Managing Discoloured Non-Vital Teeth: The Inside/Outside Bleaching Technique

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Abstract: **The discoloured, non-vital anterior tooth is a common aesthetic concern for many patients. It can have a profound effect on their self-esteem, interaction with others and employability. Discoloured non-vital teeth are frequently compromised owing to previous trauma, caries, endodontic therapy and failed restorations. Destructive invasive treatment options are likely to weaken the residual structure of the tooth. This can reduce the prognosis and challenge the long-term viability of the tooth, thereby initiating further prosthetic predicaments. This paper discusses modern approaches to the treatment of discoloured teeth. The importance of preventing and eliminating the potential for discoloration will be highlighted. The paper will include a detailed technical account on the application of the inside/outside bleaching technique, with several clinical examples.**

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Clinical Relevance: **The inside/outside bleaching technique offers multiple benefits to patients and practitioners when considering the options for a discoloured non-vital tooth.**

The presence of an unsightly discoloured tooth may be of great concern to some patients and lead them to seek professional dental advice and/or treatment. The aesthetic improvement of a patient's smile can have a profound affect on the patient's confidence and oral health,[1,2] and an improvement in oral health can significantly contribute to total well-being.[3]

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Noticeable discoloration of teeth can be a physical handicap that impacts on a person's self-image, self-confidence, physical attractiveness and employability.[4]

A number of techniques have been developed to manage the problem of a single pulpless discoloured tooth. The aim of this paper is to discuss inside/outside bleaching and to compare the merits and problems of different techniques.

Diagnosis

An accurate diagnosis allows the formulation of the optimal treatment plan. In order to establish the diagnosis, it is necessary to obtain a full history and perform a comprehensive clinical examination that should be supported by appropriate special investigations. A methodical approach will ensure that the chance of failure is reduced and that any consequence of possible failure is minimal. Ideally, the treatment option chosen should provide a predictable result and be the most beneficial and cost-effective one for the individual patient.

The most common cause of discoloration in non-vital teeth is the presence of pulpal haemorrhagic products. The discoloration seen is thought to be due to the accumulation of the breakdown products of haemoglobin or other haematin molecules[5] from the pulp, and commonly follows trauma. Discoloration can also be seen after endodontic intervention. It has been reported that 10% of patients are unhappy with the appearance of their tooth following root canal therapy.[6] Patients frequently ask 'Will my tooth go 'black' now that it has been root treated?' Restorative materials may contribute to the discoloration. It is known that a number of the materials used during endodontic therapy, such as silver-containing sealants and points, polyantibiotic pastes, eugenol and phenolic compounds may cause darkening and staining of the root dentine.[7] The migration of tin ions from amalgam restorations may also contribute to discoloration. In the majority of cases, it could be said that it is inappropriate management, choice of techniques, or the placement of inappropriate materials that are responsible for the discoloration.

Figure 1 (a). *A non-vital root-filled central incisor tooth that has discoloured.* ***(b)*** *The tooth was whitened using the inside/outside bleaching.*

THE INSIDE/OUTSIDE BLEACHING TECHNIQUE FOR MANAGING DISCOLOURED ROOT-FILLED TEETH

This technique was originally described in the American literature by Settembrini *et al*.[8] and modification of the technique was later described by Liebenberg.[9]

In essence, the bleaching gel is placed on the internal and external aspects of the discoloured root-filled tooth. The access cavity is left open during treatment so that the 10% carbamide peroxide can be easily and regularly changed. A custom-made bleaching tray keeps the bleaching agent in and around the tooth.

Discoloured root-filled teeth can be successfully managed with the inside/outside bleaching technique. The majority of cases can be successfully managed using the technique described below and without the need for pre-bleaching endodontic revision (Figures 1a and b). If there is concern about the endodontic status, revision of the root filling may be required prior to commencing the bleaching (Figures 2a-g).

