

Adapting Initial Training to the Professional Context: Teaching and Practice of Atraumatic Restorative Treatment

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Abstract

Introduction: Atraumatic restorative treatment is defined as the conservation of healthy dental structures with minimal intervention by non-invasive means. The principle is never to eliminate healthy tissue when restoring the tooth. The aim of this study was to demonstrate the need to adapt teaching to the realities of daily practice in Africa.

Materials and Methods: A prospective survey to assess the level of knowledge of ART was conducted among dentists. Subsequently, cohorts of students and working practitioners were formed for practical workshops to implement ART.

Results: 69.8% of practitioners revealed that they had to carry out conservative treatments without rotating instrumentation in order to preserve the tooth on the arch. However, more than half of the respondents (58.3%) stated that they had never heard of the term "ART". 52.5% of practitioners who said they knew about ART could not describe the surgical sequences correctly. Finally, the majority of respondents (81.3%) felt that practical workshops in continuing education could be sufficient for learning the technique.

Discussion: Although performed on permanent teeth, practitioners did not perceive ART as a definitive therapy in its own right. The pilot teaching demonstrates practitioners' interest in adopting such an approach to patient management. Since the social responsibility of dental schools is to provide learners with training that will enable them to best meet the demand of the population, it is necessary to integrate ART into initial training programmes.

Conclusion: The teaching of ART during initial training would help future practitioners to integrate it as an effective means of meeting the needs of the emerging countries of the South.

Keywords: Atraumatic restorative treatment; Tooth decay; Initial training; Non-invasive treatment; Restorative dentistry

Abbreviations: ART: Atraumatic Restorative Treatment

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Introduction

Tooth decay is a localized pathological process of external origin, which is accompanied by softening of the tooth's hard tissues and progressing towards the formation of a cavity [1]. It is seen around the world as a public health problem. Its impact on populations is a decrease in the quality of life by altering orofacial functions. The majority of health policies in Western countries aim to promote conservative care at the expense of dental extraction when caring for patients affected by the disease. This is not the case in Africa, particularly in Côte d' Ivoire, where dental extraction is frequently necessary and often not justified [2,3]. In these areas, people also have difficulty accessing basic dental care. This cannot be explained by the economic factor alone. Added to this is the need for oral infrastructure, which remains inadequate. Faced with these African realities, health care providers preferentially focus on rotating instrumentation and systematically extract teeth in the absence of materials. The promotion of minimal or non-invasive restorative dentistry is more than topical because it emphasizes prevention at the community level [4]. A therapy adapted to the conditions of difficult exercise and implemented within this framework combines restoration and prevention. This is the Atraumatic Restorative Treatment, still called « ART ». ART is defined as the preservation of healthy dental structures with minimal intervention by non-invasive means [5,6].

The principle is to avoid eliminating healthy tissue when restoring the tooth. This indication involves manual removal of the damaged tissue and filling of the cavity with Ionomer glass cement [7]. Many studies have demonstrated the effectiveness of this procedure [8-11]. The aim of this study was to assess the level of knowledge of dentists about ART, to initiate the learning of the technique through practical workshops and to evaluate the level of interest in transferring it into daily practice. This approach meets the rules and criteria of practical teaching to be validated by a pilot teaching approach.

Materials and Methods

The methodological approach consisted of a prospective survey followed by practical workshops.

Prospective Inquiry

In a scientific forum, congressional dentists were interviewed. It was a cross-sectional study aimed at assessing the specificity of the professional environment in Côte d' Ivoire. Selection was random. Not included are university hospital professionals and players in oral health prevention campaigns. The survey forms published as self-questionnaires had items relating to the level of knowledge of ART, the description of the technique, the place where the technique was learned and its implementation in patient care.

Practical workshops

The second component was to constitute a cohort of pre-service students and active practitioners for technical training workshops. Two approaches have been initiated for practical learning. Natural teeth with small, medium and large lesions on plaster blocks and mounted on ghost heads were used for the laboratory ART procedure.

The clinical workshop was held at the dental school of Abidjan. Patients who came in for routine consultations were interviewed to obtain informed consent for the procedures. A prior clinical examination was carried out to select live decayed teeth without irreversible pulsating pathologies. The indication for the validated ART, the implementation was carried out under the supervision of a supervisor previously calibrated for the teaching of the technique. The descriptive analysis was performed using the EPI-INFO version 6 software running in the MS-DOS environment.

