

*Research Article***Parental satisfaction assessment of silver modified atraumatic restorative technique in comparison to atraumatic restorative technique**Maiada M. Ahmad¹, Nagwa M. Ali khattab² and Maha Ishaq³¹ Department of Pediatric Dentistry and Dental Public Health, Faculty of Dentistry, Ain Shams University, Egypt² Department of Pediatric Dentistry and Dental Public Health, Faculty of Dentistry, Minia University, Egypt³ Department of Oral and Maxillofacial Radiology, Faculty of Dentistry, Minia University, Minia, Egypt.**Abstract**

Background: Silver diamine fluoride (SDF) has promising feedback in arresting carious lesion. The aim is to assess the parental satisfaction outcome of silver modified atraumatic restorative technique (SMART) in comparison to atraumatic restorative technique (ART). **Methods:** a randomized controlled trial with split mouth technique including 42 molars, 21 for experimental (SMART) group and 21 for control (ART) group. Molars of experimental group were treated with SDF and then restored with resin modified glass ionomer cement (RMGIC) while molars of control group were restored with RMGIC after manual removal of caries. Parental satisfaction was assessed using visual analogue scale (VAS) postoperatively. **Results:** There was no statistically significant difference regarding performance of the restoration or esthetics satisfaction, while a statistically significant difference was observed for the other aspects. **Conclusion:** Parental satisfaction of SMART group was more than that of ART group.

Keywords: Pediatric, SDF, ART, SMART, caries.**Introduction**

Dental caries is a multifactorial dynamic and one of the most common preventable diseases which is recognized as the primary cause of oral pain and tooth loss. It is a major public health oral disease which hinders the achievement and maintenance of oral health in all age groups⁽¹⁾

Conventional caries removal requires trained dentists and sophisticated equipment. Moreover, it costs higher when there is a need for general anaesthesia. To meet the need for treatment of dental caries, minimal invasive approaches such as Atraumatic Restorative Treatment (ART) present increased evidence of improved outcome over the conventional complete caries removal technique. Atraumatic

restorative treatment is actively promoted by the World Health Organization and is currently used in 25 countries and is part of regular oral personnel training⁽²⁾

ART involves manual excavation of dental caries, which eliminates the need for anaesthesia and restores the cavity with glass ionomer cement (GIC), an adhesive material that bonds chemically to the tooth structure and involves release of fluoride as it stimulates remineralization. It was adopted because of its less discomfort, minimal destruction of tooth structure and low cost⁽³⁾

Silver diamine fluoride has been used in many countries to treat active caries especially for children that are difficult to

be managed. It is a water like liquid that is applied to the caries using micro brush. Its aim is to stop progression of caries by arresting and remineralization ⁽⁴⁾

SDF has been used in, arresting, and preventing carious lesions. reducing dentine hypersensitivity and disinfecting root canals during endodontic treatment ⁽⁵⁾

The only side effect observed in randomized clinical trials in which silver diamine fluoride was applied to multiple teeth to arrest or prevent dental caries for 1,493 children was little painful small white mucosal lesion, which disappeared at 48 hours without intervention. SDF only darkens the carious lesions. It can cause a “temporary tattoo” to skin (on the patient or provider) which resolves within 2-14 days. A transient metallic or bitter taste was reported but it is still more favourable than that caused by the fluoride varnish ⁽⁶⁾

Subjects and Methods

Study Setting

Twenty-one subjects were selected from the outpatient clinic in Pediatric and Community Dentistry department, Faculty of Dentistry, Minia University. The patient had bilateral mandibular carious molars requiring treatments.

Eligibility criteria

Inclusion criteria

Apparently healthy children ranging in age from 4-6 years, of both sexes had molars free from any pathological lesions clinically and radiographically with active caries lesions code 4 or 5 or 6 according to international caries detection and assessment system (ICDAS).

Exclusion criteria

Children with known sensitivity to silver or other heavy-metal ions or had pulpally involved molars or had history of pain for a long period of time that may indicate chronic pulp inflammation were excluded.

Sample size calculation

The study was designed as a randomized controlled trial. It was calculated using

<http://sealedenvelope.com> based on 30% difference in success rates of both groups as reported by Dos Santos *et al.*, ⁽⁷⁾ α level was 0.05%, β 0.2 and power of 80%. The least required sample size was 18 per group and increased to 21 to make up for possible drop out.