Patient Selection and Pre-operative Preparation

It should be noted that it is necessary to follow the standard 10% carbamide peroxide external night-guard bleaching protocol:

- Make and record the diagnosis.
- Check the periapical status on radiographs.
- Check that the root-filled tooth is asymptomatic and satisfactorily obturated with no evidence of periapical pathology. If in doubt, consider endodontic revision prior to commencing bleaching.
- Record the pre-operative shade.
- Assess patient compliance and reliability in returning for closure of the access cavity.
- Discuss the treatment options.
- Inform the patient that existing restorations may not bleach and post-bleaching they may appear different from the surrounding tooth tissue. The patient should be warned of this and the fact that these restorations may require replacement. A diagrammatical note of those restorations should be made and given to the patient.
- Check whether the patient is allergic to peroxide or plastic.
- Check whether the patient is pregnant or breast-feeding.
- Provide the patient with verbal and written instructions.
- Make contemporaneous notes recording that the above has been carried out

Accurate Diagnosis

- Know what you are attempting to bleach as not all discoloured teeth will be as amenable to the bleaching technique as non-vital teeth (e.g. those with tetracycline staining or amalgam migration).

Bleaching Tray

- Take an alginate impression and construct an appropriate bleaching tray. Design the tray so that there are palatal and labial reservoirs for the target tooth, and so that the tray over the adjacent teeth is cut back to avoid the placement of the bleaching gel onto the unaffected teeth (Figure 3).
- Check the bleaching tray for comfort and fit.

Endodontic Preparation

- Remove the access cavity restoration to allow thorough cleaning of the whole pulp chamber (including the pulp horns) with ultrasonic instrumentation.
- Remove the coronal aspect of the gutta-percha root filling to 2–3 mm below the cemento-enamel junction. This can be easily and safely carried out with a heated plugger. This provides space for the placement of a protective barrier over the root filling. This barrier should prevent bacterial ingress around the root filling and prevent the percolation of hydrogen peroxide into the periodontal tissues. Glass ionomer cement, zinc phosphate or zinc polycarboxylate can be used for this seal (Figure 2h).
- Ensure that the pulp chamber is free of root-filling materials.

Patient Instructions

- Insert the tip of the bleaching syringe into the access cavity of each root-filled tooth and fill the cavity with the 10% carbamide peroxide.
- Load the appropriate reservoir within the tray with a pea-sized amount of the 10% carbamide peroxide (Figure 2i).
- Insert the tray over the teeth and remove the excess gel as necessary with a finger, tissue or soft toothbrush. Rinse gently and do not swallow.

Bleaching Protocol

- The gel should be changed inside the tooth and within the tray every two hours and the tray containing the gel should be worn overnight.
- After the bleaching session the patient should clean the access

Case Report

This 18-year-old male was concerned about the appearance of his discoloured upper left central incisor. When the patient was 12 years of age the tooth suffered a subluxation injury, subsequently lost vitality and was root treated. This case report illustrates the management of this discoloured tooth utilizing the inside/outside bleaching technique. Prior to bleaching, endodontic revision was provided in this case as there was clinical and radiographic evidence of endodontic failure.

Figure 2. (a) *Pre-operative labial view of 11. Note the blue-grey discoloration concentrated in the cervical two-thirds of the crown.*

Figure 2. (b) *Pre-operative palatal view of 11. Note the discoloration around the margins of the leaking composite restoration.*

Figure 2. (c) *Pre-operative radiograph of 11. There is evidence of a sub-optimal root canal filling and a 6mm diameter periapical radiolucency. Clinical examination revealed the presence of a firm and tender apical swelling in the buccal sulcus. A decision was made to perform endodontic revision prior to commencing the bleaching.*

Figure 2. (d) *Removal of the access cavity restoration revealed a heavily contaminated pulp chamber. Such an environment is not conducive to the placement of well-bonded, acid-etched composite restorations. This probably accounted for the staining around the restorative margins due to the microleakage as seen in Figure 2b.*

Figure 2. (e) *The contaminated gutta-percha point was removed from the canal. Note the extent of contamination and debris.*

