

Original Article

## Perception and Knowledge of Dentists in Southern Brazil Related to use of Atraumatic Restorative Treatment in the Public Health Service

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### Abstract

**Objective:** To investigate the perception and knowledge of dentists regarding use of the Atraumatic Restorative Treatment (ART) in public health services of cities in the central region of Rio Grande do Sul (RS), Brazil. **Material and Methods:** A cross-sectional study was conducted using a self-administered questionnaire with 60 dentists who work with public dentistry services. To evaluate possible associations between the use of ART and the independent variables we used the chi-square test and logistic regression models ( $\alpha = 0.05$ ). **Results:** Forty-four questionnaires were completed, resulting in a response rate of 73%. Of the respondents, 70.4% supported the use of ART and 81.8% reported having some training in the technique. However, 72.7% consider ART to be a temporary or urgent treatment. Professionals who do not advocate the use of ART were 76% less likely to use the technique when compared to their colleagues who defend the use of the technique (OR = 0.24, 95% CI = 0.06 to 0.98). **Conclusion:** While most dentists have knowledge and positive attitude towards ART, greater dissemination is required for this technique can be used effectively on the public service.

**Keywords:** Public Health, Primary Health Care, Dental Caries.

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## Introduction

The Atraumatic Restorative Treatment (ART) was proposed in the early 1980s as a strategy to control and manage caries [1] and officially adopted in clinical situations in the 1990s by the World Health Organization (WHO). This treatment is currently part of the "Basic Package of Oral Care," also developed in partnership with WHO, which includes, besides ART, emergency procedures, use of fluoridated toothpaste and hygiene and diet orientations, aiming to offer basic conditions of oral health for populations of developing countries [2].

There has been a decrease in caries prevalence in the last decade [3]. However, based on the population of pre-school children, the number of cavitated lesions exceeds the number of restored teeth, corroborating data from an epidemiological survey conducted in Santa Maria, RS, Brazil [4]. In this study, the prevalence of caries in primary dentition was 23.5% [4]. In the adult population, the 'missed' component of the DMFT index also significantly increases. Tooth loss in adults between 35 and 44 years old has been associated with the use of the public health service, indicating that users of this service have a higher prevalence of tooth loss than those who do not use it [5]. This finding indicates that the disease burden in this age group is significantly larger and the service is not able to absorb the demand, or even, that the service is ineffective, making extraction the only possible alternative therapy [5].

In this sense, the effectiveness of ART [6-9] associated with reduced clinical time and cost, make this approach a promising option for the Brazilian public health system, that may aid to reduce inequalities. Thus, the use of ART could assist in achieving the public health system goals, which are to improve access and health levels, and to reduce the impact of treatment costs [10].

Previous studies that assessed the ART use in Brazilian public health show a lack of dissemination, knowledge and technical qualification of professionals using this approach [11-13]. Therefore, the aim of this study was to evaluate the perception and knowledge of dentists regarding use of ART in public health services of cities located in the central region of Rio Grande do Sul, Brazil.

## Material and Methods

### Design and Sample

This cross-sectional study was conducted from May to July 2015 and included a convenience sample of 44 dentists who worked in 66 basic units of the Municipal Health Department of the cities of Santa Maria, Agudo, Formigueiro, Palma Nova, Restinga Seca and São Sepé, located in the central region of the state of Rio Grande do Sul, Brazil. All professionals working in the public service units of these municipalities (n = 60) were invited to participate. Professionals on vacation or leave of absence for any reason during the period of data collection were excluded.

### Data Collection

A self-administered questionnaire assessing theoretical and scientific knowledge in relation to ART, the credibility of the professionals in the treatment and their interest in training was used. The questionnaire was adapted from a previously validated version for application to dentists from the public health system [14]. Aspects related to caries removal, clinical sequence, restorative material, concepts and technical indications of the ART were considered. Moreover, demographic data such as gender, age, time since graduation (years), time working in the public health system (years) and higher education background were also collected.

Spreadsheets with names and earnings of dentists were requested from coordinators of the cities included in the study so that the questionnaires could be sent to participants in nominal envelopes. The envelopes were grouped by health unit in each city in packages addressed to the directors of the units, together with the authorization of the coordinators and a letter containing information about the research.

### Data Analysis

The data were submitted to descriptive statistical analysis, considering the absolute and percentage distributions. To evaluate possible associations between the use of ART and the independent variables, we used the chi-square test and logistic regression models, with 5% significance level. Statistical analyses were performed using STATA version 12.0 (Stata Corp., College Station, Texas, USA). The independent variables were gender (male or female), age ( $\leq 36$  years or  $> 36$  years), time since graduation ( $\leq 15$  years or  $> 15$  years), higher education background (Graduation or Specialization), time working in the public health system ( $\leq 10$ , or  $> 10$  years), supports use of ART or not, ART use (urgent/temporary treatment or definitive restorative treatment) and type of training (theoretical and/or practical or none).

