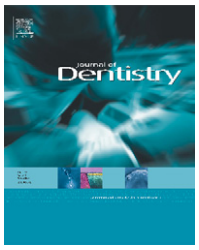
available at www.sciencedirect.com

ScienceDirect

journal homepage: www.intl.elsevierhealth.com/journals/jden



Two-year clinical evaluation of one-step self-etch systems in non-carious cervical lesions

Shisei Kubo [a,*], *Hiroaki Yokota* [b], *Haruka Yokota* [b], *Yoshihiko Hayashi* [c]

[a] *Center for Clinical Education and Training, Nagasaki University Hospital of Medicine and Dentistry, 1-7-1, Sakamoto, Nagasaki 852-8588, Japan*

[b] *Clover Dental Clinic, 3-17-13, Shodai, Sawara-ku, Fukuoka 812-0012, Japan*

[c] *Division of Cariology, Department of Developmental and Reconstructive Medicine, Course of Medical and Dental Sciences, Nagasaki University Graduate School of Biomedical Sciences, 1-7-1, Sakamoto, Nagasaki 852-8588, Japan*

ARTICLE INFO

Article history:
Received 7 August 2008
Received in revised form
28 October 2008
Accepted 28 October 2008

Keywords:
Randomized controlled trial
Two-year clinical evaluation
One-step self-etch
Resin composite
Non-carious cervical lesions

ABSTRACT

Objectives: This randomized controlled clinical trial evaluated the 2-year clinical performance of S^3 Bond (S3) and G-Bond (GB) in 108 non-carious cervical lesions.

Methods: Twenty-three patients, 12 male and 11 female (mean age: 61.8 years, range: 30–79 years) regularly visiting the Nagasaki University Hospital of Medicine and Dentistry, participated in the study. Each patient received both materials randomly. All restorations (53 restorations for S3 and 55 restorations for GB) were placed by one dentist. The restorations were blindly evaluated by two examiners at baseline, 6 months, 1 and 2 years using modified USPHS criteria. The data were statistically analyzed using the Cochran Q test and Fisher's exact test.

Results: One restoration of each material was lost during 2 years. The only minor clinical problem was the integrity of the enamel margin. Slight marginal staining occurred adjacent to 11 restorations of both S3 and GB. There was no significant difference in the clinical performance between S3 and GB for each variable.

Conclusions: Under the protocol used in this study, S3 and GB have demonstrated an acceptable clinical performance up to 2 years.

1. Introduction

A systematic review of current clinical trials has revealed that one-step self-etch systems are not as effective as conventional three-step total-etch systems and two-step self-etch systems.[1] In order to address this problem, several newer one-step self-etch systems with a relatively thin adhesive layer were, approximately 10 μm, developed a few years ago.[2–11] Introduction of a new technology and/or modification of a photoinitiator are used in these adhesive systems, and most of them are provided as a real one-bottle system. Comparison of the latest and the earliest versions of one-step self-etch systems from the same manufacturers showed a significant improvement of bond strengths and marginal sealing.[5,6] In addition, many studies have indicated that the newly developed one-step self-etch systems demonstrate comparable laboratory bond strengths to those of the two-step self-etch systems.[7–11] Therefore, newer one-step self-etch systems would be expected to demonstrate good clinical performance. However, sufficient information about their clinical performance, which can provide the ultimate proof of clinical effectiveness, has not been available.[2–4]

The aim of this randomized controlled clinical trial was to evaluate the 2-year clinical performance of resin composites

* *Corresponding author*. Tel.: +81 95 819 7757; fax: +81 95 819 7757.
E-mail address: kubo@net.nagasaki-u.ac.jp (S. Kubo).

0300-5712/$ – see front matter
doi:10.1016/j.jdent.2008.10.008

in non-carious cervical lesions (NCCLs) restored with two newly developed one-step self-etch systems.

2. Materials & methods

Twenty-three patients, 12 male and 11 female (mean age: 61.8 years, range: 30–79 years) regularly visiting the Department of Conservative Dentistry, Nagasaki University Hospital of Medicine and Dentistry, participated in the study. No consideration was given to periodontal condition or parafunctional habits. All patients signed a consent form that had been approved by the Ethics Committee of Nagasaki University School of Dentistry.