Figure 2. (f) *The access cavity was modified in order to gain complete access to the pulp chamber, including the pulp horns. The chamber and coronal aspect of the root canal was meticulously debrided with ultrasonic instrumentation. The canal was irrigated with copious amounts of 5% sodium hypochlorite and re-prepared. The tooth was dressed with non-setting calcium hydroxide for a fortnight prior to definitive obturation with gutta-percha and canal sealer.*

Figure 2. (g) *Post-operative periapical radiograph of the definitive root canal obturation.*

Figure 2. (h) *The excess gutta-percha was cut back to beyond the cemento-enamel junction (CEJ) and a polycarboxylate protective barrier was placed to seal the root canal filling.*

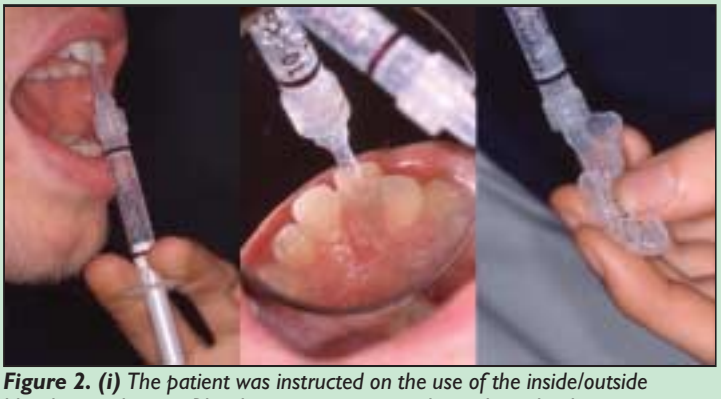

Figure 2. (i) *The patient was instructed on the use of the inside/outside bleaching technique. Bleaching agent is syringed into the palatal access cavity and also into the bleaching tray.*

Figure 2. (j) *At the two week review the tooth was asymptomatic and there was a marked improvement in the colour. The tooth was provisionally restored with zinc polycarboxylate cement. A week following cessation of bleaching the tooth was definitively restored with a composite restoration.*

cavities out with a toothbrush or single-tufted brush. Injection of the viscous bleaching gel within the cavity will naturally remove any food debris throughout the day.

- Unlike vital bleaching, there is no limit to how many times the material can be changed as the patient is highly unlikely to experience sensitivity. The more often the agent is changed, the more rapidly the bleaching will occur.

Reassessment

- The patient should be instructed to cease the bleaching procedure when he/she is happy with the degree of lightening. The patient should be reviewed at 2–3 days to reassess the degree of lightening and to avoid prolonged exposure of the access cavities. Owing to the frequency at which the bleaching agent can be changed, the desired result will usually be achieved rapidly (about 2–3 days).
- On completion of bleaching, the pulp chamber should be cleaned out thoroughly with ultrasonic instrumentation and provisionally restored with glass ionomer cement or zinc polycarboxylate (Figure 2j).

Definitive Restoration

- The definitive composite restorations should not be placed for *at least a week* after cessation of the bleaching process. This ensures that the enamel is free of any residual oxygen that would otherwise lead to air inhibition of the composite bond.[10]
- Following bleaching, the tooth may appear more translucent than the adjacent teeth owing to the reduced volume of dentine within the root-treated tooth. The 'body' of the tooth should be restored with a restorative material with moderate translucent properties (e.g. glass ionomer cement or dentine shades of composite resin). This will provide the tooth with a body colour and will greatly enhance the final aesthetic result.

Causes of Failure to Bleach

A frequent reason for failure of the target tooth to lighten is poor patient compliance. Good patient selection should minimize this as a problem. Failure by the patient to follow the instructions will lead to prolonged treatment time and the discoloration may remain. Prolonged treatment will mean that the access cavity is open for longer and it may be more appropriate to consider other treatment options. The presence of existing restorations, the incomplete removal of an access cavity restoration, or the insufficient removal of the coronal gutta-percha will hinder the penetration of the bleaching agent. Adequate extension of the bleaching tray at the cervical margins is necessary to hold the bleaching agent in this area for sufficient time.

