The purpose of this study was to evaluate patient acceptance and perception of pain with regard to orthodontic mini-implants. The study was conducted on 58 individuals undergoing orthodontic treatment, who had orthodontic mini-implants placed as anchorage devices. Data were collected using a questionnaire containing 6 questions evaluating perception of pain during mini-implant placement and during use, difficulty with cleaning, unaesthetic appearance, difficulty with eating and benefits observed. Data were tabulated and analyzed using Fisher and Spearman’s Correlation Coefficient tests. It was found that 94.8% of the patients reported that they would be willing to undergo treatment with mini-implants again. Of the negative aspects evaluated, the most significant was discomfort during placement, while the least significant was difficulty with eating. Patients’ perception of aspects related to mini-implants was shown to be independent of the quantity of these devices placed. Although the patients evaluated some aspects of mini-implants negatively, the mean score for benefits observed was very high, indicating good patient satisfaction with treatment.

Key words: Orthodontics, Orthodontic Anchorage Procedures, Pain.

INTRODUCTION

Anchorage is essential to achieving the objectives of orthodontic treatment. The main advantage of mini-implants is that they allow the movement of several teeth without loss of anchorage. Other advantages include the small size, minimal anatomic limitations, more comfortable surgery for patients, immediate loading and low cost. They provide an excellent alternative, as extra-oral appliances depend on patients’ cooperation, thus limiting treatment. There are many studies on mini-implants in the literature, particularly discussing their properties and clinical applications. Nevertheless, even with the popularization of orthodontic treatment with mini-implants, there are few studies on the tolerance, acceptability and opinion of patients with regard to treatment with them. Based on this premise, the aim of this study was to evaluate patients’ perception of mini-implants with respect to pain, aesthetics, hygiene and benefits observed, and thereby fill this gap in the literature.
MATERIALS AND METHODS
The research was conducted on 58 individuals aged 30 to 50 years (Mean: 35 years 5 months), who were undergoing orthodontic treatment with mini-implant placement at the Orthodontic Clinic of the Southwest Bahia State University. Initially, all the patients presented skeletal Class II and Class I malocclusion, in which the proposed treatment involved premolar extractions. A total of 132 self-drilling mini-implants were placed, all of the self-tapping type, measuring 1.6mm thick and 8mm long (SIN - Sistema de Implantes Nacionais, São Paulo, Brazil). All mini-implants were inserted by the same orthodontist.

The mini-implants were placed after infiltrative local anesthesia with a little less than 1/4 of the anesthetic cartridge. A lancet was used to demarcate the cortical bone at the site defined as ideal for mini-implant placement, and the mini-implants were inserted directly into the bone using a manual driver. All the mini-implants were placed between maxillary second premolars and first molars. They were loaded using a nickel titanium spring with 100 g force measured with a dynamometer.

Data were collected by means of a questionnaire containing questions about pain perception during mini-implant placement and use, difficulty with cleaning, unaesthetic appearance, difficulty with eating and the benefits. Patients were asked to use a scale of 0 to 10 to rank their perceptions. One question asked whether the subject would be willing to undergo mini-implant placement again, and another asked how many mini-implants were placed. The questions were asked at different times. The question about perception of pain during placement was asked immediately after implant placement. The questions about pain perception while using mini-implants, difficulty with cleaning, unaesthetic appearance, and difficulty with eating were asked 28 days after placement. The question about the benefits observed was asked 6 months after placement (Figure 1). The research was conducted in compliance with the criteria established by Resolution CNS 196/96 of the Ministry of Health (Brazil, 1996), so the questionnaire was only administered after approval by the Research Ethics Committee of the Southwest Bahia State University, Protocol Number 125/2011.

The Spearman correlation coefficients were calculated to evaluate the relationship between the visual analog scale scores of the various aspects investigated. The scores were compared according to the number of mini-implants placed, using the Mann-Whitney test. The level of significance adopted was 5% (α = 0.05). The data were tabulated and analyzed using the statistical software BioEstat (version 5.0, Belém-PA, Brazil).

RESULTS
The number of mini-implants placed in patients participating in the research ranged from 1 to 5, with mean ± SD = 2.3 ± 1.1. Of the 58 participants, 55 (94.8%) reported that they would be willing to undergo further treatment with mini-implants, 2 (3.4%) would not be willing to do so and 1 (1.7%) did not answer the question. The descriptive statistics for the Visual Analog Scale scores for the six aspects investigated are presented in Table 1.

The factor with the most negative impact on mini-implant placement is discomfort and pain during placement, followed by the difficulty with cleaning. The factors that had the least negative impact were, in order, difficulty with eating and unaesthetic appearance. The mean score for benefits observed was very high, indicating good satisfaction with the end result of the treatment.

