolescents who undergo invasive procedures and less invasive procedures, use of music in the waiting room along with rapport activities. All these procedures can contribute to identify and reduce the level of anxiety of children and adolescents and as serve as a thermometer for the dentist to assess whether behavioral adjustment is effective in their patients. VPTm can also be used in association with other tests and anxiety evaluation scales, such as FIS, DASm, Frank's scale, as well as pressure gauging in order to observe heart rate, thus covering variables other that the modified VPT alone is not able to evaluate [26,27].

## Conclusion

The level of anxiety was inversely proportional to age, with younger children being more anxious. Children and adolescents who have never been to the dentist tended to be more anxious. There is a need for more studies and larger number of participants to confirm the results presented here.

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**Conflict of Interest:** The authors declare no conflicts of interest.

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