

Clinical Studies of Dental Cements: II. Further Investigation of Two Zinc Oxide–Eugenol Cements for Temporary Restorations

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Two zinc oxide–eugenol cements of compressive strengths of 2,200 psi and 3,500 psi, selected in a previous study, were compared in a blind clinical study for suitability as a cementing material for temporary restorations. No difference was detectable clinically between the two cements in relation to retentive quality, taste, removal of the restoration when required, and cleaning the dentin.

A previous paper¹ reported the clinical findings on five zinc oxide–eugenol cements used to cement temporary restorations made from aluminum shell crowns or acrylic resin. The cements were similar in physical properties, except for the compressive strengths, which were 200, 1,000, 2,200, 3,500, and 5,400 psi, respectively. In the previous study it was found that two cements, one with a compressive strength of 2,200 psi and the other with a compressive strength of 3,500 psi, were the most satisfactory for cementing temporary restorations. The data collected, however, were not sufficient in quantity to differentiate between the two cements. There was the possibility that one or the other of the two cements might prove superior, and this investigation was undertaken to collect further data and explore this possibility.

Materials and Methods

As in the previous study, the two cements* were used routinely for cementing temporary restorations in the clinic of the University of Michigan School of Dentistry at

This investigation was supported in part by Project #07174 from the Board of Regents, University of Michigan, and by the L. D. Caulk Company of Milford, Del.

Received for publication May 6, 1968.

* L. D. Caulk Co., Milford, Del.

Ann Arbor. The cement for each restoration was selected at random, and standard quantities of powder and liquid were dispensed (0.6 gm powder and 0.3 ml liquid). When subsequent cementation of temporary restorations was required in the same patient, the alternate cement was assigned. From the data collected on each patient, a single cementation with each cement was selected by a standard pattern for inclusion in the study insuring an analysis on the basis of "single use." In this way, each cementation recorded represented one cementation of one temporary restoration on one tooth by one operator. No tooth was selected twice, and no patient was selected twice for the same cement. Data were collected at the time the temporary restoration was cemented and at the time the restoration was removed. The method and the criteria used in collecting the data have been described in a previous paper.¹ Difficulty in cleaning cement from the dentin was recorded on three occasions with each cement.

Tables 1 through 7 were analyzed for statistical significance by means of the 2×2 chi-square technic. Table 8 was not analyzed because of the very small number of failures with either cement.

Results

In the manner described earlier, 335 cementations were selected: 176 restora-

TABLE 1
RETENTION DATA FOR ALL
TEMPORARY RESTORATIONS

Cement C		Cement E	
Successful	Failed	Successful	Failed
161	15	145	14

$$\chi^2 = 6.01; 0.90 > p > 0.95.$$

tions were cemented with cement C (2,200 psi), and 159 restorations were cemented with cement E (3,500 psi). Data were collected regarding retention and are shown in Tables 1 through 3. Data were also collected in regard to taste, ease of removal

TABLE 2
RETENTION DATA FOR ACRYLIC RESTORATIONS

Cement C		Cement E	
Successful	Failed	Successful	Failed
73	11	78	10

$\chi^2 = 0.12; 0.80 > p > 0.70.$

TABLE 3
RETENTION DATA FOR ALUMINUM CROWN FORMS

Cement C		Cement E	
Successful	Failed	Successful	Failed
88	4	67	4

$\chi^2 = 0.14; 0.80 > p > 0.70.$

TABLE 4
PATIENT COMMENTS ON TASTE, ALL RESTORATIONS

Cement C			Cement E		
LA*	Burn	No Burn	LA	Burn	No Burn
21	44	111	12	36	111

$\chi^2 = 0.59; 0.50 > p > 0.40.$

* Local anesthesia.

TABLE 5
EASE OF REMOVAL, ALUMINUM CROWNS

Cement C			Cement E		
Easy	Difficult	Impossible	Easy	Difficult	Impossible
76	10	2	62	5	0

$\chi^2 = 1.48; 0.30 > p > 0.20.$

TABLE 6
EASE OF REMOVAL, ACRYLIC TEMPORARY RESTORATIONS

Cement C			Cement E		
Easy	Difficult	Impossible	Easy	Difficult	Impossible
66	6	1	69	8	1

$\chi^2 = 0.15; 0.80 > p > 0.70.$

TABLE 7
EASE OF CLEANING RESTORATION FOR REUSE, ALUMINUM CROWNS

Cement C			Cement E		
Easy	Difficult	Impossible	Easy	Difficult	Impossible
74	4	2	61	0	0

$\chi^2 = 4.78; 0.05 > p > 0.025.$

TABLE 8
EASE OF CLEANING RESTORATION FOR REUSE, ACRYLIC TEMPORARY RESTORATIONS

Cement C			Cement E		
Easy	Difficult	Impossible	Easy	Difficult	Impossible
65	2	0	70	1	0

No analysis; too few failures.

of the temporary restoration, ease of cleaning the restoration when required for reuse, and ease of cleaning the dentin. These latter data are recorded in Tables 4 through 8.

Where local anesthesia was used, no data regarding taste were obtained (Table 4). Two patients were sensitive to the cements and developed reactions which prohibited the further use of the cement.

Only Table 7 showed any significant difference between the two cements.

Discussion

The results of the study confirm the indications of the previous study. It would appear that there is a range of acceptable compressive strength for a cement for temporary cementation of temporary restorations. No doubt the many variables of retentive qualities in both tooth preparation and the temporary restorations used account for the failure to detect a more critical value for compressive strength.

The differences between the cements in regard to ease of cleaning aluminum crowns shown in Table 7, although statistically significant, needs to be interpreted with caution because of the small number of difficult or impossible restorations recorded. This one area of difference is not considered to be sufficient to indicate one cement as being preferable to the other.

Conclusions

A zinc oxide-eugenol cement of the type described with a compressive strength in the range from 2,200 psi to 3,500 psi will serve satisfactorily as a cement for the usual variety of temporary restorations placed in clinical restorative dentistry.

- GILSON, T.D., and MYERS, G.E.: Clinical Studies of Dental Cements: I. Five Zinc Oxide-Eugenol Cements, *J Dent Res* 47: 737-741, 1968.