

[54] DENTISTRY

[76] Inventor: **Peter Frank Kurer**, Speakers House,
39 Deansgate, Manchester 3,
England

Primary Examiner—Louis G. Mancene
Assistant Examiner—J. Q. Lever
Attorney—Louis Orenbuch

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[56] **References Cited**

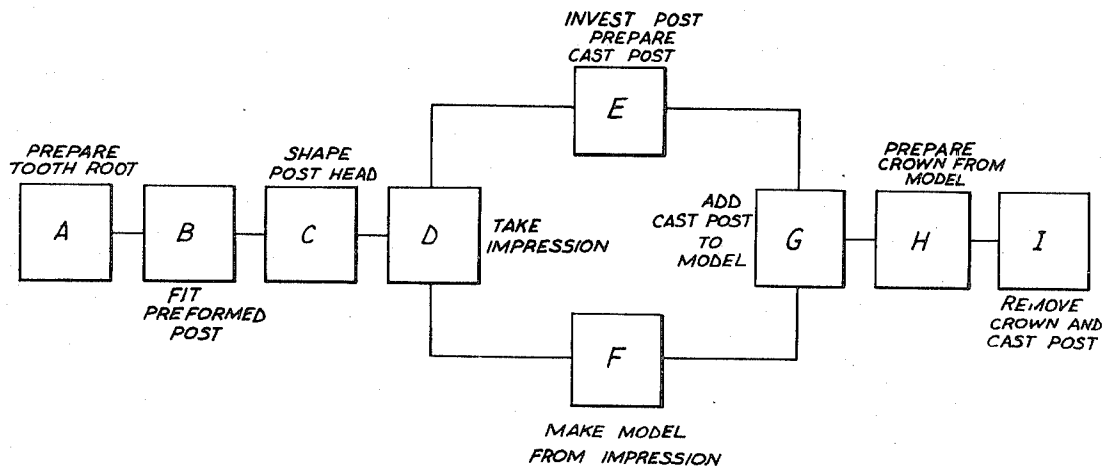
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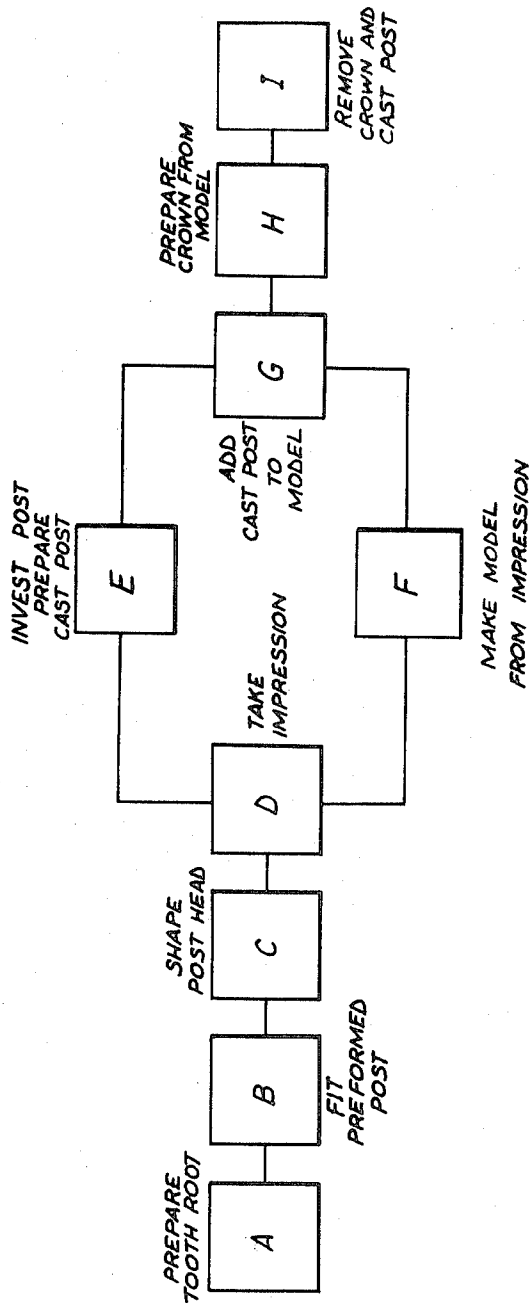
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[57] **ABSTRACT**

In the preparation of a cast post for use in dentistry a pre-formed, headed post of a material which dissipates under heat is applied to a prepared root canal, the head of the post is shaped into conformity with the surrounding teeth, the resultant post is removed and a corresponding cast post is produced in accordance with conventional investment casting practice. A purpose-made crown is produced by taking an impression of the pre-formed post, when in situ, and of the adjacent teeth, preparing a model embodying such preformed post and shaping a crown to fit the thus produced model.

