Rev. Odont. UNESP
10(1/2):11-14, 1981

HISTOLOGICAL EVALUATION OF THE PULPAL REACTION TO FOTOFIL RESTORATIONS

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ABSTRACT: After polishing and application of a conditioning acid solution on the buccal surface of 36 permanent teeth of dogs, deep Class V cavities were prepared with diamond points at high speed with air-water spray. Twenty-six teeth were filled with Fotofil, a visible light-cured composite restorative material, according to the manufacturer instructions, and the remaining 10 specimens were lined with paraffin wax and filled with Fotofil, to serve as control. Forty-two days later the teeth were extracted and prepared for histological analysis. The average thickness of the remnant dentine under the cavity floor was 557 micrometers. The control teeth presented normal morphological picture. Of the 26 specimens restored with Fotofil, 11 presented no inflammatory response and in the remaining 15 teeth a chronic inflammatory reaction was presented and localized under the cavity floor. According to the results obtained in this study, it is recommended that before the use of Fotofil an adequate lining should be applied.

KEY-WORDS: Composite resin, pulp reaction, filling.

From a clinical stand-point, there are some advantages in the use of light-cured composite resins because they are presented in a single pack system, and so they do not need mixing and the working may be controlled by the clinician. If the activation source is a visible light those advantages are increased because of greater security for patients and clinicians.

Data about the pulpal response to Fotofil, a visible light-cured composite resin, were presented by BLOCH *et al.* (1977). Nevertheless, we think that further observations must be done, by using an effectively inert material as control and avoiding that possible pulpal effect of acid-etching on dentine is summed to the pulpal response to resin. The purpose of this study is to contribute in the obtention of more data on such matter.

MATERIAL AND METHOD

Thirty six permanent teeth of young adult dogs were used. The teeth were submitted to prophilaxys with pumice/water, washed and dried. Then, the labial surfaces were acid-etched during two minutes with the solution provided by the manufacturer and newly washed.

Deep class V cavities were prepared in the gingival third of the labial surfaces using inverted cone-shaped diamond points, at high speed, under water cooling.

After gentle whashing and drying with cotton pellets, 10 cavities were lined by paraffin-wax and restored with Fotofil, in order to be used as control. The remaining 26 cavities were only restored with Fotofil, extending the composite over the acid-etched

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enamel. All the restorations were exposed to the visible light during 60 seconds.

Forty two days later, the animals were submitted to perfusion with 10% formalin and extraction of the treated teeth. The pieces were immersed in formalin for 72 hours, decalcified in formic acid-sodium citrate solution and paraffin embedded. The blocks were serially cut at 6 micrometers intervals and stained by hematoxylin and eosine.

RESULTS

The dentine thickness under the cavity floors, measured along the dentinal tubules, ranged between 160 and 976 micrometers, with 557 as an average.

In the control teeth, there were observed calcium-traumatic line and reparative dentin varying in thickness, with canalicules reduced in number but uniform; the odontoblastic layer had a slight reduction in number of cells, but the pulp tissue was not infiltrated by inflammatory cells (fig. 1).

Eleven teeth composite filled but not paraffin-lined (42%) presented more or less evident calcium-traumatic line, reparative dentin varying in thickness, little reduction of the odontoblastic layer, and remaining pulp tissue free of inflammatory cells (figs. 2 and 3), similarly to the control specimens.

Other 11 specimens filled but not lined (42%), besides the calcium-traumatic line and reparative dentin, there were observed inflammatory cells from the chronic series, immediately under the cavity floor (fig. 4). This mild inflammatory reaction changed to moderate (fig. 5) in another three specimens (12%).

Only one teeth (4%) presented little area of predentine and dentine resorption together with a severe chronic inflammation (fig. 6) in the pulp tissue near the cavity floor; but calcium-traumatic line, reparative dentine, and reduced and disorganized odontoblastic layer were also present.

DISCUSSION

The phophoric acid solution was applied on the enamel previously to cavity preparation to avoid accidental dentine contamination, which could produce pulpal irritation (STANLEY *et al.*, 1975).

The results observed in control group are similar to those presented by HOLLAND *et al.* (1978), such as calcium-traumatic line, reparative dentine with little reduction in canalicules number and odontoblastic layer nearly normal.

Pulps of teeth filled with Fotofil, without lining, presented a somewhat better response than those observed by BLOCH *et al.* (1977). These authors observed chronic inflammatory cells in the pulp tissue beneath the Fotofil filled cavities in 37% of the cases, 8 weeks after the operative procedure, it being that 30,8% of the pulps had a chronic cells concentration suggesting a severe reaction. Nevertheless, BLOCH *et al.* (1977) did not mention the enamel acid-etching before filling; this fact and their description about some teeth that were discarded because of plaque on the walls and floor of cavities suggest that they must have greater marginal leakage, it being responsible for the more severe inflammatory reaction they reported.

Although this study showed Fotofil to be a composite resin little irritant to the pulp tissue, it appears cautions the use a cavity liner to counter such irritation.

RUSSO, M., KOMATSU, J., TAKAYAMA, S., HOLLAND, C. Jr., SASAKI, T. & QUINTELLA, L.P.A.S. Avaliação histológica da reação pulpar a restaurações com Fotofil.

