

## Longitudinal behavioral analysis during dental care of children aged 0 to 3 years

**Robson Frederico Cunha**<sup>(a)</sup>  
**Ana Carolina Soares Fraga Zaze**<sup>(b)</sup>  
**Ana Elisa de Mello Vieira**<sup>(c)</sup>  
**Fabíola Lemos Melhado**<sup>(d)</sup>  
**Maria Lucia Marçal Mazza**  
**Sundefeld**<sup>(e)</sup>

<sup>(a)</sup>PhD, Professor of Pediatric Dentistry; <sup>(b)</sup>MSc, Graduate Student in Pediatric Dentistry; <sup>(c)</sup>PhD, Professor of Statistics – School of Dentistry at Araçatuba, São Paulo State University (UNESP), Araçatuba, SP, Brazil.

<sup>(c)</sup>PhD, Professor of Pediatric Dentistry, School of Dentistry, Educational Foundation of Santa Fé do Sul, Santa Fé do Sul, SP, Brazil.

<sup>(d)</sup>PhD, Private practitioner in Araçatuba, SP, Brazil.

**Abstract:** “When” and “how” the dentist intervenes have repercussions on children’s physical and emotional patterns. The objective of the present study was to conduct a longitudinal behavioral analysis during dental care of babies aged 0 to 3 years. A total of 216 patients seen at the Baby Clinic of the School of Dentistry at Araçatuba, São Paulo State University (UNESP), were selected. The selection criterion was attendance at ten dental care sessions at bimonthly intervals for routine procedures such as clinical examination and oral hygiene. There was a predominance of cooperative behavior compared to uncooperative behavior when each visit was analyzed separately. The behavior of the patients must have been directly influenced by their psychomotor development. Constant attendance and exposure of the baby to non-stressful dental stimuli are factors that favor a cooperative behavior.

**Descriptors:** Behavior; Child; Dental care.

**Corresponding author:**

Robson Frederico Cunha  
Rua José Bonifácio, 1193 - Vila Mendonça  
Araçatuba - SP - Brazil  
CEP: 16015-050  
E-mail: [cunha@foa.unesp.br](mailto:cunha@foa.unesp.br)

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## Introduction

Pediatric dentistry arose from the recognition that children have specific dental problems. “When” and “how” the dental surgeon intervenes have repercussions on children’s physical and emotional patterns, since they are in a stage of considerable growth and development.<sup>1</sup> These repercussions may be positive or negative, depending on the context. Thus, concern with the psychological aspects involved in dental care has increased. Nowadays, it is widely accepted that the knowledge about the behavior and functioning of the human being improved the integration of the professionals involved in dental care. The dentist should focus his interest on the child as a whole, including not only physical but emotional well-being as well.<sup>1</sup>

Although the behavior of children is more related to their mental development than to chronological age, the dental pediatrics literature relates some typical characteristics to different age groups, and more frequently so in the 3 to 12 year age group.<sup>2,3,4</sup>

Since the 1980s, dental care for babies (0 to 36 months of age) has grown extensively in Brazil, a fact that has led to an increase in the number of professionals that provide dental care to children as early as during their first year of life. According to Cunha *et al.*<sup>5</sup> (2003), infancy is the best period to create good habits that will persist throughout adult life. This early care is justified not only by the maintenance of oral health but also by the possibility to accustom the child to the routine of dental procedures. However, little has been published in the past about the infant’s behavior in the dental office. Pereira, Freire<sup>6</sup> (2004) investigated children’s behavior during dental attendance and concluded that the behavior depends on the babies’ psychological development. According to Walter *et al.*<sup>7</sup> (1999), newborns are docile, easy to handle and require the presence of their mothers since separation will influence the children’s reactions to new situations. This is an important aspect when providing dental care in this age group. Other variables, such as unfamiliar environments and interference from persons through physical contact, may affect their behavior.

Percinoto, Cunha<sup>8</sup> (2002) reported that studies are necessary to rule out doubts regarding the

reactions of those babies to stimuli applied in the dental office and possible behavioral sequelae that those stimuli may cause in the future, knowing that the patient is in a phase of considerable physical and psychological development. According to Klein<sup>9</sup> (1967), the emotional impact of dental treatment on children is still unknown, and the way they internalize their experience with the dentist is believed to be decisive for the formation of attitudes and expectations during dental treatment.

Based on the above considerations, the behavior of babies submitted to dental care should be further explored since baby dentistry is a growing area that requires scientific evidence to offer physical and emotional well-being to the patient. The objective of the present study was, thus, to conduct a longitudinal behavioral analysis during dental care of babies aged 0 to 3 years.