3 Claims, 1 Drawing Figure





INVENTOR:
PETER FRANK KURER
BY
Louis Orenbuch

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DENTISTRY

The invention concerns dentistry and has more particular reference to the production of a cast post shaped to receive a purpose-made crown.

The most usual method of attaching a purpose-made crown to the root of a tooth in the mouth is by means of a cast gold post.

There are many techniques which can be employed in making a cast gold post although these can conveniently be subdivided into two main categories:

(a) Direct technique; (b) Indirect technique.

In either case the root canal of the tooth is widened with suitable instruments by the operator and is otherwise suitably prepared.

In the case of the Direct technique, the root canal is then filled with wax, such wax ultimately forming the shank of the post. A head is built up on the wax and is carved to a shape large enough to retain a purpose-made crown, yet fitting in with adjacent and with opposing teeth.

The wax model is now removed with great care so as to avoid distortion and is then invested in dental investment; the wax is driven off by heating the investment and the post is then cast, a precious or semi-precious alloy being the material of choice for forming the post.

The Direct technique of making a cast gold post does have disadvantages. For example:

I. It is by no means certain, when the wax model is made, that the wax has reached to the bottom of the root canal and has accordingly completely filled the cavity in the tooth root;

II. Whilst building up and carving the head, stresses are introduced into the wax shank and this can affect its fit in the root canal, always providing that a good fit was achieved initially when the soft wax was pushed into the root canal;

III. During removal of the wax post, distortion must be avoided. If any undercut was caused in the root canal on the widening thereof, wax will run into it and on removal of the post distortion can be caused to the wax pattern by the wax in the undercut;

IV. The fragile wax post has to be transported for investment and use in making a gold post without damage and without distortion due to temperature changes; and

V. A separate dental appointment is needed to fit the cast post into the root whereafter an impression for the crown needs to be taken. The crown is fitted at a third appointment.

In the case of the Indirect technique, after suitable preparation of the root canal, an impression is taken of such canal. A model of the canal is made and the Direct technique is followed, using the model as the starting point.

The disadvantages of the Indirect technique are:

I. It is difficult to fill the thin tube-like cavity in the root of the tooth with impression material;

II. It is impossible to check whether the cavity has been completely filled;

III. Any undercut in the preparation of the root canal can cause permanent distortion of the impression material if this is non-elastic; and

IV. The delicate impression has then to be invested without damage.

The object of the present invention is to provide an alternative method to those hereinbefore referred to for preparing a cast post.

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According to the present invention a method of casting a post for use in dentistry, which post is shaped to receive a purpose built crown, comprises the steps of preparing the root canal and face of the tooth in question, inserting a preformed, headed post of a material which dissipates when subjected to heat and is of a cross-section appropriate to that of the thus prepared root canal into such canal and into seating engagement with the root face, shaping the head of the preformed post having regard to the shape of the surrounding teeth, removing the thus shaped post, investing the same and using the investment as a mold to form a cast post of a like shape thereto.

The preformed, headed post is a precision made pattern element having a shank matched to the prepared root canal and a head which can readily be shaped into conformity with surrounding teeth.

According to a preferred feature, a cement simulation disc is applied to the root face of the tooth before insertion of the preformed post into the root canal.

The invention also includes the method of preparing a purpose-made crown for a tooth in which a cast post is made in accordance with the method as aforesaid and which includes the further steps of taking an impression of the preformed post and of the surrounding teeth after the shaping of the head and whilst the post is in situ in the tooth root, locating the shaped, preformed post, or a cast image, thereof, in the impression, producing a model from such impression, and preparing a crown consistent with the model.

The invention will now be described further by way of example only, with reference to the accompanying block diagram illustrating one embodiment thereof. Thus, referring now to the Drawing, the root canal is first widened and deepened by means of a reamer and the root face is countersunk to receive the head of a preformed, headed post (Action A). Conveniently, the deepening and widening of the canal is effected by an engine reamer to approximately the required dimensions, the final dimensions being achieved using a hand reamer of a slightly greater dimension than the engine reamer previously used.

