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## A Clinical Evaluation of a Light-Cured Plastic Temporary Filling Material (Fermit<sup>®</sup>)

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### Summary

Fermit, a kind of a visible-light-cured resin, has recently been used as a temporary filling material. This clinical study was done to determine whether or not Fermit was superior to Dura Seal which was previously reported by us in this journal. The prepared cavities were sealed with Fermit for an average of 11.0 days. Fermit was found to have the same properties as Dura Seal, except for many losses of the seal (17.6 % of the total) and difficulty in filling.

### Introduction

The authors had previously reported in this journal on "Clinical Evaluation of a Plastic Temporary Filling Material (Dura Seal<sup>®</sup>)"<sup>1)</sup>. It was a chemically-cured resin. Concerning the ease of removal of the temporary filling and the resistance to abrasion, it was found to be superior to zinc oxide-enge-nol cement. Recently Fermit<sup>®</sup>, a kind of visible-light-cured resin<sup>2,3)</sup>, has been marketed as a temporary filling material.

This study was done to know how Fermit was superior to Dura Seal.

### Materials and Methods

This study involved 187 teeth (149 vital and 38 pulpless) of 114 patients (39 male and 75 female) who came to the clinic of Matsumoto Dental College between October 1990 and May 1991 (Table 1 and 2). Fermit, a visible-light-cured resin and a product of Vivadent Co., was inserted into the prepared cavities as a temporary sealer. The sealer tended to stick to the plastic instrument, but this could be prevented to some degree by placing a lubricat such as petroleum jelly, alcohol, and varnish

upon the instrument. The temporary sealers inserted were then exposed to visible light for 20 to 80 seconds or more and mostly 40 seconds, using the visible light unit (Table 3). No special consideration was given to shielding the dental pulp from any stimulus produced by the sealer. Occlusal adjustment and correction of the shape of the filling were performed after it was firmly set. At the beginning of the next appointment, data on the condition of the temporary filling were obtained by verbal questioning of the patient's progress, and by visual examination of the condition of the seal, of evidence of abrasion, deformation, and food impaction. The sealing periods ranged from 2 to 37 days, and the average was 11.0 days.

## Results

### 1. Irritation to the pulp, interdental papilla and marginal gingiva.

Unfavorable symptoms were reported for 41 (33.1%) out of all 124 vital teeth treated, and for 14 (25.9%) of the 54 vital teeth which were judged to have been well sealed during the term of temporary filling. The complaints included pain on mastication, reactions to hot and cold water and to sweets, and a generalized feeling of strangeness. Table 4 lists the frequencies reported both for

**Table 1:** Distribution of patients according to age and sex

Sex	Age							Total
	10s	20s	30s	40s	50s	60s	70s or over	
Males	5	11	16	8	4	1	0	45
Females	11	16	31	13	6	3	1	81
Total	16	27	47	21	10	4	1	126

**Table 2:** Distribution of teeth according to type of teeth and jaw

Tooth type	Central	Lateral	Cuspid	1st	2nd	1st	2nd	3rd	Total
	incisor	incisor		premolar	premolar	molar	molar	molar	
Maxillary	1	0	3	14	24	33	22	1	89
Mandibular	0	0	0	12	16	35	24	2	98
Total	1	0	3	26	40	68	46	3	187

**Table 3:** Exposure time

Time (sec.)	20	40	60	80 or more	Total
Number of teeth	4	139	31	13	187

**Table 4:** Unfavorable symptoms reported at the next appointment (vital teeth)\*

Cold water pain	26 (6) **
Hot water pain	2 (1)
Pain on mastication	20 (12)
Reaction to sweets	3 (0)
Strange feeling	5 (0)
Hypersensitive dentin	3 (2)
Asymptomatic teeth	83 (40)

\*N=124. Some teeth had two or more symptoms.

\*\*Numbers in parentheses are the frequencies for the 54 teeth judged well sealed.

teeth that had been well sealed and those that were not ; for both types, two or more unfavorable symptoms were reported for some teeth.

Inflammation of the dental papilla and marginal gingiva was observed in 9 (7.7%) out of 117 teeth having the gingival walls in the cavities.

