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# DENTAL HEALTH

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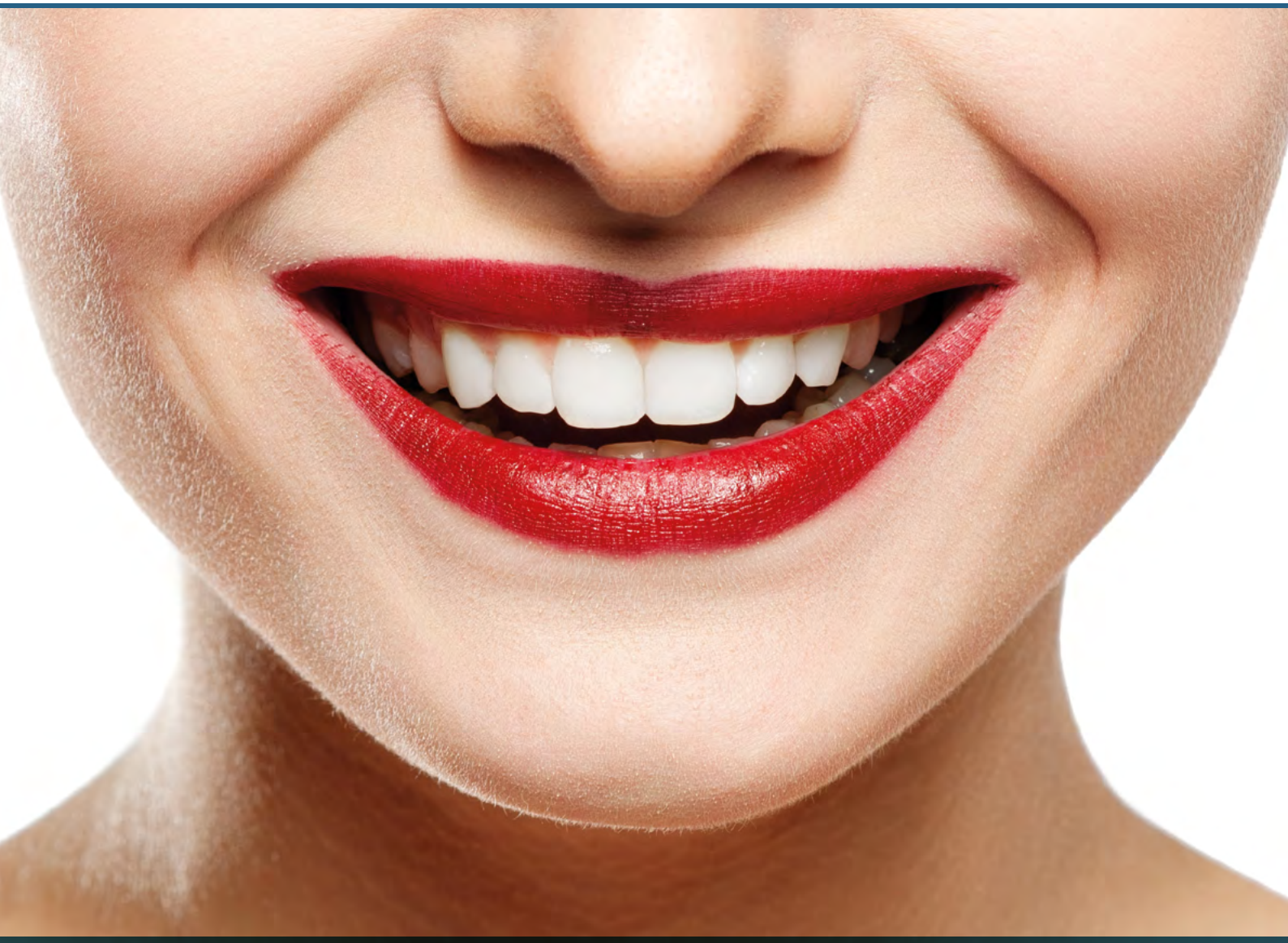