Those cases that remain discoloured, despite good patient compliance, are commonly because of discoloration that is not of pulpal origin. This may be observed in discoloured non-vital teeth that have previously been restored with an amalgam restoration in the palatal access cavity. The bleaching agent will readily breakdown the discoloration molecules that originate from the pulp, but metal ions that have migrated from the amalgam into the adjacent tooth structure are more resistant. All of the old amalgam must be removed as otherwise it can produce a green tinge, but this tends to occur only occasionally with prolonged bleaching.[11] Bleaching should still be considered as the initial treatment of choice as it may produce the desired aesthetic result in the patient's perception. If not, the new lightened baseline colour will improve the aesthetic predictability of veneers.

THE OTHER BLEACHING TECHNIQUES FOR MANAGING THE DISCOLOURED NON-VITAL TOOTH

Many different non-vital bleaching

Figure 3. *A bleaching tray used with the inside/outside bleaching technique. The upper right central incisor is undergoing bleaching treatment. Note how the tray is cut back from the upper right lateral incisor to avoid bleaching to this tooth during treatment.*

techniques have been described. The 'walking bleach' technique was described in 1961 by Spasser.[12] This technique involved placing a paste of sodium perborate mixed with water into the pulp chamber of a non-vital tooth and sealing it in. Later, in 1967, Nutting and Poe[13] described a similar technique using a paste of sodium perborate mixed with hydrogen peroxide. Sodium perborate mixed with water has been reported to be as effective as when it is combined with hydrogen peroxide.[14,15] Techniques incorporating the use of heat and/or light[16] have also been suggested. Home bleaching with 10% carbamide peroxide gel has been advocated.[17]

CONCERNS ABOUT BLEACHING

The main areas of concern with regards to bleaching are over any possible toxicity, damage to the hard dental tissues, tooth resorption and sensitivity.

A comprehensive appraisal of the literature relating to the safety and effectiveness of 10% carbamide peroxide under the supervision of a dentist confirms that it is completely safe from the viewpoint of general toxicity, risk of mutation and risk of carcinogenesis.[4] There are conflicting reports in the literature as to whether 10% carbamide peroxide has a detrimental effect on the hard dental tissues. The evidence seems to indicate that the effect on the surface texture.[18,19] and wear resistance[19,20] of human enamel is minimal and reversible with time.[21] The more significant factors relating to enamel changes are a low pH of hydrogen peroxide,[22] higher concentrations of carbamide peroxide[23] and the bleaching system used.[21,24]

Of frequent concern to dentists is the possible association between the bleaching of non-vital teeth and the induction of resorption. Resorption can occur following trauma to a tooth or teeth. The probability of developing resorption, and the severity of the resorption, is related to the type of injury, the force involved, whether the tooth was displaced from its socket and in which direction. The cases in which internal bleaching has been associated with invasive cervical resorption are invariably those cases where heat,[25] light and *very* high concentrations of hydrogen peroxide (e.g 30%) have been used,[26] together with a previous history of trauma.[27] Even with a thermo-catalytic technique and 'walking bleach' procedures, the incidence of developing invasive cervical resorption has been reported to be relatively low. Figures of 3.9%[27] and 6.8%[28] have been reported in bleached non-vital teeth with no history of trauma, and 2%[25] and 7.4%[27] in bleached non-vital teeth with a history of trauma.

The concentration of hydrogen peroxide released when 10% carbamide peroxide is used is significantly less than with the peroxide agents used in earlier techniques. Sodium perborate releases 10% of its volume as hydrogen peroxide, i.e. usually about 7% hydrogen peroxide. When sodium perborate is mixed with 6% hydrogen peroxide this produces 17.8% hydrogen peroxide and, if mixed with 12% hydrogen peroxide, produces 25.6% hydrogen peroxide. Ten per cent carbamide peroxide releases 3.5% hydrogen peroxide. This is less than half the concentration of hydrogen peroxide released by sodium perborate alone. Resorption has only been reported in cases where the concentration of 30% hydrogen peroxide has been used in combination with heat. This concentration is nearly nine times greater than 3.5% hydrogen peroxide released by 10% carbamide peroxide.