## 2. Marginal sealing and discoloration

At the following appointment, sealing around the margins of the preparation was judged excellent when no gaps, curled edges, or fractures were observed. The seal was judged as fairly good when one of these faults was found but only around part of the perimeter. When a fault was seen around the entire margin, it was judged poor. The results of these observations are given in Table 5. Discoloration of the temporary filling was recognized in 49 out of 154 teeth.

## 3. Loss of the filling

Loss of the filling was recognized in 33 out of all 187 teeth and found in the teeth having the compound and cuspal protection cavities. The average time to be lost the filling was 4.3 days.

## 4. Ease of removal

Removal was judged excellent when the temporary filling material could be dislodged from the cavity in a single mass by an explorer or a spoon excavator. It was judged fairly good when removal took more time but could be accomplished without a rotary cutting instrument. Removal was judged as poor when rotary cutting instruments were required. In 141 teeth, or 91.6% of the total, removal was excellent ; in 13 teeth (8.4%) it was fairly good ; in no teeth was it found poor (Table 6). 33 teeth

**Table 5 : Quality of the marginal seal**

Results	status of the pulp		Total
	Vital teeth	Pulpless teeth	
Excellent	54	6	60
Fairly good	63	23	86
Poor	7	1	8
Total	124	30	154

**Table 6 : Ease of removal of temporary filling**

Excellent	141
Fairly good	13
Poor	0
Filling lost	33
Total	187

**Table 7 : Deterioration of temporary fillings observed at next appointment**

	Simple (n=27)	Type of Cavity		Total (n=154)
		Compound (n=81)	Cuspal Protection (n=46)	
Abrasion	2	2	5	9
Curled edge	4	7	7	18
Gap	6	14	13	33
Fracture	1	5	4	10
Bending	4	15	7	26
Loss of filling	0	16	17	33
Unchanged	20	58	28	106

More than one of the conditions listed was observed for some of the fillings.

in which the fillings had been lost were excluded from these data.

#### 5. Mechanical strength

Evidence of abrasion was found in 9 teeth whose average temporary filling time was 10.8 days. Fractured fillings were observed in 10 teeth and their average temporary filling time was 12.9 days. Curled edges, gaps, and bendings were seen in 18, 33, and 26 teeth respectively (Table 7).

#### 6. Food impaction

Food impaction into the interproximal area was found in 13 of 111 teeth having the proximal cavities and the opposing teeth.

### Discussion

In our clinical study previously reported on Dura Seal<sup>1)</sup> similar to Fermit, it was recognized that Dura Seal had good mechanical properties and ease of removal superior to zinc oxide-eugenol cement<sup>4,5)</sup>. It did not indicate pulp damage and was decided to be able to use as the temporary filling material for the prepared cavity but not good for the intracanal medication<sup>6)</sup>.

This clinical study was done to know how Fermit was improved on the failures of Dura Seal. Fermit possessed mechanical strength, marginal sealing, and ease of removal as same as Dura Seal. But Fermit was difficult to fill because of its stickiness to the plastic instrument and needed in all cases to place the lubricat upon it. It was considered that loss of 33 fillings (17.6% of the total) was caused by insufficient contact to the cavity wall owing to the difficulty in filling. On the other hand, regarding Dura Seal only a filling (0.7% of the total) was lost in the sealing period. There was no advantage over the light-cured resin compared with chemically-cured resin in this study.

### Conclusions

Fermit, a visible-light-cured resin used as the temporary filling material, was utilized to seal the prepared cavities of 187 teeth, and its clinical usefulness was evaluated and compared with Dura Seal. The sealing periods ranged from 2 to 37 days and the average was 11.0 days. The results obtained are as follows.

1. Pulp damage due to irritation by Fermit was not observed in this short term study as well as Dura Seal.
2. Fermit possessed mechanical strength, marginal sealing, and ease of removal as same as Dura Seal.
3. Loss of the filling was found is 33 (17.6%) out of all 187 teeth treated.

### References

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## 抄録：光重合型プラスチック暫間充填材の臨床的評価

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最近, 可視光線重合レジン的一种である Fermit が, 暫間充填材として用いられている。本臨床実験は, 本誌で以前我々が報告した Dura Seal より, Fermit が優れているか否かを決定することにあつた。形成した窩洞を, 平均11.0日間 Fermit で仮封した。Fermit は仮封材の脱落 (全例中17.6%) が多いことと充填しにくいことを除いては, Dura Seal と同じ性質を有していることが判明した。