Results

The results are presented in the form of tables and photographs grouped in plates.

Prospective survey

In the end, the prospective survey made it possible to interview ninety-six (96) practitioners practising in seven different cities. The characteristics of the sample revealed a high participation of practitioners with more than ten years of professional experience (47.9%),

a higher representativeness of the public sector (60.4%) and initial training carried out for the most part in Côte d'Ivoire (54.2%) (Table I). Practitioners claimed to face daily difficulties in managing patients. This mainly concerned failures of large equipment such as the dental unit or radiography (68.8%), poor technical equipment with a malfunctioning type of rotating instrumentation, lack of consumables, or even the non-existence of equipment (82.3%) (Table II). In another sense, practitioners revealed that the cost of conventional restorative care (amalgam, composite resins) also impeded access to care for a number of patients (31.2%) (Table II).

	Variables	N (%)	Total N (%)
Genre	Female	39 (40.6%)	96 (100%)
	Male	57 (59.4%)	
Sector of activity	Public sector	58 (60.4%)	96 (100%)
	Private sector	38 (39.6%)	
Place of training	Côte d'Ivoire	52 (54.2%)	96 (100%)
	Excluding Côte d'Ivoire	44 (45.8%)	
Occupational seniority	Less than 5 years of service	19 (19.8%)	96 (100%)
	Between 5 and 10 fiscal years	31 (32.3%)	
	More than 10 fiscal years	46 (47.9%)	

Table I: Characteristics of the sample.

Difficulties encountered	N	%
Failure of large equipment dental chair, X-ray etc.)	66	68.8
Poverty of the technical platform (absence or malfunction of the rotating instrumentation, lack of consumables and filling materials, etc.)	79	82.3
Cost of care	30	31.2

Table II: Distribution of the main difficulties encountered by practitioners.

Despite these difficulties, 69.8% of practitioners revealed that they had to perform conservative treatments without rotating instrumentation in order to preserve the tooth on the arch (Table III). However, more than half of the respondents (58.3%) stated that they had never heard of the term "ART" (Table III). Of those familiar with the concept, their main sources of information were scientific meetings (65%) or personal documentation (17.5%) (Table III). 52.5% of the latter could not correctly describe the ART operating sequences, hence the agreement with a level of knowledge estimated to be satisfactory at 47.6% (Table III). Finally, the survey revealed that practitioners were motivated to learn ART. The majority (81.3%) felt that practical workshops in continuing education could be sufficient for learning the technique, while 17.7% felt that teaching as early as pre-service training was necessary to consider ART as a treatment similar to that of conventional training (Table IV). These survey data motivated the introduction of practical sessions.

ART Procedure

The workshops initially consisted of presenting the material to the participants. It consisted of an examination tray consisting of a mirror, a precelle, a mixing spatula, a mouth spatula, an excavator and a probe 6 (Plank 1A). The procedure requires a second tray consisting of rolls of salivary cotton pads, cotton balls and joint paper (Plank 1B). For cavity disinfection, a mouthwash is used (Planche 1C). The filling material used is glass ionomer cement in the form of powder and liquid to be mixed (Plank 1D).

Variables		N (%)	Total N (%)
Carrying out coronary restoration in the absence of rotating instrumentation	Yes	67 (69.8%)	96 (100%)
	No	29 (30.2%)	
Knowledge of the term ART operating protocol	Yes	40 (41.7%)	96 (100%)
	No	56 (58.3%)	
Source of information	Initial training	4 (10%)	40 (100%)
	Documentation	7 (17.5%)	
	Scientific meeting	26 (65%)	
	By a colleague in Cabinet	3 (7.5%)	
Knowledge of the ART operating protocol	Yes	21 (52.5%)	40 (100%)
	No	19 (47.5%)	
Assessment of Satisfactory level of knowledge	Satisfactory	10 (47.6%)	21 (100%)
	Unsatisfactory	11 (52.4%)	

Table III: Distribution of ART knowledge level variables.

Variables		N (%)	Total N (%)
Apprenticeship in initial training		17 (17.7%)	96 (100%)
Apprenticeship in continuing education	Theoretical teaching	1 (1%)	
	Practical teaching	78 (81.3%)	

Table IV: Interest in learning about ART.