AN IMPORTANT ROLE FOR **DENTAL HYGIENISTS?**

**WHITENING:** BEST PRACTICE FOR ACHIEVING RESULTS

**TOOTHWEAR:** A REVIEW OF AETIOLOGY AND MANAGEMENT

# BEST PRACTICE FOR TOOTH WHITENING: ACHIEVING RESULTS

Diane Rochford

Tooth whitening has become a common elective dental procedure and an integral part of dental practice in the UK today. Over the past ten years the demand for a 'Hollywood' smile has been steadily increasing.The use of peroxide based materials, such as hydrogen peroxide for in-surgery and at home use, and carbamide peroxide for home whitening, have proven to be safe and effective when the treatment is supervised by a dentist.[1]

Delivering safe and appropriate treatment ensures that patients attain good and consistent results. The aim of this paper is to demonstrate how the successful implementation of a tooth whitening programme, and protocols which follow best practice, can achieve the desired results for a patient with moderate tetracycline staining.

## Case study

During a new patient visit a 52-year-old female enquired about the possibility of whitening her teeth. She described how the colour of her teeth had been a major concern for some time, along with her receding gums, tooth wear and chipping. The dentist noted these concerns and explained she would pay special attention to the discolouration, recession and tooth wear during the oral examination (Figure 1).

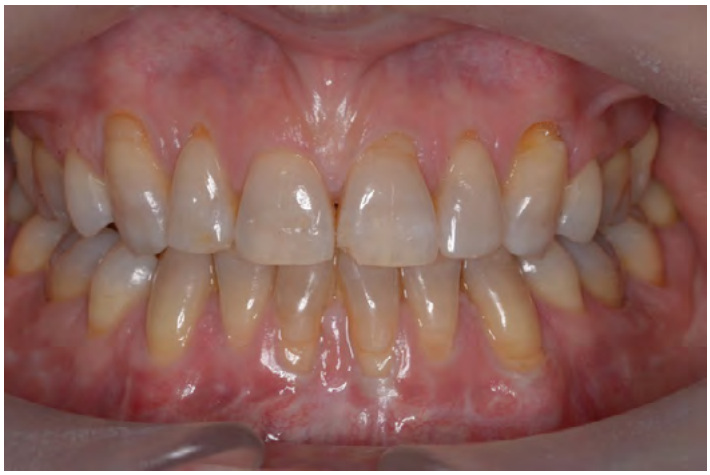

FIG 1. PATIENT'S TEETH AT EXAMINATION

### *Examination*

A requirement of the 2012 EU legislation is that *a dentist should carry out an examination to determine a patient's suitability, ensuring there are no risk factors or oral pathology*.[2] It is also essential that detailed and contemporaneous records are maintained.[3] However, currently there is very little documented in the literature as to what constitutes an 'appropriate examination'.

### *Medical history*

Patients should complete an up to date medical history prior to any whitening treatment.

Specific to tooth whitening, the clinician should consider:

- Allergies: Potential allergies to plastics (home whitening trays), ingredients in the whitening gels such as glycerine, flavourings or preservatives must all be documented and checked.[4]

- Medications: Antidepressants, antihistamines and diuretics are some medications that can cause xerostomia.[5] They should all be recorded along with any current medications that could induce gingival overgrowth, such as anticonvulsants, calcium channel blockers and immunosuppressants, such as cyclosporine.[6]

  Tetracycline based antibiotics, such as minocycline, are frequently prescribed for acne and other skin conditions.[7]

- Smoking: Patients who smoke should receive smoking cessation advice.[4]

- Pregnancy: There is a lack of evidence concerning the effects on the developing foetus, and it is currently recommended that tooth whitening is not carried out during pregnancy or whilst the mother is breastfeeding.[7]

In this particular case, the significance of tetracycline based medication documented in the patient's medical history helped to determine the cause of her discolouration.

### *Intra-oral examination*

The patient's oral health was thoroughly assessed evaluating her periodontal health, condition of the teeth and restorations present. In some cases radiographs may be appropriate to determine areas of decay, periapical radiolucencies or internal resorption.[4]

A series of photographs was taken during the initial examination, and subsequently repeated throughout the treatment. This is useful as patients often forget how discoloured their teeth were initially. Tracking the patient's progression is essential to provide clinicians with reliable records and evidence should a complaint or legal issues arise.