An apertured cement simulation disc serves to locate the head of the post relative to the root face in the position the head will occupy when an adhesive is present between the head and the root face. The disc simulates the thickness of the adhesive layer and, consequently, the disc is removed before the head is cemented to the root.

A preformed post of a cross-section appropriate to that of the prepared root canal is then located in such canal, (B), the shank of the post being trimmed as to length, as appropriate, so that the head thereof seats accurately upon the countersink in the root face. The head of the post is now trimmed (C) having regard to the shape of the adjacent and opposing teeth, wax being added to the head of the post, if necessary to maintain alignment with adjacent teeth, or to the shanks of the post, to take account of an oval bore to the root canal.

After completion of the trimming an impression is taken (D) of the in situ post and of the surrounding teeth, the post, after the removal thereof from the root, locating accurately in such impression. A model is made from the impression in the usual way using conventional dental materials, (F), the post being present

in the impression during the production of the model and thereby forming a removal part of such model.

After removing the prefabricated post from the aforementioned model, a cast post is made from the trimmed preformed post by investing the same in a dental investment, (E), an access channel being provided through the investment material to communicate with the preformed post, heating the invested post in a suitable furnace and casting a precious or semi-precious metal into the space left by the dissipation of the preformed post, which latter post is of any rigid or semi-rigid material which is completely dissipated by heat. Suitable materials are polypropylene, polystyrene or wax.

If desired, the cast post may be of a precious alloy, e.g., platinum/iridium, having an adequate strength characteristic and which can be cast to a sufficient degree of accuracy as to form. Gold, however, is the preferred material of choice.

In order to produce a purpose-made crown the cast post is applied to the model, (G), and a crown therefor shaped, (H), having regard to the form and contours of the surrounding teeth. The crown and cast post are subsequently removed from the model and are available for fitting in the patient's mouth.

It will be appreciated that by means of the method as aforesaid it is possible, during the course of only two appointments, to prepare a tooth root to receive a preformed post, and to fit a suitably shaped cast post and crown into such tooth root.

The method of the present invention presents one or more of the following advantages:

1. No difficulty in getting the preformed post completely into the root canal.
2. No danger of distortion of the shank whilst trimming the head.
3. Ease of trimming of the head. No head need first be built.
4. No danger of distortion in removing, handling or investing the trimming preformed post ready for casting.
5. The preformed post offers the advantages of the direct technique in being fitted not into a model but directly into the root.
6. The preformed post offers the advantages of the indirect technique that it is finished after one appointment, a cast post can be prepared and that post and an appropriate crown returned to the dentist both to be cemented at the second appointment.
7. Simplicity of technique — minimum of skill being

required.

8. Saving of time.

9. A precision fitting post.

The method as aforesaid may be varied to suit particular circumstances. Thus, for example, the use of a cement simulation disc can be avoided if the cast post is cemented into the root canal before taking the impression for the crown, although to proceed in this way is to require that the patient need a further appointment since the cast post and the crown cannot be produced at the same time. In the case of the initial application of the preformed post to the root-canal, it may be found necessary to crop the post to ensure a proper seating on the tooth root face. As an alternative to providing the post to a given length and varying such length by severing a part thereof, the head may be provided in the form of a sleeve slidably mounted on the post and movable axially thereof into engagement with the root face. In a still further arrangement, the head may be detachable from the post thereby to provide a facility for selection of a head particularly suited to the circumstances.

I claim:

1. A method of casting a post for use in dentistry comprising the steps of:

- a. preparing the root canal and the face of the tooth;
- b. inserting in the root canal a preformed, post of a material which dissipates when subjected to heat, the post having a shank portion whose cross-section is appropriate for the prepared root canal and the post having a head which seats upon the root face,
- c. shaping the head of the preformed post to a form appropriate for the adjacent teeth;
- d. removing the thus shaped post,
- e. investing the shaped post to form a mold, and
- f. employing the mold to cast a permanent post.

2. The method according to claim 1, further including the step of:

- locating a cement simulation disc on the root face before inserting the preformed post into the root canal to provide a spacer simulating the thickness of a layer of dental cement.

3. The method according to claim 1, wherein the steps of preparing the root canal and the face of the tooth includes countersinking the root face to form a bore in which the head of the preformed post is received.

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