Randomization and allocation concealment

A split mouth technique was used, one side was assigned for the study group (group 1: SMART) and the other was for the control one (group 2: ART). The examined molars must be at least one at each side. Children who were eligible for the trial were randomly and equally assigned using a computer-generated list of random numbers (Random Allocation Software, version 1.0.0) to either SMART or ART group.

Clinical examination:

Under the same dental setting that included a standard light source, sharp explorer and metallic mirror, the children were clinically examined by a single investigator and delivered dental treatment to all patients to ensure standardization.

The operative steps

For the experimental group (SMART group 1)

1. The lips were coated with lip balm (Vaseline) to protect them from being stained by SDF.
2. Isolation by application of cotton used for moisture control.
3. Gross debris was removed without caries excavation, affected surfaces were dried and then, SDF was applied to the carious dentine using micro-brush for one minute according to the American Academy of Paediatric Dentistry (AAPD) guidelines and then the excess was removed with cotton tip applicator
4. After dryness of SDF a resin modified glass ionomer (RMGIC) capsules was applied into the cavity and cured according to manufacturer instructions.

For the control group:

1. Isolation with cotton roles.

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2. Soft dentine was removed from the periphery of lesion with care to avoid pulp exposure by sharp excavator.
3. RMGIC was applied and cured according to the manufacturer instructions. Parental satisfaction was assessed postoperatively using VAS for both groups.

Ethical considerations

The ethical clearance for this study was obtained from research Ethic Committee of Faculty of Dentistry, Minia university (no:329).

Parents signed a written informed consent laid down by the Ethical Committee,

Faculty of Dentistry, Minia University. Children older than seven years were also informed about the nature of the study using age-appropriate language. They were allowed to ask any questions related to the trial and choose either to participate or not.

Results

Chi square test and fisher’s exact test were used to compare parental satisfaction in the experimental and control groups. There was no statistically significant difference regarding performance of the restoration or esthetics satisfaction, while a statistically significant difference was observed for the other aspects.

Table 1: comparison of parental satisfaction in the experimental and control groups

	Satisfaction score	Experimental		Control		P-value
		No	%	No	%	
1.The simplicity of the procedure	0	0	0%	0	0%	<0.001
	5	0	0%	14	66.67%	
	10	21	100%	7	33.33%	
2. The time needed for the procedure	0	0	0%	0	0%	<0.001
	5	0	0%	11	52.38%	
	10	21	100%	10	41.62%	
3. The attitude of your child toward the treatment	0	0	0%	2	9.52%	<0.001
	5	0	0%	9	42.86%	
	10	21	100%	10	41.62%	
4. Performance of the restoration	0	0	0%	0	0%	-
	5	0	0%	0	0%	
	10	21	100%	21	100%	
5. Esthetics	0	0	0%	0	0%	0.488
	5	2	9.52%	0	0%	
	10	19	90.48%	21	100%	

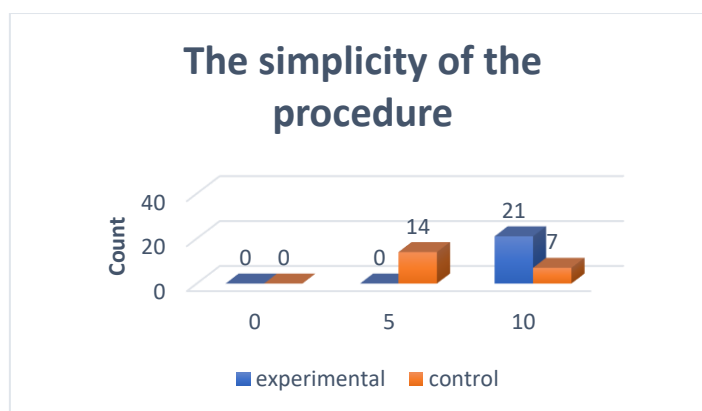


Figure 1. Bar chart for the simplicity of the procedure.