## Discolouration

An integral part of the examination is the correct diagnosis of tooth discolourations, which determine the type of treatment recommended.

| Type of discolouration | Cause |
|---|---|
| Yellowing of enamel | Genetics or ageing |
| Extrinsic stain | Tea, coffee, red wine and nicotine |
| Orange, brown and green staining | Chromogenic bacteria associated with poor oral hygiene |
| Small white opaque flecks | Mild fluorosis |
| Intense white opaque spots or brown patches | Moderate and severe fluorosis |
| White spots | Enamel hypo mineralisation due to premature or low weight birth, chronic infections or an elevated temperature. |
| Yellow to grey with no banding | Mild tetracycline stain |
| Yellow, brown to dark grey | Moderate tetracycline stain |
| Blue grey or black with banding | Severe tetracycline stain |
| Single yellow tooth | Trauma or internal and external resorption |

Although a diagnosis is the dentist's responsibility, it is important that dental hygienists and therapists can identify the various discolourations when a patient enquires about tooth whitening treatment (Figures 2 -5). [4,7]

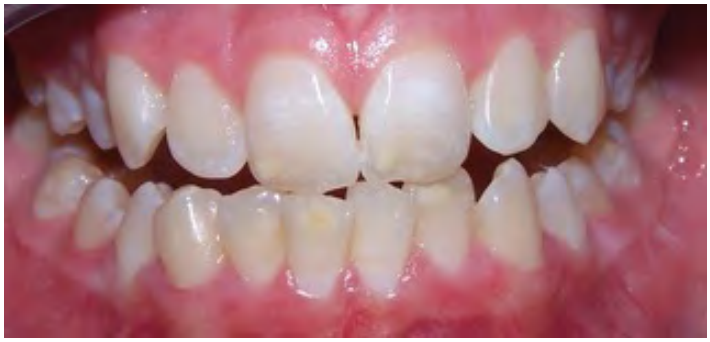

FIG 2. MODERATE FLUOROSIS

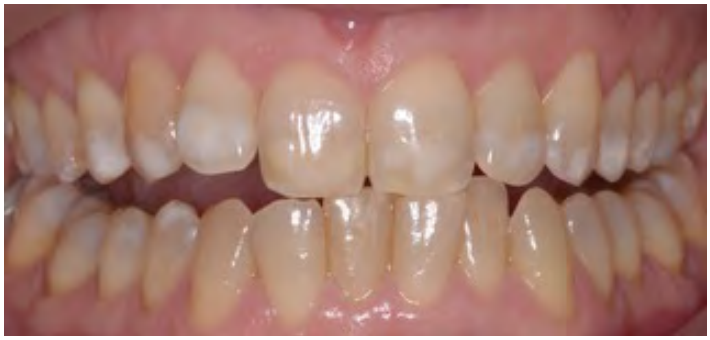

FIG 3. WHITE SPOTS

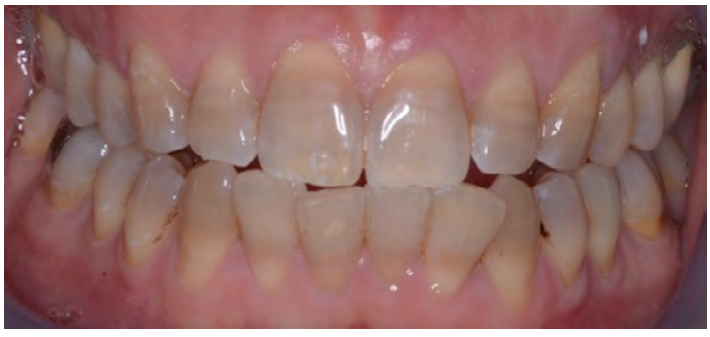

FIG 4. MODERATE TETRACYCLINE STAINING

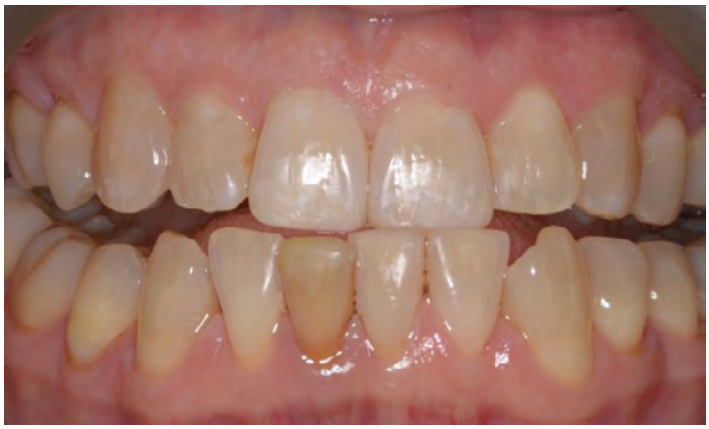

FIG 5. SINGLE YELLOW TOOTH

The initial discussions with the patient focused on:

- Expectations: Her long-term goals for her whole mouth, not just her teeth and smile. Documenting this information provided a good starting point when discussing the final treatment plan and options for treatment. A patient whose expectations exceed the reality of what can be achieved often leads to disappointment.[4] Good communication between the clinician and the patient is essential to achieve realistic expectations.

- Initial shade: In this case the initial shade was evaluated by the dentist while reviewing the patient's medical history, which noted multiple previous courses of tetracycline and ensured an accurate diagnosis.

  Patients often enquire about tooth whitening at the end of their dental hygiene visit. With the removal of extrinsic stain, this is an ideal time to assess the baseline colour or determine any discolourations that are genetic, acquired or as a result of the ageing process.[7]

- Introduction to the treatment options: The advantages and disadvantages of the possible treatment options were discussed with the patient, her need for commitment to the treatment along with a brief explanation of the protocols that need to be followed for the treatment to be effective. Further treatment to attain optimal oral health and possible further aesthetic treatment post whitening was also discussed.[4]

Following the initial examination, the patient was scheduled for a new patient dental hygiene visit for appropriate evaluations, oral hygiene instruction and some initial instrumentation.

## *Treatment plan discussion*

All diagnosed treatment is based on the patient's individual therapeutic needs. The dentist had presented the findings of the examination and a full treatment plan to the patient, detailing the treatment options available to achieve optimal oral health. In this case, along with continued hygiene visits, tooth whitening treatment specific to tetracycline staining, buccal composites and incisal bondings were also required. Appropriate fees were discussed and the patient was given the opportunity to ask questions regarding all aspects of the treatment plan, allowing for informed consent.

A prescription was written in line with the GDC scope of practice which states that *tooth whitening carried out by a dental hygienist or therapist must follow a dentist prescription*.[8]

As with the examination, there is very little documentation of what the prescription should include and it therefore may be prudent to seek advice from indemnity companies and discuss with the referring dentist what you feel is an appropriate prescription.

# Treatment

## *Home whitening*

The safest, most effective treatment, providing the best and longest lasting results is 10% carbamide peroxide in custom made trays.[9] Due to the intrinsic nature of tetracycline staining, the research shows that more socially and aesthetically acceptable results can be achieved when treatment is carried out for an average of three to four months however, depending on the severity of the staining, it may take up to 12 months.[7] Based on the research and clinical evidence, the treatment prescribed for this patient was home whitening, with custom made trays, using 10% carbamide peroxide gel for an extended period of time, approximately four months.

Extra time was added to the hygiene visit to allow for upper and lower alginate impressions to be taken and the technician was instructed to make upper and lower bleaching trays.

A stipulation of the legislation is that *the first cycle of use must be carried out by a dentist or dental hygienist, or dental therapist under the dentist's direct supervision to ensure an equivalent level safety*.[8] The GDC and indemnity providers advise that it is appropriate for a dentist to be on the premises during the first use of the tooth whitening product, such as fitting of the trays and dispensing the gel.

## *Fitting the trays*

The trays were tried, ensuring a good and comfortable fit. A demonstration of how to safely apply the gel should be carried out, before the patient can practice applying the gel and seating the tray themselves.

In accordance with the legislation, the patient should receive *instruction* to ensure the treatment is carried out at home safely, deeming it necessary to demonstrate the safe application of the gel and then clearly explaining the treatment protocol to follow.