There appears to be no evidence in the scientific literature reporting the development of invasive cervical resorption when only low concentrations of hydrogen peroxide (i.e. 3.5% released from 10% carbamide peroxide) are used and when hydrogen peroxide is used without heat.

It is highly unlikely that patients will experience the same degree of sensitivity sometimes associated with vital night-guard bleaching, as the target tooth is non-vital. However, it has been shown that patients can still experience gingival and tooth sensitivity when a bleaching tray is used with a placebo bleaching agent.[29] The fit and extension of the tray should be checked as an ill-fitting tray may cause sensitivity.

THE BENEFITS COMPARED WITH THE OTHER BLEACHING TECHNIQUES

There is little scientific evidence reported specifically on the inside/outside bleaching technique or studies comparing this method with the other bleaching techniques.[30] The majority of the literature relates to case studies. Further research, preferably from randomized controlled clinical trials, is necessary to confirm scientifically that this technique has distinct benefits over other bleaching techniques.

It is easy to see the potential benefits of using the inside/outside bleaching technique for non-vital cases compared with the external night-guard bleaching technique. The removal of the access cavity restoration allows evaluation of the pulp chamber, as in many cases a substantial amount of contamination and discoloration may originate from the coronal aspect of the tooth. Bleaching agent will not penetrate restorative filling materials, so removal of the palatal restoration allows the bleaching agent to get to where it is needed. A greater surface area is bleached at a time as the agent is applied to the external and internal aspects of the discoloured tooth.

The potential benefits over the walking bleach technique is that there is no temporary access cavity restoration that has the potential to be lost from the

Figure 4. (a) *A vital central incisor tooth, with evidence of pulpal sclerosis, which has discoloured.* ***(b)*** *The tooth was whitened using the external night-guard bleaching technique. The patient has a high lip line so masking the discoloration with other restorative techniques may have been less predictable.*

access cavity because of the oxygen liberated from the bleaching agent trapped inside. The degradation rate of carbamide peroxide during the bleaching process is exponential and, after two hours, only 50% of the active carbamide peroxide is still available.[31] The efficacy of the bleaching process is maximized as the carbamide peroxide can be changed every two hours.

The use of 10% carbamide peroxide without the application of heat is intended to reduce the potential for the induction of cervical resorption that is associated with other bleaching techniques. The treatment time is shorter than the walking bleach technique so the contact time of the hydrogen peroxide with the peri-cemental tissues is reduced. The concentration of released hydrogen peroxide is lower than that used with the walking bleach technique or the thermocatalytic technique. As the bleaching is carried out at home, the patient is very much responsible for the degree of lightening they want for their tooth.

The potential disadvantage of this technique is that good patient compliance is necessary. The patient must be relatively dextrous to place the bleaching agent within his/her tooth. The access cavity must remain open during treatment but this should not be of concern when this technique is used for a short period of time in a motivated patient. As long as the patient is caries free, aware of his/her diet, and capable of using a single-tufted brush or probe to clean the cavity, one should not be overly concerned about any potential for caries within 2–3 days. The presence of a restoration to seal the gutta-percha root filling, and the fact that the 10% carbamide peroxide is bactericidal itself, will minimize the potential of coronal leakage and endodontic failure. Patients may occasionally complain of food packing in the access cavity. Patients with good manual skills may be instructed to place a cotton pellet within the access cavity in between bleaching episodes and during eating. This must then be removed prior to recommencing bleaching.

The external (only) night-guard bleaching technique could be used in discoloured tooth cases where there is concern about contamination of the access cavity restoration or for 'topping up' the lightened non-vital tooth in the future. However, this is not as effective as the inside/outside bleaching technique.

In cases where a localized discoloured tooth is vital (e.g. pulpal obliteration or contusion injuries) there is no need to root treat the tooth electively (Figure 4) and standard external night-guard bleaching can be used in these cases.[32]

DISCUSSION OF THE OTHER TREATMENT OPTIONS

There are many treatment options and combinations of options available to manage the discoloured tooth. The protracted problems associated with the regulations of bleaching products in the UK has contributed to the clinical and ethical dilemmas in deciding which option is the most appropriate for an individual patient.

