Single discolored tooth: An alternative treatment approach
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A single discolored tooth is often difficult to treat, but one with an obliterated pulp chamber and root canal presents an even greater challenge. The use of nightguard bleaching is offered as a simpler, alternative treatment to either root canal therapy or the removal of sound tooth structure for fabrication of a facial veneer or a complete-coverage crown. (Quintessence Int 1993;24:233-235.)

Introduction
The reasons for discoloration of a single tooth are varied, but it is most frequently due to pulpal necrosis arising from trauma, caries, or large restorations. Infection of the primary predecessor, which may alter formation of the permanent tooth, or postendodontic discoloration are also common causes of single-tooth discoloration.

Bleaching is often advocated for the treatment of discolored teeth. It is usually less invasive and less expensive than other esthetic procedures such as bonding with composite resins, veneers, or the fabrication of complete-coverage crowns. The use of different bleaching techniques is dependent on whether the tooth is vital or not. For vital teeth, application of bleaching agents with high-intensity lighting is often advocated. Nightguard vital bleaching has also been proved successful for the treatment of mildly discolored teeth. For a nonvital tooth, the bleaching agent may be placed within the pulp chamber and activated by heat. Alternatively, the "walking bleach" technique, in which a mixture of hydrogen peroxide solution and sodium perborate is sealed in the pulp chamber, may be employed. However, external cervical root resorption is a serious complication associated with intracoronal bleaching.

Case report
A single discolored tooth is often difficult to treat because of the problem of matching color to adjacent teeth, but such a tooth with an obliterated pulp chamber and root canal presents an even greater challenge. A 27-year-old woman was referred for treatment of a single discolored maxillary right central incisor (Fig 1). The patient could not recall any previous history of trauma to the tooth. The tooth was darker than the adjacent teeth but had an intact crown with no existing caries or restorations. There were no other clinical signs and the tooth gave no response to thermal or electrical pulp tests. A periapical radiograph revealed that both the pulp chamber and root canal were completely obliterated (Fig 2). No periapical lesion or widening of the periodontal ligament space was found.

The patient was offered several treatment options. Root canal therapy could have been carried out, with the attendant risk of perforation during the attempt to locate or "create" the root canal. Alternatively, the tooth could be reviewed at regular intervals to monitor changes in "pulpal" or periapical status. Subsequently, a facial veneer or a complete-coverage crown could be fabricated, but the problem of color matching to the adjacent teeth would still exist.

The patient opted for the less invasive treatment of bleaching the discolored tooth. Because the pulp chamber was completely obliterated, the "walking bleach" technique was contraindicated, because an artificial pulp chamber would have to be created to accommodate the bleaching agent. Bleaching was therefore carried out externally.
Esthetic Dentistry

Fig 1 Discolored maxillary right central incisor.

Fig 2 Periapical radiograph reveals the obliterated pulp chamber and root canal of the maxillary right central incisor.

Fig 3 Tooth after nightguard bleaching with 10% carbamide peroxide.

Technique

The technique employed was similar to that reported for nightguard vital bleaching. Prophylaxis was performed to remove surface stains and plaque. A stone cast was made from an alginate impression of the patient's maxillary arch. Light-polymerized laboratory bisphenol glycidyl methacrylate resin (LC Block-out Resin, Ultradent) was placed over the facial surface of the right central incisor, 0.5 to 1.0 mm from the gingiva. A vacuum-formed soft plastic nightguard (Sof-Tray, Ultradent), approximately 2 mm thick, was fabricated over the modified stone cast. The nightguard covered all the teeth in the arch and was trimmed 1 mm apical to the gingiva, and following the scalloped gingival contour.

The nightguard was fitted and issued to the patient with four 1.2-mL tubes of 10% carbamide peroxide (Opalescence, Ultradent). The patient was instructed to brush and floss her teeth prior to using the nightguard. Two to three drops of the bleaching gel were to be placed into the nightguard in the space corresponding to the tooth to be lightened. Excess bleaching gel that was extruded was to be wiped off. The nightguard had to be cleaned and rinsed each morning after use. The patient was told to wear the nightguard with the bleaching gel during sleep every night until the desired lightening of the discolored tooth had been achieved.

Results

A favorable result was attained after 4 weeks of continuous use of nightguard bleaching (Fig 3). The average exposure time was 8 hours per night. There was a slight lightening of teeth adjacent to the original discolored tooth. The patient did not notice this and was generally pleased with the final result.

A transient problem of gingival irritation was encountered by the patient. However, this was mild and disappeared when the patient was advised to be more diligent in cleaning away excess bleaching gel after insertion of the nightguard. No other problems were reportedly encountered.

The patient will be reviewed at 6-month intervals for up to 2 years, and radiographs will be taken at each recall visit to monitor the periapical status of the treated tooth.

Discussion

Nightguard bleaching offers several advantages, including ease and convenience. Because the majority of the bleaching is accomplished outside the dental office, the technique provides significant savings of cost and time for the patient. This technique also avoids the use of intense external heat and strong, caustic bleaching agents.
ing agents. Most bleaching, whether for vital or non-
vital teeth, will require touchups within 1 to 3 years.\(^1\)
The duration of the esthetic result for the nightguard

technique appears to exceed 1 year.\(^2\) However, because

of the ease of treatment, if any regression should
occur, the patient can resume treatment at any time
with only periodic supervision by the dentist.

In this patient, the use of this bleaching technique
also resulted in a slight lightening of the teeth adjacent
to the original discolored tooth. This resulted from
inadvertent seepage of the bleaching agent from the
reservoir to the surrounding area. This procedure
should therefore be limited to patients who are willing
to accept a slight lightening of the adjacent teeth.

The reservoir for the bleaching agent was limited to
only the discolored tooth to minimize the occurrence of
side effects, such as tooth sensitivity and irritation of the
gingiva or mucosa, which appear to be dose-related.\(^3\)

The predictability of success may be uncertain.
However, the use of this technique for the treatment
of a single discolored tooth with an obliterated pulp
chamber and root canal (that is otherwise symptomless)
may be a better alternative to attempting root canal
therapy with the attendant risk of perforation or re-
moving sound tooth structure for the fabrication of a
facial veneer or a complete-coverage crown.

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