The patient was advised to start with the upper teeth first, wearing the trays at night for 2-3 weeks before starting with the lower teeth (Figures 6 and 7).[7,10]

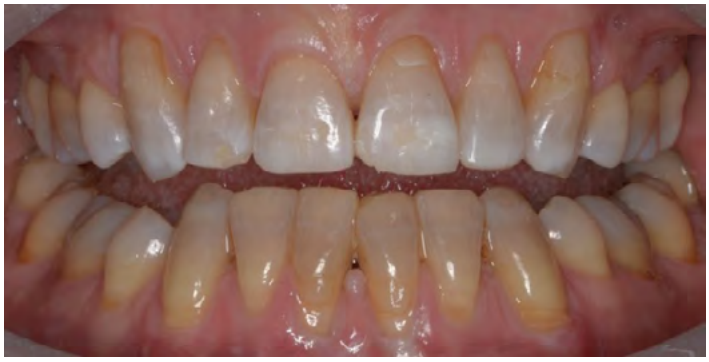

FIG 6. UPPER TEETH ARE LIGHTER THAN THE LOWERS, REASSURING THE PATIENT THAT THE TREATMENT IS WORKING EFFECTIVELY.

The concentration of tooth whitening gels prescribed by a dentist must contain, or release, up to 6% hydrogen peroxide or 16% carbamide peroxide, as defined by the legislation.[2] This applies to both home and in-surgery whitening products. In this case 10% carbamide peroxide was prescribed for the patient as higher concentrations are likely to cause more sensitivity and



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do not lessen the treatment time.[11] Since hydrogen peroxide is only active for 30-60 minutes and applied during the day it would take more days to achieve the same result as using carbamide peroxide which is active for 6 – 10 hours: carbamide peroxide is more effective for home whitening.[11]

## *Managing sensitivity*

Sensitivity is a result of the passage of peroxide solution through the enamel to the dentine and affects approximately 50% of patients.[11,12] Products containing 3-5% potassium nitrate have been shown to be effective. This is commonly found in desensitising toothpastes along with desensitising products provided by the various companies that manufacture the whitening gels. Protocols for effective management of sensitivity can off-set any apprehensions the patient may have.

Steps to follow:

- Use desensitising toothpaste when brushing before the treatment commences and throughout the treatment if required;
- Place the desensitising toothpaste (SLS free) in the whitening trays which should be worn for 10-30 minutes before and/or after whitening;
- Apply desensitising gel to the trays and wear for 30-60 minutes during the day.[13,14]

This patient was provided with written instructions to take home, along with a range of desensitising products, her trays and the whitening products. As a duty of care she was also encouraged to call the practice with any questions or concerns she may have once she began the treatment. A review visit was subsequently scheduled.

## *Review visits*

Typically, a review visit is a short appointment to *monitor* the patient's progress, answer any questions or concerns, dispense gel according to the prescription, record the shade and take photographs. Prolonged cases such as this where the patient has tetracycline staining, require encouragement as there are significant changes at the beginning which then start to slow as the treatment progresses.[10] The patient attended 3-4 weekly reviews until the treatment was complete.

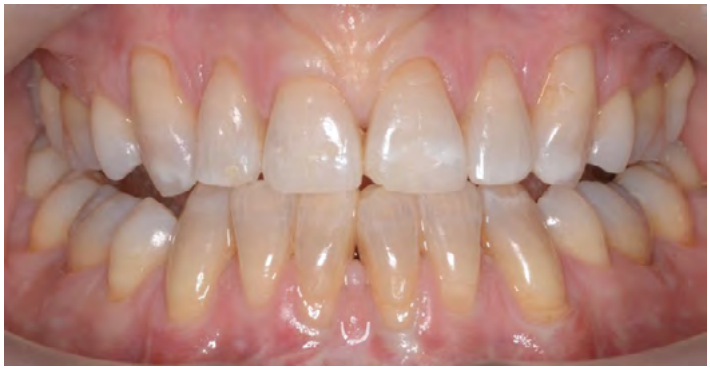

FIG. 7 WHITENING TREATMENT OF UPPER ARCH IS UNDERWAY AND ABOUT TO BEGIN LOWERS

# Would other whitening treatments work?

## *In-surgery*

In accordance with EU legislation 6% hydrogen peroxide is now used for in-surgery treatment. Some dentists offer this type of treatment at the manufacturer's recommendation as a 'kick start' or a 'boost' before or after home whitening to achieve acceptable results. Patients often think that carrying out the treatment in the surgery is less time consuming, they see an immediate change and it reduces their commitment to home whitening. Shade changes are recorded soon after the resin barrier/isolation has been removed, the teeth are dehydrated, giving the illusion of whiter and lighter teeth. The true shade is usually seen on the 3rd day following treatment.[9] Multiple visits are required to attain a similar result as home whitening.