## Methods

A total of 216 records of patients aged 0 to 36 months seen at the Baby Clinic of the School of Dentistry at Araçatuba, São Paulo State University (UNESP), Araçatuba, SP, Brazil, were selected. The selection criterion was attendance at ten dental care sessions at bimonthly intervals according to the dental care protocol for babies published by Cunha *et al.*<sup>10</sup> (2000). For this study design, it was crucial that the subjects had received exactly the same experience at each visit. Children presenting restorative care, longer intervals between appointments or mental and/or physical disease were not included in the study. This research was reviewed and approved by the appropriate institutional Ethics Committee, and the children’s parents were approached concerning the study.

Baby dental care and assessment of the babies’ cooperation were provided by dentists who were previously oriented. The dental clinical procedures were performed in dental chairs for babies (“macri”) and included only clinical examination and oral hygiene using gauze. When teeth were present, application of a 0.1% neutral sodium fluoride solution using a cotton-tipped swab was also performed. No mirrors or probing instruments were used in the procedures. The mothers were always present hold-

ing their children's hands. At each session, the patients were classified into two categories according to their behavior:

- *Cooperative patients*: children who do not cry and react favorably to the procedures; children who cry when they lie down on the dental chair but do not impair the procedures;
- *uncooperative patients*: children who keep their lips sealed during care, cry and try to impair the procedures with their hands.

The data collected from the babies' records (date of birth, gender, age of the patient at the first and tenth session, and behavior shown during the procedures of oral hygiene and clinical examination in each session) were processed and analyzed by the Chi-Square test and Fisher's exact test for the determination of an association between variables. A level of significance of 5% was set for all analyses.

## Results

The percentage of males and females was similar among the 216 children examined (49.54% and 50.46%, respectively). The mean age of the children was approximately 7 months at the first visit and 25 months at the tenth visit. A mean period of 20 months for conclusion of the ten visits was observed.

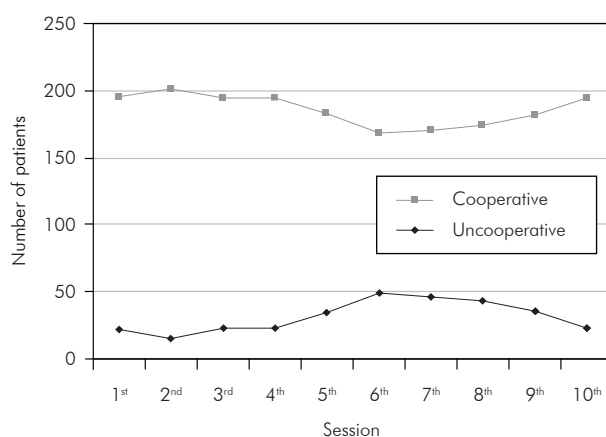
There was a predominance of *cooperative behavior* compared to *uncooperative behavior* when each visit was analyzed separately (Table 1 and Graph 1). However, a significant increase in the number of *uncooperative patients* was observed for the sixth,

seventh and eighth sessions compared to the first session.

No association was observed between the behavior shown by the babies during dental care and gender ( $p > 0.05$ ). Table 2 shows a significant association between the behavior shown by the children and age group during dental care performed at the Baby Clinic for the first visit. At the tenth appointment, however, there was no significant association between those variables (Table 3).

## Discussion

One of the objectives of the preventive and education program developed at the Baby Clinic of the School of Dentistry at Araçatuba, São Paulo State University (UNESP), Araçatuba, SP, Brazil is to



**Graph 1** - Graphical illustration of the distribution of patients according to session and behavior.

**Table 1** - Distribution of the patients evaluated during dental care according to session and behavior.

Session	Uncooperative Patients	Cooperative Patients	$\chi^2$	p value
1 <sup>st</sup>	21 (9.72%)	195 (90.28%)		
2 <sup>nd</sup>	15 (6.94%)	201 (93.06%)	0.7576	0.3841
3 <sup>rd</sup>	22 (10.19%)	194 (89.81%)	0.0002	0.9899
4 <sup>th</sup>	22 (10.19%)	194 (89.81%)	0.0002	0.9899
5 <sup>th</sup>	34 (15.74%)	182 (84.26%)	3.0001	0.0833
6 <sup>th</sup>	48 (22.22%)	168 (77.78%)	11.6594*	0.0006
7 <sup>th</sup>	46 (21.30%)	170 (78.70%)	10.1751*	0.0014
8 <sup>th</sup>	43 (19.91%)	173 (80.09%)	8.0890*	0.0045
9 <sup>th</sup>	35 (16.20%)	181 (83.80%)	3.4673	0.0626
10 <sup>th</sup>	22 (10.19%)	194 (89.81%)	0.0002	0.9899

\* Statistical significance ( $p < 0.05$ ).