A total of 108 cervical lesions, 93 NCCLs and 15 defective cervical resin composites placed in NCCLs, were restored with S^3 Bond (S3: Kuraray Medical, Tokyo, Japan) or G-Bond (GB: GC Corp., Tokyo, Japan) in conjunction with a hybrid resin composite (Clearfil AP-X, Kuraray Medical) by the principal investigator. All but two patients had less than three restorations for each adhesive system. Each patient received both restorative groups which were randomly assigned. The distribution of the restorations was approximately equal except for the right side and the left side as shown in Tables 1 and 2.

The enamel wall of the cervical lesion was lightly roughened with a diamond bur at high speed with water cooling, and a short (approximately 1 mm) enamel bevel prepared to increase surface area for bonding and to enhance aesthetics as reported by Van Meerbeek et al.[12] Dentin walls were lightly ground with a steel round bur at slow speed without local anesthesia. No retention grooves were placed. In order to secure contamination-free access to the cavity, the adjacent gingiva was retracted by a gingival retraction cord, and the operating field was isolated with cotton rolls and a saliva ejector.

The cavities were treated with S3 or GB according to the manufactures' instructions. For S3, the self-etch adhesive was applied to the cavity and left for 20 s. The solvent was evaporated with high pressure air for about 10 s which also thinned the adhesive layer. The adhesive was irradiated for 10 s with a conventional light-curing unit (New Light VL-II, GC Corp., Tokyo, Japan, output $>400\ mW/cm^2$). For GB, the self-etch adhesive was applied to the cavity for 10 s, strongly air-blown for about 5 s and light-cured for 10 s. The hybrid resin composite was placed in a single increment, contoured with a hand instrument, and light-cured for 40 s except for very large and/or deep lesions which were restored in several increments, and each increment cured for 20 s. The excess composite was trimmed and contoured with an ultrafine diamond bur with water coolant. The restorations were finished with ultrafine diamond points as a lap joint margin to avoid damaging surrounding tooth tissues, and polished with slow speed silicone points at a following visit.

The restorations were blindly evaluated at baseline, 6 months, 1 and 2 years by the second and third investigators, and further 1:1 color photographs taken. Slightly modified USPHS criteria were used (Table 3). In case of disagreement, a consensus was reached based on assessment of the photographs. In view of the need to observe the restorations in the future, no attempt was made to remove any visible excess by refurbishing.

Cochran Q test was used to compare the changes across the four time points (baseline, 6 months, 1 year and 2 years). The comparison of two adhesive systems for each category was performed with Fisher's exact test. For all of the statistical analyses, a significant level was set at ≤ 0.05.

3. Results

All patients were examined at each recall. However, one restoration for each adhesive system could not be examined as the teeth had been extracted. The clinical evaluations are

Table 1 – Distribution of restorations.

Adhesive systems	Arch	Right quadrants (57)				Left quadrants (51)			
		Molar	Premolar	Canine	Incisor	Incisor	Canine	Premolar	Molar
S3 (53)	Maxilla	1	6	2	2	2	8	10	1
	Mandible	1	7	0	0	7	3	3	0
GB (55)	Maxilla	2	8	5	7	2	2	9	1
	Mandible	0	9	3	4	0	0	3	0

(·), total number of restorations.

Table 2 – Distribution of restorations by lesion size and depth.

Adhesive systems	Small (23)			Medium (52)			Large (33)			Total		
	S	M	D	S	M	D	S	M	D	S	M	D
S3 (53)	13	0	0	4	20	2	2	9	3	19	29	5
GB (55)	10	0	0	6	18	2	0	8	11	16	26	13
Total (108)	23	0	0	10	38	4	2	17	14	35	55	18

(·), total number of restorations.
Small (<1 mm in longitudinal width); medium (1–2.5 mm); large (>2.5 mm); S, shallow (<0.5 mm); M, moderate (0.5–1.5 mm); D, deep (>1.5 mm); no significant differences in distribution were found between adhesive systems.