RESUMO: Em trinta e seis dentes permanentes de cães, submetidos à profilaxia e à aplicação de solução ácida no esmalte das faces vestibulares, foram preparadas cavidades tipo classe V, com ponta diamantada e refrigeração a água. Vinte e seis dentes foram restaurados com a resina composta Fotofil, de acordo com as instruções do fabricante e os 10 restantes, antes de receberem o mesmo material, tiveram suas cavidades forradas com parafina, para servirem como controles. Decorridos 42 dias da realização das restaurações, os dentes foram extraídos e preparados para análise histológica. A espessura de dentina remanescente foi, em média, de 557 micrômetros. As polpas dos dentes utilizados como controles apresentavam-se isentas de células inflamatórias. Verificou-se que, nos restantes 26 espécimes, 11 demonstraram tecido pulpar normal, sendo que nos demais detectou-se a presença de células inflamatórias do tipo crônico, localizadas sob o preparo cavitário. Os resultados obtidos indicam a utilização de um material protetor adequado, quando da realização de restaurações dentais com o material testado.

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Recebido para publicação em 28.05.81

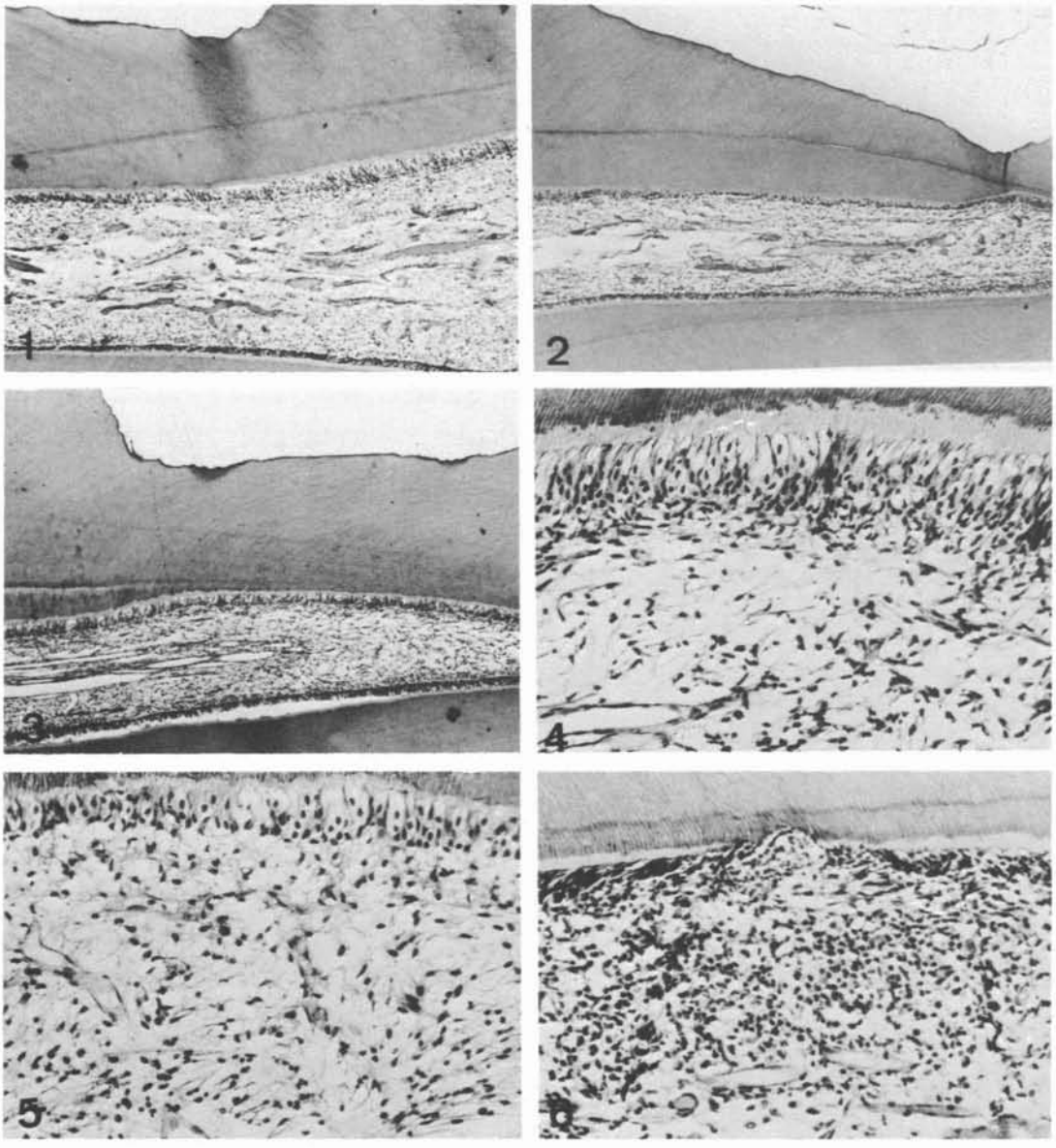

Fig. 1 — Control tooth. Remaining dentine 400 micrometers in thickness. Calcium-traumatic line, reparative dentine, little reduction of the odontoblastic layer and normal pulp tissue. H.E. 4OX.

Fig. 2 — Fotofil. Remaining dentine 160 micrometers thick. Calcium-traumatic line, reparative dentine, odontoblasts reduced in number, normal pulp tissue. H.E. 40X.

Fig. 3 — Fotofil. Remaining dentine 400 micrometers thick. Same findings observed in figure 2. H.E. 40X.

Fig. 4 — Fotofil. Remaining dentine 400 micrometers thick. Reparative dentine, predentine, little reduced odontoblastic layer, some chronic inflammatory cells. Mild inflammatory reaction. H.E. 200X.

Fig. 5 — Fotofil. Remaining dentine 320 micrometers thick. Reduced odontoblastic layer, chronic inflammatory cells. Moderate inflammation. H.E. 200X.

Fig. 6 — Fotofil. Remaining dentine 960 micrometers thick. Reduced and disorganized odontoblastic layer, area of dentine and predentine resorption, chronic inflamatory reaction. H.E. 200X.