<table>
<thead>
<tr>
<th>Feeling with regard to</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Min-Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discomfort and pain (during placement)</td>
<td>3.03</td>
<td>2.30</td>
<td>0.0 - 8.3</td>
</tr>
<tr>
<td>Discomfort and pain (during use)</td>
<td>1.56</td>
<td>2.16</td>
<td>0.0 - 8.0</td>
</tr>
<tr>
<td>Difficulty with cleaning</td>
<td>2.12</td>
<td>2.61</td>
<td>0.0 - 8.0</td>
</tr>
<tr>
<td>Unaesthetic appearance</td>
<td>0.81</td>
<td>1.87</td>
<td>0.0 - 10.0</td>
</tr>
<tr>
<td>Difficulty with eating</td>
<td>0.77</td>
<td>1.61</td>
<td>0.0 - 10.0</td>
</tr>
<tr>
<td>Benefits observed</td>
<td>8.56</td>
<td>2.21</td>
<td>0.0 - 10.0</td>
</tr>
</tbody>
</table>
Fig. 1: Assessment Questionnaire.

**IDENTIFICATION**

**Gender**
- [ ] Male  [ ] Female

**Age** __________

Please provide your answer on the following scale by marking the level that represents how you feel regarding:

- Discomfort and pain (during placement) – immediately after placement.
- Discomfort and pain (during use) – 28 days after placement.
- Difficulty with cleaning – 28 days after placement.
- Unaesthetic appearance – 28 days after placement.
- Difficulty with eating – 28 days after placement.
- Benefits observed – 6 months after placement.
- How many mini-implants were placed? __________
- Would you be willing to undergo mini-implant placement again? ( ) Yes ( ) No
Table 2 shows the correlation coefficients (r) between the visual analog scale scores of the aspects analyzed. There was significant correlation between the variable “discomfort and pain (during use)” and the variables “difficulty with cleaning” and “difficulty with eating”. Significant correlation was also found between “difficulty with cleaning” and “difficulty with eating”.

Table 3 compares the visual analog scale scores of the aspects analyzed according to the quantity of mini-implants placed. There was no statistically significant difference for any of the study questions between patients receiving up to two mini-implants and patients receiving more than two.

DISCUSSION
The purpose of this study, as was the case with the few available in the literature, was to evaluate patients’ perception of mini-implants regarding pain, aesthetics, difficulty with cleaning and eating, and benefits observed. The scale used for evaluation enabled a clearer understanding of level of pain and difficulty related to mini-implants, in addition to the degree of benefits obtained.

The mean score for benefits was 8.56 and the percentage of patients who would be willing to undergo mini-implant placement again was 94.8%, so the rate of satisfaction with the treatment can be considered high. These results agree with Brandão and Mucha (90%), Blaya et al. (100%), Lee et al. (77.8%) and Gündüz et al (94.81%).

Discomfort and pain during mini-implant placement was the negative factor most often reported by patients, although since the mean is low, it is unlikely to be a limitation to this procedure. This finding is very close to other studies by Lee et al., in which 72.2% of the subjects reported little or no pain, and by Kuroda et al., in which only about 25% of the subjects reported pain at the time of self-tapping mini-implant placement. In the study by Baxmann et al., the percentage of patients that felt little or no pain was lower, at approximately 40%.

In addition to discomfort and pain during mini-implant placement, the most relevant side effects, in decreasing order, were difficulty with cleaning, discomfort and pain during use, unaesthetic appearance and difficulty with eating. Other studies.
have mentioned negative effects as being difficulty with speech, cleaning and chewing. 

Correlation analysis suggests that patients reporting discomfort and pain during the use of mini-implants would probably also report difficulty with cleaning and/or eating. Similarly, patients reporting difficulty with cleaning may also have difficulty with eating, and vice-versa.

Biofilm control in the peri-implant region is essential for maintaining orthodontic mini-implants within patterns of normality, and is directly related to their successful use. As the variable “difficulty with cleaning” was observed in two of the three significant correlations previously mentioned, it is important for the dental surgeon to know and convey a mini-implant cleaning protocol to patients.

The quantity of mini-implants placed showed no relationship with the negative aspects evaluated by the patients, suggesting that the patients’ perception with regard to treatment does not depend on the number of mini-implants placed.

The data gathered in this study show that the mini-implant is the greatest revolution in anchorage for orthodontics over the past 15 years, making treatments more predictable, aesthetic and comfortable.

CONCLUSION

From the information collected and analyzed, it may be concluded that mini-implants are recommended for clinical use, since the patients reported a low degree of discomfort and pain during their placement and use, little difficulty with cleaning, minimal complaints of aesthetic compromise and little difficulty with eating. Moreover, the great majority said that they would be willing to undergo mini-implant placement again, thus showing that the benefits outweigh the possible risks or discomfort.

REFERENCES