For the patient in this case study with tetracycline stain, in-surgery whitening would not be appropriate as the 6% hydrogen peroxide is not able to penetrate the dentine sufficiently during the one hour sessions.[10]

## *Over the counter products (OTC)*

Products containing or releasing 0.1% hydrogen peroxide are permitted for sale over the counter in the UK and Europe. A review of the literature available for a variety OTC products revealed that whitening toothpastes, floss and toothbrushes are superficial stain removing agents.[15] Rinses and paint on gels may produce a whitening effect, however they are clinically insignificant, whilst whitening strips could achieve results similar to home trays. However all the studies were financed by the manufacturers and based on short term evaluations. Long term, independent clinical trials are required to validate their effectiveness. The low concentrations of hydrogen peroxide released would render the product ineffective on tetracycline stain, therefore would not be recommended as a viable treatment method.

The same principles are applied for all patients undergoing tooth whitening treatment.

The table below indicates the duration of treatment according to the diagnosed discolouration.

| Type of discolouration | Duration of treatment |
|---|---|
| Yellowing of enamel | 2 - 6 weeks |
| Extrinsic stain | 2 - 6 weeks |
| Orange, brown and green staining | 2 - 6 weeks |
| Fluorosis | 2 - 6 weeks, longer depending on severity and colour of the discolourations |
| White spots | 2 - 6 weeks, longer depending on severity |
| Mild tetracycline stain | 3 – 4 months (average) |
| Moderate tetracycline stain | 3 – 4 months (average) |
| Severe tetracycline stain | 4 -12months |

Taken from Haywood (2007) & Newson, *et al*. (2008)[7,11]

The age of the patient should be considered: a younger person generally attains an acceptable result in less time than an older person.

The patient completed the whitening treatment, for which all her expectations were met, if not exceeded. At two to three weeks post whitening the shade had settled, the composite bondings were placed and final photographs taken.

Continuing with four monthly hygiene visits to maintain optimal oral health, the shade is assessed periodically. Before topping up any whitening the trays must be checked and the gel dispensed according to the dentist's prescription. Three years on from the initial treatment the patient is still very happy with the shade of her teeth and the improved aesthetics, so no topping up has been necessary (Figure 8).

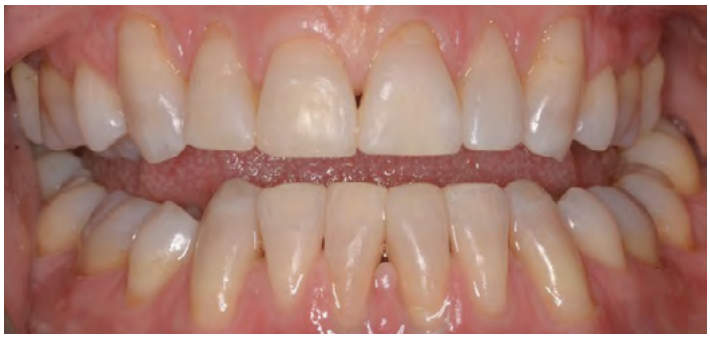

FIG. 8 FINAL RESULT WITH COMPOSITE BONDINGS FOLLOWING WHITENING

## Conclusion

It is important that all members of the dental team are familiar and comply with the current EU Legislation. Full and detailed explanations of the legislation are available from indemnity providers and the GDC. Revision of these documents during a team meeting maybe appropriate to ensure practice protocols are in-line with the guidance.

Training and education are essential for all members of the team, however it is recommended by indemnity providers that those members of the dental team who are permitted in the GDC Scope of practice, and provide treatment, should undertake more formal education, learning and understanding the theoretical and clinical aspects of the subject. Designing an evidence based whitening programme and protocols ensures best practice, predictable and successful whitening.


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Diane Rochford practices as an extended duties dental hygienist and teaches with Dr Greenwall on her dental bleaching courses in the UK and overseas. Diane also runs her own courses specifically for dental hygienists and therapists. She has written and published articles for various dental journals including *Dental Health* and *Primary Dental Journal*. Diane has been a BSDHT member since qualifying, she is currently the BSDHT North West Region group representative on Council.

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1ST APRIL FOR THE MAY ISSUE

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