The options for managing the discoloured, pulpless, non-vital tooth can be summarized as follows:

- Monitor and Review.
- Bleaching:
  1. Inside/Outside Bleaching Technique with 10% carbamide peroxide.
  2. Walking Bleach Technique:
     i. Carbamide peroxide;
     ii. Sodium perborate and water;
     iii. Sodium perborate and hydrogen peroxide.
  3. External Bleaching – Chairside Bleaching or Home Bleaching or a combination of both.
- Restorative:
  1. Veneer – Direct composite or indirect laboratory constructed composite or porcelain veneers;
  2. Crown – with or without a post;
  3. Extraction and prosthetic replacement.

Monitor

Some patients, especially with a low lip line, may accept a mildly discoloured tooth. However, monitoring of the situation may be unacceptable to many patients. The presence of discoloration may indicate that restorative failure has occurred (e.g. owing to endodontic or restorative leakage), and suggest that appropriate intervention is necessary.

Restorative

Placement of a veneer on a significantly discoloured single tooth is unlikely to provide a satisfactory aesthetic result. The cervical margin is the most difficult area to mask and this may be of most concern in an aesthetically driven patient with a high lip line. In order to mask the discoloration, it may be necessary to construct a relatively thick veneer with an initial opaque layer.[33] This involves greater cervical tooth preparation in order to provide an adequate bulk of porcelain in this region and to prevent a poor emergence profile. The enamel is relatively thin at the cervical margin, so any tooth reduction

in this region is likely to expose a significant amount of discoloured dentine and may make the situation worse. It is difficult to harmonize a thick, possibly opaque, veneer on a discoloured tooth with an adjacent natural tooth that has different translucent, reflective and refractory properties. Porcelain veneers have a relatively good survival rate with a failure rate of approximately 3% per year.[34,35] However, once a patient has embarked on restorative treatment, the tooth is likely to be involved in further preparation and restorations. Despite the reported favourable survival rate of veneers, it is appropriate to note that 'survival' does not necessarily relate to 'aesthetic satisfaction'. Many reports do not include this important information, in spite of the fact that many veneers are placed to improve the appearance.

It has been reported that the preparation and impression standards for veneers provided within the UK are less than satisfactory.[36] This lack of predictability has been suggested as a reason for the reduction in the number of porcelain veneers prescribed in England and Wales. In the year 1992–93, a total of approximately 150,500 porcelain veneers were claimed under the NHS General Dental Service in England and Wales. This figure steadily reduced over the next decade by nearly 50% to 83,000 in the year 2001–02.[37] The concern is that, because of the real and imagined difficulties with veneers, practitioners may be prescribing more destructive techniques, such as full coverage restorations, as they may feel that these are more predictable, easier in terms of aesthetic 'blending', and possibly better financially compensated under the NHS General Dental Services.

The dental profession is slowly accepting that the destructive restorative procedures, involved in the placement of full coverage restorations, have significant biological consequences and problems. The placement of a full coverage restoration in an attempt to provide a predicable and 'permanent' solution for the discoloured tooth may not provide a favourable 'permanent' long-term clinical or aesthetic outcome. Restorations used to mask the discoloration do not address the remaining discoloration within the root dentine. Gingival recession in the future may lead to the exposure of the restorative margins and the discoloured root dentine. The completion of gingival maturation around the crown of an adolescent patient may result in a similar predicament. There is the potential for the greyness of a metallic post to shine through the cervical aspect of the tooth and cause cervical 'grey-out'. In order to improve the aesthetics, it may be necessary to replace the restoration and extend the restorative margins more cervically. The conical form of a root means that further tooth preparation in a cervical direction will be on a smaller circumference of root. In order to produce a suitable preparation form, it is necessary to remove an increasing amount of precious coronal tooth tissue. This will result in an increased crown-to-root ratio and a reduced bulk of root dentine. It must be remembered that there is the potential for gingival recession to occur again in the future.