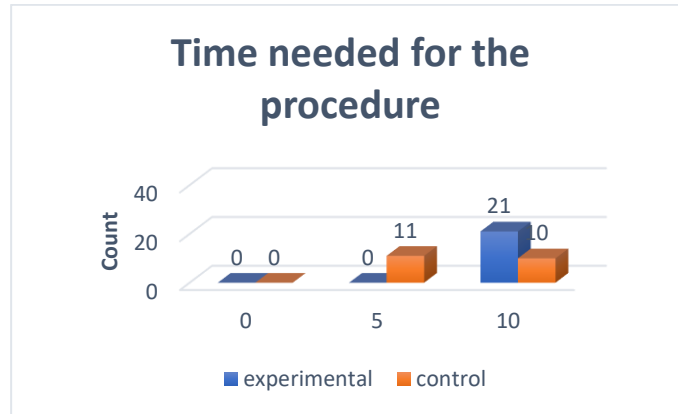


Figure 2. Bar chart for the time needed for the procedure.

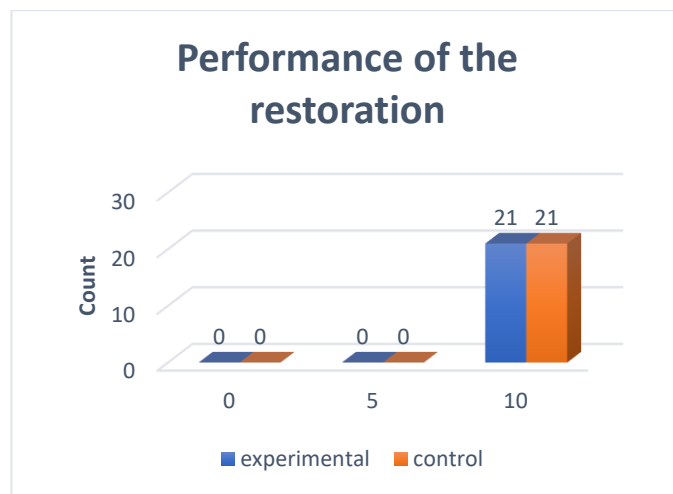


Figure 3. Bar chart for the performance of the restoration.

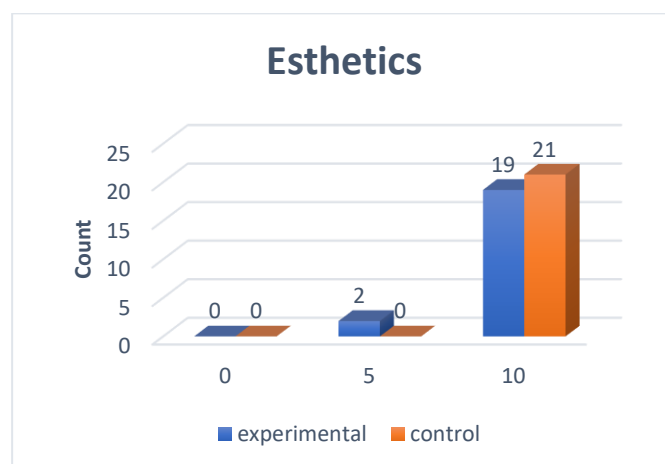


Figure 4. Bar chart for the esthetics.

Discussion

Dental caries is a multifactorial disease that involve alternating processes of demineralization and remineralization of hard tissues. The concept that the demineralized tissues could be remineralized again is increasingly accepted by dental professionals⁽⁸⁾

SDF is used for several years ago and has promising results in prevention and arresting of caries. It is only blamed for discoloration of tooth structure which negatively affect patient and parent satisfaction. Moreover, SDF doesn't restore masticatory function of the treated tooth⁽⁹⁾

From this point and because of the scarce clinical trials and lack of evidence on whether to use SMART or ART in treatment of carious lesions in primary molars, the current study was carried out to evaluate the parental satisfaction for both approaches.

The concentration of 38% SDF was used in the present study since it was proved statistically significant effect in arresting and prevention of caries in primary teeth in comparison to 12% SDF⁽¹⁰⁾

The parental satisfaction in relation to performance of restorations and aesthetic concern, there was lower satisfaction scores in the experimental group, however differences were statistically non-significant.