### Ethical Aspects

The study was approved by the Ethics Committee of the Federal University of Santa Maria (CAAE: 39128814.7.0000.5346). A proposal containing the identification and research objectives was presented to the health coordinators of the cities involved. After approval, the participating dentists received written information about the study and signed a positive consent form.

### Results

The response rate was 73%. More than half of the dentists (70.4%) were female, with age above 36 years (63.6%). Most participants concluded the graduation course over 15 years (63.6%) and worked in the public health service for over 10 years (59.1%). An important part of the professionals (72.7%) are specialists (Table 1).

Regarding knowledge about ART, 70.4% of the sample defends the use of ART and 81.8% had some training, whether theoretical or practical. However, 72.7% of the sample does not consider ART as a definitive restorative procedure. The concept of ART, the type of glass ionomer cement

used and the indication of the treatment were the points that generated more doubts (Table 2). It was demonstrated that 54% of the respondents does not indicate ART as sealants, demonstrating the lack of knowledge about indication and the advantages of the use of ART sealants. Most dentists (59.1%) do not consider ART or modified ART when the clinical procedures are performed in the dental office. In addition, 34.1% of professionals consider the conventional glass ionomer cement or resin modified as election materials for the technique.

**Table 1. Description of dentists sample according to the variables investigated (n = 44).**

Variables	N	(%)
Age		
≤ 36 years	16	(36.4)
> 36 years	28	(63.6)
Gender		
Female	31	(70.4)
Male	13	(29.5)
Time since graduation		
≤ 15 years	16	(36.4)
> 15 years	28	(63.6)
Higher education background		
Graduation	12	(27.3)
Specialization	32	(72.7)
Time working in the public health system		
≤ 10 years	18	(40.9)
>10 years	26	(59.1)
Supports use of ART		
Yes	31	(70.4)
No	13	(29.5)
Use of ART		
Temporary or urgent treatment	32	(72.7)
Definitive restorative treatment	12	(27.3)
Type of training		
Theoretical or practical	36	(81.8)
None	8	(18.2)

**Table 2. Knowledge concerning the Atraumatic Restorative Treatment (ART).**

Question	Correct responses
Caries removal	33 (75.0%)
Clinical sequence	35 (79.6%)
Restorative material	29 (65.9%)
Concept of ART	18 (40.9%)
Indication of the technique	24 (54.6%)

Among the independent variables investigated, only the position front to ART was significantly associated with their use (Table 3). Among the professionals who support the technique, 64.5% actually use the ART in the public health service ( $p = 0.04$ ). Logistic regression analysis showed that professionals who do not advocate the use of ART were 76% less likely to use the

technique when compared to their colleagues who defend the use of the technique (OR = 0.24, 95% CI = 0.06-0.98).

**Table 3. Association between the use of the ART and variables assessed (n= 44).**

Variables	Frequency [n (%)]		p*	OR (IC 95%)
	Does not use	Uses		
Age (years)				
≤ 36	7 (43.8)	9 (56.2)		Ref.
> 36	13 (46.4)	15 (53.6)	0.86	0.90 (0.26-3.09)
Gender				
Female	14 (45.2)	17 (54.8)		Ref.
Male	6 (46.2)	7 (53.8)	0.95	0.96 (0.26-3.52)
Time since graduation (years)				
≤ 15	7 (43.8)	9 (56.2)		Ref.
> 15	13 (46.4)	15 (53.6)	0.86	0.90 (0.26-3.09)
Higher education background				
Graduation	5 (41.7)	7 (58.3)		Ref.
Specialization	15 (46.9)	17 (53.1)	0.76	0.81 (0.21-3.09)
Time working in the public health system (years)				
≤ 10	8 (44.4)	10 (55.6)		Ref.
>10	12 (45.5)	14 (54.5)	0.91	0.93 (0.28-3.12)
Supports use of ART				
Yes	11 (35.5)	20 (64.5)		Ref.
No	9 (69.2)	4 (30.8)	0.04	0.24 (0.06-0.98)
Use of ART				
Temporary or urgent treatment	16 (50.0)	16 (50.0)		Ref.
Definitive restorative treatment	4 (33.3)	8 (66.7)	0.32	2.00 (0.50-8.00)

## Discussion

The Ministry of Health of Brazil recommends the ART technique as an individualized protocol for extra clinical care of school children, institutionalized patients and for treating primary teeth [15]. As a collective approach, it can be used to reduce the quantity of tooth loss in populations with high prevalence of caries, until those individuals can be scheduled for specialized care [15]. While it is recommended as an effective technique in controlling dental caries, ART also minimizes the stress suffered by the patient during the dental procedures and is less expensive, an important aspect, especially for public health [16]. The present study aimed to investigate the perception and knowledge of dentists regarding use of the Atraumatic Restorative Treatment (ART) in public health services of cities located in the central region of Rio Grande do Sul (RS).

