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3,266,147

DENTAL CAVITY LINERS

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The present invention relates to liners for use in teeth cavities after they have been prepared to receive fillings.

The accepted practice is for a dentist to coat a tooth cavity with a dental cement after it has been readied for filling, the coat being effective to block the effects of heat and cold on the filling from being a stimulant to the nerve of the filled tooth. It is also the practice to coat the prepared cavity with calcium hydroxide when the decay process is close to the pulp of the tooth. This latter practice has the objectionable feature that the coat does not show in an X-ray, a factor of particular importance if a patient changes dentists. In that case and in the absence of any record of previously performed work, the teeth are usually X-rayed. In a tooth filled in accordance with the above summarized technique, the calcium hydroxide coat shows a void, and, as a consequence, the filling is usually removed to make sure that the apparent void does not represent decay.

The principal objectives of the present invention are to eliminate the above referred to objectionable feature, to enable the dentist to apply the calcium hydroxide with maximum ease, convenience, and accuracy, and also to provide an easy and effective method of lining a deep defect caused by decay with the lining providing insulation against thermal changes induced by a metal restoration. These objectives are attained by providing a cavity liner in the form of a thin flexible sheet carrying first and second substances with each substance being distributed throughout the area of the sheet so that they become a coat for the cavity when the liner is applied thereto. The first substance is calcium hydroxide and the second is opaque to X-rays and inert with respect to the first substance.

In more detail, the sheet materials used are absorbent and of a thickness to ensure that they can hold adequate amounts of both substances. At the same time, it is essential that the liner be thin enough to make it easy to apply to a prepared cavity and to avoid interference with the filling. Both objectives are met with a sheet thickness in the order of 1 mm. Surgical sponge material in sheets of approximately that thickness has proved satisfactory in use.

It is, of course, essential that the substance that is used as an indicator for X-ray photography be inert with respect to calcium hydroxide and those that meet that requirement are barium sulfate, bismuth sub-nitrate and bismuth sub-carbonate.

In order to ensure an effective calcium hydroxide coat, and at the same time, safeguard against the appearance of any void should an X-ray be subsequently taken, both substances must be distributed throughout the area of the sheet so that they become a coat for the cavity when the liner is applied thereto. This result is best achieved by mixing the substances together in water; the sheet is then saturated so that the substances are intimately mixed and evenly distributed providing, when the liner is applied, a coat for the prepared cavity that is both a block against the effects of heat and cold and opaque with respect to X-rays.

Best results are obtained, as far as X-rays are concerned, when the second substance is a mixture of barium sulfate, bismuth sub-nitrate, and bismuth sub-carbonate, particularly when the three are mixed together in approximately equal parts.

In practice, it is preferred that the percentage by

weight of calcium hydroxide to the percentage by weight of the indicator or indicators, be in the range of from 40-60% to 60-40%. In practice, excellent results are attained when approximately equal parts by weight of both substances are used.

After the saturated sheet dries, it is ready for use. Once the cavity is readied for filling, the dentist has but to cut from the sheet a piece that will fit that particular cavity as a liner, and the filling may then be completed, after that liner has been inserted in that cavity, with assurance that the calcium hydroxide coat is of maximum effectiveness and will be opaque with respect to X-rays.

I claim:

1. A liner for a tooth cavity that has been prepared for filling and particularly for use in place of a cement base where there are deep-seated defects caused by caries, said liner comprising a thin, flexible sheet and first and second intimately mixed substances carried by said sheet as a dry coating, each being dry and distributed throughout the area of the sheet so that each substance becomes a coat for the cavity when the liner is applied thereto, said first substance being calcium hydroxide and the second substance being opaque to X-rays and inert with respect to the first substance and being at least one of the indicators from the group consisting of barium sulfate, bismuth sub-nitrate, and bismuth sub-carbonate.

2. A liner for a tooth cavity that has been prepared for filling and particularly for use in place of a cement base where there are deep-seated defects caused by caries, said liner comprising a thin, dry flexible sheet the thickness of said sheet being in the order of 1 mm., and first and second intimately mixed substances carried by said sheet as a dry coating, each being dry and distributed throughout the area of the sheet so that each substance becomes a coat for the cavity when the liner is applied thereto, said first substance being calcium hydroxide and the second substance being opaque to X-rays and inert with respect to the first substance and being at least one of the indicators from the group consisting of barium sulfate, bismuth sub-nitrate, and bismuth sub-carbonate.

3. A liner for a tooth cavity that has been prepared for filling and particularly for use in place of a cement base where there are deep-seated defects caused by caries, said liner comprising a thin, dry flexible sheet of surgical sponge, the thickness of said sheet being in the order of 1 mm., and first and second intimately mixed substances carried by said sheet as a dry coating, each being dry and distributed throughout the area of the sheet so that each substance becomes a coat for the cavity when the liner is applied thereto, said first substance being calcium hydroxide and the second substance being opaque to X-rays and inert with respect to the first substance and being at least one of the indicators from the group consisting of barium sulfate, bismuth sub-nitrate, and bismuth sub-carbonate.

4. A liner for a tooth cavity that has been prepared for filling and particularly for use in place of a cement base where there are deep-seated defects caused by caries, said liner comprising a thin, dry flexible sheet and first and second intimately mixed substances carried by said sheet as a dry coating, each being dry and distributed throughout the area of the sheet so that each substance becomes a coat for the cavity when the liner is applied thereto, said first substance being calcium hydroxide and the second substance being opaque to X-rays and inert with respect to the first substance and comprising a mixture of barium sulfate, bismuth sub-nitrate, and bismuth sub-carbonate.

5. A liner for a tooth cavity that has been prepared for filling and particularly for use in place of a cement base where there are deep-seated defects caused by caries, said liner comprising a thin, dry flexible sheet and first and

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second intimately mixed substances carried by said sheet as a coating, each being dry and distributed throughout the area of the sheet so that each substance becomes a coat for the cavity when the liner is applied thereto, said first substance being calcium hydroxide and the second substance being opaque to X-rays and inert with respect to the first substance and comprising a mixture of equal parts of barium sulfate, bismuth sub-nitrate, and bismuth sub-carbonate.

6. A liner for a tooth cavity that has been prepared for filling and particularly for use in place of a cement base where there are deep-seated defects caused by caries, said liner comprising a thin dry flexible sheet and a mixture of approximately equal parts of first and second dry substances carried by said sheet as a dry coating, each being distributed throughout the area of the sheet so that each substance becomes a coat for the cavity when the liner is applied thereto, said first substance being calcium hydroxide and the second substance being opaque to X-rays and inert with respect to the first substance and being at least one of the indicators from the group consisting of barium sulfate, bismuth sub-nitrate, and bismuth sub-carbonate.

7. A liner for a tooth cavity that has been prepared for filling and particularly for use in place of a cement base where there are deep-seated defects caused by caries, said liner comprising a thin dry flexible sheet and a mixture of approximately equal parts of first and second dry substances carried by said sheet, each being distributed

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throughout the area of the sheet so that each substance becomes a coat for the cavity when the liner is applied thereto, said first substance being calcium hydroxide and the second substance being opaque to X-rays and inert with respect to the first substance and comprising a mixture of equal parts of barium sulfate, bismuth sub-nitrate, and bismuth sub-carbonate.

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