The profession also accepts that dental restorations do fail and are increasingly communicating this to patients from the outset. It is likely that numerous replacements of restorations will be required in a young/middle-aged patient's lifetime. The more conservative the technique used at the start, the more options will be available if and when failure occurs later in life. A more conservative approach utilizing bleaching techniques and/or adhesive principles will often produce a very satisfactory outcome and also ensure that sufficient tooth structure remains for any subsequent restorations.

PREVENTION OF TOOTH DISCOLORATION

Ideally, one should attempt to prevent the discoloration from the outset, as prevention is better than cure. The practitioner has multiple opportunities during the management of a potentially discoloured non-vital tooth to prevent this occurring. A systematic and meticulous approach will help to prevent and minimize problems in the future.

- **Optimal management and follow-up of trauma cases** – to help ensure that pulpal health is maintained. To instigate endodontic therapy as soon as necessary in order to minimize the possibility of discoloration from the dying pulp.
- **Adequate access** – in order to gain good access to the pulp canal system. Ensuring that no pulpal remnants are left in the pulp horns of the chamber.
- **Ultrasonic instrumentation** - to ensure complete debridement of the pulp chamber, *especially* the pulp horns. Entry into the pulp chamber with an ultrasonic tip permits safer canal localization, with less chance of perforation when compared with rotary instruments.
- **Copious irrigation** – sodium hypochlorite is the irrigant of choice. Its bactericidal and tissue-degrading properties ensure that pulpal remnants are removed as far as possible from the root canal system. Owing to the complexity of the root canal system, a chemo-mechanical approach is necessary to maximize the efficiency of canal debridement.
- **Good endodontic preparation and obturation techniques** – to minimize coronal or apical leakage.
- **Adequate coronal gutta-percha removal** – to avoid discoloration of the tooth owing to shine-through of the gutta-percha and to allow adequate penetration of the bleaching agent to the cervical margin. Removal of the carbon deposits of the heated and burnt gutta-percha with ultrasonic instrumentation is necessary. Adequate reduction also allows for an optimal height of the coronal access restoration to be placed and minimizes possible microleakage.
- **Suitable access cavity restorative materials** – amalgam is unsuitable as this can lead to discoloration. A well-placed tooth-coloured material such as composite is the restoration of choice. An optimal technique for

placement is required in order to avoid microleakage, discoloration and loss of the restoration, secondary caries or endodontic failure

- **Monitoring and regular review** – so that intervention can be instigated as soon as needed.

DISCUSSION

There are many options for managing discoloured teeth. However, there is a marked contrast in the amount of tooth structure that has to be removed to provide a similar aesthetic outcome. The prescribing pattern of dental procedures is likely to be influenced by many factors. It is essential to discuss all of the possible management options with patients, irrespective of the method of remuneration. Patients are then in the position to make an informed decision about how they wish to have their clinical situation managed. If the patient is fully informed of the advantages and problems of each treatment option, they can then make the decisions rather than 'the system' making it for them.

Patients have the right to have all the options discussed and should be fully informed of the possible long-term outcome. When considering the options for their discoloured non-vital tooth, it is very possible that a fully informed patient will opt for inside/outside bleaching.

When considering remuneration, it could be suggested that a bleaching technique that provides the same patient perceived outcome as a crown should be worth the same. Some might argue that a technique that is conservative of tooth tissue and is less invasive for the patient should, in fact, be worth more.

CONCLUSION

The inside/outside bleaching technique is a conservative, safe and effective technique for the management of discoloured teeth. Many experienced operators would regard it as the treatment of choice when confronted with this clinical situation. The treatment objectives are achieved quickly with little patient inconvenience. The main benefits are the retention of precious tooth tissue and avoiding the risks associated with tooth preparation and post preparation. The technique is very cost-effective when compared with invasive restorative procedures, especially when laboratory fees have to be considered. If, for any reason, the bleaching fails to provide the final desired result, the new baseline colour can facilitate the success of less aggressive adhesive techniques such as veneers.

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