This high acceptance of esthetics, among both groups (approximately 90% for SMART and 100% for ART), could be due to the simplicity of the procedure observed by the parents, elimination of pain and removal of high-speed equipment and avoidance of local anaesthesia injection. Also, the SDF black staining was masked with GIC application that reduced the black staining resulted from SDF.

While a statistically significant difference was observed for the simplicity of the procedure since SMART (100%) was

easier and simpler than ART (33%) which needed excavation. Although, in a study conducted by Clemens et al., 2017 it was non-significant difference, and this might be attributed to the difference in study design⁽¹¹⁾

Also, time needed for the procedure and attitude of the child towards the treatment were better in the experimental group with statistically significant difference. The use of split mouth technique with both techniques (SMART and ART) being evaluated with same child enable him to evaluate and score simplicity of the procedure; steps of ART took more time and little bed discomfort than that required for SMART.

Similar findings were reported by Monse et al., 2012 and Lim et al.,2017, however, differences between groups were not statistically significant may because of difference in methodology since Lim compared Interim therapeutic restoration approach versus treatment under general anaesthesia approach while Monse compared SDF versus ART.^(12,13)

Conclusion

Parental satisfaction of SMART group was significantly higher than that of ART group.

References

1. Wang L, Lopes LG, Bresciani E, Lauris JR, Mondelli RF, Navarro MF. Evaluation of Class I ART restorations in Brazilian schoolchildren: three-year results. *Spec Care Dentist* 2004;24 (1):28-33
2. Dorri, Martinez-Zapata, Walsh, Marinho, Sheiham Deceased, Zaror. Atraumatic restorative treatment versus conventional restorative treatment for managing dental caries. *Cochrane Database Syst Rev*. 2017 Dec 28;12(12).
3. Hat, Kumar. Atraumatic Restorative Treatment A rural prospective. *Journal*

- of health sciences and research. 2011; 2(1): 29-32.
4. Seifo N, Robertson M, MacLean J, et al. The use of silver diamine fluoride (SDF) in dental practice. *Br Dent J* 2020; **228**: 75-81.
 5. Mei, May Lei & Lo, Edward & Chu, Chun-Hung. Clinical Use of Silver Diamine Fluoride in Dental Treatment. *The Compendium of continuing education in dentistry*. (2016). 37. 93-98; quiz100.
 6. Castillo, Rivera, Aparicio, Lazo, Aw, Mancl and Milgrom. The shortterm effects of diammine silver fluoride on tooth sensitivity: a randomized controlled trial *J. Dent. Res* , 2011 ,90 203-8
 7. Dos Santos VE Jr, de Vasconcelos FM, Ribeiro AG, Rosenblatt A. Paradigm shift in the effective treatment of caries in schoolchildren at risk. *Int Dent J* 2012; 62(1): 47-51
 8. Gao, Zhao, Hiraishi, Duangthip, Mei ML, Lo ECM. Clinical trials of Silver Diamine Fluoride in arresting caries among children: a systematic review. *JDR Clin Trans Res* 2016; 1: 201–210.
 9. Shounia TY, Atwan S, Alabduljabbar R Using silver diamine fluoride to arrest dental caries: a new approach in the US. *J Dent Oral Biol*. (2017) 2:1105
 10. Fung MHT, Duangthip, Wong MCM. Randomized clinical trial of 12% and 38% silver diamine fluoride treatment. *J Dent Res* 2018;97(2):171–8.
 11. Clemens, Gold, Chaffin. Effect and acceptance of silver diamine fluoride treatment on dental caries in primaryteeth. *J Public Health Dent*. 2018 Dec;78 (1):63-68. doi: 10.1111/jphd. 12241.Epub 2017 Jul 27. PMID: 28749529.
 12. Monse, Heinrich-Weltzien, Mulder, Holmgren, van Palenstein Helderma. Caries preventive efficacy of silver diammine fluoride (SDF) and ART sealants in a school-based daily fluoride toothbrushing program in the Philippines. *BMC Oral Health*. 2012 Nov 21; 12:52.
 13. Lim, Kiang, Manohara, Tong, Nair, Hong, Hu. Interim therapeutic restoration approach versus treatment under general anaesthesia approach. *Int J Paediatr Dent*. 2017 Nov;27(6):551-557.