**Table 2** - Distribution of the patients evaluated at the first appointment, according to behavior and age range.

Age	Behavior		TOTAL
	Uncooperative	Cooperative	
0 – 6 months	3	89	92
7 – 12 months	18	106	124
Total	21	195	216

Statistical significance ( $p < 0.05$ );  $\chi^2 = 6.3945$ ;  $p$  value = 0.011.

demonstrate that dental care can be a pleasant activity, eliminating the stigma and fear of the dentist.<sup>10</sup> Since its inception, more than 3,000 infants have been attended. The recall visits for the program, with a usual maximum interval of two months, are encouraged until the patient reaches three years of age. The outcomes<sup>10</sup> are excellent: caries-free children and parents changing their attitudes toward the roles of prevention and maintenance of oral health.

The present longitudinal study evaluated the behavior of children from the first to the third year of life during ten dental visits, with a mean period of 20 months for conclusion of the appointments. In a previous study, Cunha *et al.*<sup>5</sup> (2003) had examined the behavior of babies during a shorter period of time (4 consecutive appointments).

Ready acceptance of the dental experience by children aged 0 to 3 years is difficult because of their limitation in communication and emotional instability, in addition to their still developing independence, socialization, security and language. A reaction of fear or anxiety in the presence of the unexpected and unknown is common. All of these situations may originate an *uncooperative patient* behavior during dental care.

The classification used in the present study was an adaptation of the behavioral scale elaborated by Walter *et al.*<sup>7</sup> (1999). Other known measures to rate the behavior of children may not be appropriate for the evaluation of infants due to their complexity. Some of them even require the children's participation during the evaluation. Unfortunately little has been published, which makes the comparison of results difficult.

Analysis of the behavior of the patients during ten care sessions at bimonthly intervals showed a

**Table 3** - Distribution of the patients evaluated at the tenth appointment, according to behavior and age range.

Age	Behavior		TOTAL
	Uncooperative	Cooperative	
19 – 24 months	10	72	82
25 – 30 months	13	93	106
31 months or older	0	28	28
Total	23	193	216

Fisher's exact test;  $p$  value = 0.1470; No statistical significance ( $p > 0.05$ ).

predominance of *cooperative behavior*, especially for the first five and the last two visits. For the intermediate visits (sixth, seventh and eighth sessions), a significant increase in the number of *uncooperative patients* was observed; however, that number was lower than the number of *cooperative patients* (Table 1). These findings are similar to those reported by Pereira, Freire<sup>6</sup> (2004) for children aged 0 to 3 years.

The findings also support the concept that the behavioral reactions of the patients go through a process of maturation during the first three years of life, which can be divided into three phases. In the first phase (corresponding to the first year of life), the patient exhibits a cooperative behavior regarding dental procedures. In this phase, the baby strongly manifests one of the types of global response to the complex of stimuli offered by the environment, which is called affectionate reaction. The infant tries to establish a positive adaptation to the environment. Recognizing this concept and also considering a child and a mother who are emotionally calm, it is possible to make the infant feel that the dental office is a reliable environment and the first visit will proceed relatively undisturbed.

In the second phase (corresponding to the second year of life) the motor capabilities of the infant mature. That phase corresponds to the sixth, seventh and eighth visits in the present study, when the number of *uncooperative patients* increased. Therefore, episodes of crying, mouth closing, tongue action and the use of other body parts that have acquired a notion of movement such as the arms may now impair the work of the professional. It is interesting

to emphasize that the stimuli offered to the patients studied were the same. As babies psychologically become more aware of their body, along with their developing motor ability, a greater interaction with the environment happens, which results in opposing manifestations to dental procedures. However, we do not consider these manifestations to be negative reactions.

Finally, in the third phase (corresponding to the third year of the baby's life), the responses become more favorable with the ongoing visits and the children start to cooperate with the treatment. The experience obtained during the appointments was fundamental for the progressive decline in *uncooperative behaviors* since the patients were able to perceive the procedures performed as not stressful. The philosophy of the preventive program to which these patients were submitted is based on continuous follow-up so that visits require a lower level of cooperation since they tend to be faster and to involve simple procedures that do not cause discom-

fort to the patient and are effective in maintaining oral health.

The behavioral manifestations described above have important repercussions on clinical care, and the professional should be aware of them, i.e., babies who initially show a *cooperative behavior* will be considered *uncooperative* after some sessions, but they will eventually exhibit again a *cooperative behavior* with the ongoing care (Tables 2 and 3). The professional should inform the parents about these reactions so that they may firmly comply with the instructions which promote the oral health of their children.

## Conclusion

Based on the results, it was possible to conclude that the behavior shown by patients was directly influenced by their psychomotor development. Constant attendance and exposure of the baby to non-stressful dental stimuli are factors that favor a *cooperative behavior*.

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