Most participants had graduated more than 15 years ago (63.6%), have worked in public health for over 10 years (59.1%) and are over 36 years of age (63.6%). In general, professionals with this profile tend to show little willingness to change previously established concepts and practices

already established by the profession, for example, the training focused on individualized care, technicalities and particular contexts, which creates resistance to accept new practices such as the ART [17-19]. However, the association of these variables with the use of ART was not statistically significant in this study. It should be noted that the sample size is small, which may reduce its statistical power. In this study, only 64.5% of the professionals who advocated the approach actually used it in their routine clinical practice. Furthermore, 30.8% of those who do not advocate ART, use it in the public service, which can result in poor clinical outcomes. Despite its strategically simplified technique, the ART, like other restorative treatments, presents operative particularities and the major cause of failure is related to operator performance [20,21].

Although most dentists reported having some technical training, whether theoretical or practical, inconsistent results were observed with regard to the principles of ART, since 72.7% consider it as a temporary restorative treatment or only indicated in urgent cases. Scientific evidence has shown that the technique, when performed with high viscosity glass ionomer cement, presents satisfactory longevity in both primary and permanent teeth [6-9] and thus, should be considered a definitive restorative treatment.

Previous studies that assessed the ART use in the Brazilian public health system also pointed out that a large portion of professionals are familiar with the technique and its indications, but needed further clarification, especially regarding the definition of ART and an "adjustment of the oral environment" [12,13]. This is because in both situations, there is a combination of preventive and curative procedures and partial caries removal. Furthermore, similar materials and instruments are used, and most often there is no need for local anesthesia for caries removal [22]. A low rate of correct responses was obtained for questions related to concepts and indications of ART. Although the term "Atraumatic Restorative Treatment" refers to the restorative procedures, this approach also presents a preventive component, based on the use of educational measures and sealants with high viscosity glass ionomer cement [1]. This fact is not yet well known or perhaps well understood by many professionals, reducing the impact of the use of ART to improve health indicators. The use of sealants in ART could greatly reduce the need for future invasive intervention in the public system [1,23].

Another doubt of professionals refers to realization of clinical procedures in the dental office environment with the aid of suction and a light reflector. Many of the respondents do not consider this intervention as ART or define it as conventional ART. In fact, ART arose from a need to preserve decayed teeth in individuals living in communities whose electricity and financial resources were scarce and tooth extraction was the only alternative therapy [24]. Over the years, however, there have been some discussions regarding the use of the suction apparatus and light-curing devices to accelerate curing of the material, as part of the atraumatic approach. The consensus is that these changes do not violate the technical definition, enabling its use in the dental office. [25] Moreover, it has been recommended that ART should not be associated with the expression "modified ART" [26]. This term has also been used to describe the situation in which high speed is used for opening



a cavity in the dentin and then the dentin is removed with hand instruments. According to its creators, these procedures have been practiced over the years and cannot be described as a "modification" of ART. However, in Brazil, the term modified Atraumatic Restorative Treatment (ARTm) refers to the use of ART in conventional clinical settings, even when using high speed in enamel to reach the carious lesion, since the approach remains true to the principle of minimum intervention of the original technique [25].

ART is an appropriate strategy for the socioeconomic indicators and oral health of the population, offering an effective, high-quality and accessible therapy, contributing to access to dental services and promoting an approach centered on patients within their social context. However, greater dissemination is required in order for this technique to be incorporated effectively in the public health system. The lack of perception of human resources regarding ART about its potential in the control of dental caries, as well as the lack of effective training for the correct performance of atraumatic restorations are among the barriers to be overcome for effective implementation of ART in the public health system [27].

Professional extension courses, in-person or remotely, developed properly, have the potential to promote the skills required for the correct use of ART, especially for those professionals with less clinical experience and limited prior knowledge of the technique [14]. Thus, it can be a viable alternative for insertion and / or consolidation of ART in public health.

## Conclusion

The use of ART in the public health system is associated with credibility in the technique. Conversely, it has often been incorrectly considered to be a temporary or urgent treatment.

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