Figure 1: Materials for the ART procedure: (A) Examination tray consisting of a mirror, precelle, mixing spatula, mouth spatula, excavator and probe 6. (B) the sterile tray consisting of rolls of salivary cotton wool, cotton balls and articulating paper. (C) mouthwash and IVC. (D) CVI powder and liquid ready to be mixed.

Once the diagnosis has been made and the ART indication has been accepted, the tooth is isolated with salivary cotton pads (Plank 2A) and grooming of the cavity is performed with a mouthwash pad (Plank 2B). The removal of the decayed tissue is carried out using the excavator (Plank 2C) followed by a new grooming. The preparation of the CVI is carried out to obtain a pasty consistency and detachable by the finger (Planche 2D, 2E). The material is carried into the cavity by means of the mouth spatula (Plank 2F) and pressure is exerted with the thumb previously coated with insulation (Plank 2G). Excess material is removed with a spatula and then the occlusion is checked by using the paper to be articulated before the material is hardened (Plank 2H). Finally, motivation for oral hygiene and check-ups are given as instructions to the patient at the end of the procedure.



Figure 2: ART operating sequences. (A) the use of rolls of salivary cotton pads as an operative field for the isolation of a 47 whose diagnosis of superficial dentinitis has been made. (B) grooming of the cavity with a mouthwash pad; (C) removal of decayed tissue from the excavator and re grooming. (D): preparation of the CVI for (E): obtaining a soft consistency detachable by the finger. (F): filling of the cavity with the mouth spatula. (G) application of the petroleum jelly coated thumb to exert sufficient pressure for material diffusion. (H): check the occlusion with the joint paper.

Discussion

ART saw its rise in the second half of the 1990s in Thailand and Zimbabwe in community-oriented campaigns for the promotion of oral health [12,13]. The therapeutic approach is part of a management concept whose preventive and curative aspects are mainly aimed at stopping the evolution of the carious process from its initial phase while preserving the integrity of dental tissues as much as possible. The treatment was initially dedicated to the temporary tooth and then gradually it concerned the permanent teeth, precisely the first molars [8,9,11]. Subsequently, the target populations were the so-called disabled persons, the elderly and grabataires, for the ease of implementation with small equipment transferable from one place to another [14,15]. The surgical procedure remains painless for the patient, inexpensive with a durability equivalent to that of conventional materials such as amalgam and composite resins [16,17,11].

These data from the literature contribute to considering ART as a therapy in its own right in restorative dentistry, implying the need to integrate it into training [18]. The majority of dentists work in the public sector in Côte d' Ivoire. The context is that practitioners are confronted with difficulties due to the absence or malfunction of rotating instruments and the failure of dental chairs as identified by the prospective survey. The results of this study seem to reflect the reality in health centres and are consistent with data from the national oral health programme.

ART does not seem to be carried out very often by practitioners because they limit this treatment to temporary teeth. Indeed, the comfort of manual digging with an excavator makes the child accept therapy in contrast to the fear generated by rotating instrumentation. Although performed on permanent teeth, the respondents did not perceive the intervention as a definitive therapy. For good reason, ART was not part of the curricula for the initial training of dentists. And yet, this therapeutic approach meets the current concepts of using alternative materials to amalgam. In fact, the last ten years have seen the use of adhesive materials to the detriment of amalgam, whose principles of cavitation preparation are not very economical for healthy tissues. The reference material for ART is Ionomer glass cement, several works to date have demonstrated its ease of use, resulting in time savings and its ability to release fluorine [10]. It is a commercially available material and one of the cheapest medical devices in restorative dentistry. It appears to be an ideal material in the Ivorian context where the relatively low socio-economic level of many patients limits access to oral health care.

The infatuation perceived during the workshops is reflected in the fact that practitioners generally wanted to master the protocol for implementing treatment. The majority (81.3%) of respondents concerned post-graduate training would be justified by the professional seniority of the practitioners interviewed. They were in fact senior citizens working full-time and thus posing the difficulty of finding employment.

A recent investigation showed that the e-learning method could be a solution [18]. It should not be overlooked, however, that the apparent simplicity of implementing ART may mask the rigour it imposes on practitioners concerned about the sustainability of treatment. It is clear from this observation that the technique must be an integral part of the training programmes for dental surgery students.

Conclusion

This study shows that ART is an easily applicable therapy for practitioners. In the health policy of governments, it promotes access to basic oral health care for a larger number of the population with low investment costs. Teaching technology during initial training would help future practitioners to integrate it as an effective means of meeting the needs of the emerging countries of the South.

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