

Tooth whitening and orthodontics: The icing on the cake

By Dr Yassine Harichane, Canada

Tooth whitening is a therapeutic procedure that provides the final touch to orthodontic treatment. The objectives in orthodontics are both functional — restore masticatory function, swallowing, breathing and phonation—and aesthetic—balance and harmonise the face, and improve the smile. To achieve the last goal, various criteria are taken into account: tooth alignment, shade and shape, and even the shape of the lips. All these parameters are important; however, the most visible aspect of the smile is the dental shade. One can restore function, correct an occlusal dysfunction, close a diastema or even inject dermal fillers, but if the teeth are left yellowish, the smile remains unattractive. Tooth whitening is a therapeutic solution that restores the natural lustre of the teeth by removing organic stains, which means it is not tooth bleaching. For the orthodontist, there are only advantages. It is easy to perform, non-invasive, requires no anaesthesia and produces no irreversible destruction of the tooth. This procedure is rewarding for the dental team, since the dental assistant can be involved in all steps of the process. It is suitable for the majority of patients. Tooth whitening is a cost-effective technique that requires little material and time, and is efficient if the practitioner is rigorous. Finally, the main concern for patients, it is painless.

How does it work?

The enamel shade can change because of tobacco stains, food or trauma, for instance. The protocol involves the application of a tooth whitening product, such as hydrogen peroxide, carbamide peroxide or sodium perborate. The last one must be avoided, since it is classified as repro-toxic. The first two are efficient and safe. The difference between them lies in the fact that hydrogen peroxide is the active ingredient and carbamide peroxide is a derivative that degrades into hydrogen peroxide. This release is progressive and slow. This process is suitable when the practitioner desires a soft and progressive effect. Regarding dosage, the percentage provided by the manufacturer reflects the concentration: 1% of hydrogen peroxide is equivalent to 3% of carbamide peroxide. In Europe, the maximum limit for vital teeth is 6% hydrogen peroxide or 18% carbamide peroxide.

What are the indications?

There are two main indications: intrinsic post-eruptive stains and extrinsic stains. Intrinsic post-eruptive stains concern mostly clinical cases involving pulp necrosis (trauma, endodontic treatment, endodon-

tic calcification). Among extrinsic stains, there are tobacco stains, discolouration due to ageing and physiological stains. It is in the last category to which most post-orthodontic treatment applies. Indeed, tooth whitening will allow beautiful finishing by complimenting the orthodontic result. The patient will notice the difference—the teeth are well-aligned and whiter—and forget that the orthodontic process took so much time, as the tooth whitening needs just a few days. The treatment is of benefit to the practice too, since the orthodontist not only restores the function, but improves the aesthetic outcome painlessly too.

How to perform tooth whitening

The different techniques will be demonstrated through clinical cases. In the first case, the patient was being treated with a lingual appliance (Fig. 1) and wished to whiten her teeth. In-office tooth whitening was deemed the most suitable. The soft tissue—gingivae, tongue and lips—must be protected (Fig. 2). The product is applied to the vestibular aspects of the teeth (Fig. 3) and renewed every 15–20 minutes. A good result can be obtained (Fig. 4) with a gentle and efficient product containing 6% hydrogen peroxide (Opalescence Office, Ultradent Products; Fig. 5). Hydrogen peroxide was chosen because, being the active ingredient, its efficacy is immediate. A 6% concentration is the limit, but it is strong enough to observe a difference and low enough to avoid temporary thermic hypersensitivity.

A take-home whitening process entails the use of trays loaded with tooth whitening gel. After an orthodontic treatment, two options are available. An impression of both arches is taken, then stone models are prepared. A soft tray sheet is thermoformed, which allows the making of custom whitening trays (Fig. 6). At the second appointment, the patient receives the trays and the product, together with the user instructions for one or two weeks on the basis of daily use for 60–120 minutes (Fig. 7). For this application, carbamide peroxide of 10% or 16% is chosen (Opalescence PF, Ultradent Products; Fig. 8). The choice of carbamide peroxide is suitable for at-home application, since the gel releases hydrogen peroxide progressively. The choice of concentration depends on the clinical case. A young patient or a patient with already treated thermic hypersensitivity should use 10% carbamide peroxide. Any other patient or a former smoker should use 16% carbamide peroxide. For at-home application, if the practitioner does not wish to prepare trays in-office or



Fig. 1: Patient undergoing lingual orthodontic treatment.



Fig. 2: Soft-tissue protection during the in-office tooth whitening procedure.



Fig. 3: Application of tooth whitening gel to the vestibular aspects of the teeth.



Fig. 4: Before and after in-office tooth whitening on a patient wearing a lingual appliance.



Fig. 5: Opalescence Office kit for in-office whitening.



Fig. 6: Custom trays



Fig. 7: Clinical case before and after at-home tooth whitening using custom trays.



Fig. 8: Opalescence PF kit for at-home whitening.

through the laboratory, an already prepared kit containing ready-to-wear trays can be used (Opalescence Go, Ultradent Products; Fig. 9). In this case, at the first appointment, the patient receives a kit containing a

tray pre-filled with tooth whitening product. Once at home, over ten days approximately, the patient applies the tray into the mouth and leaves the gel to work for 60–90 minutes (Figs. 10 & 11). It is a huge time-saving

approach for the patient and the orthodontist, with an uncompromised result.



Fig. 9: Opalescence Go kit for at-home whitening.



Fig. 10: Clinical case before and after tooth whitening using ready-to-wear trays.



Fig. 11: Pre-filled trays on the teeth.



Fig. 12: Profluorid Varnish for dental hypersensitivity treatment.



Fig. 13: Remin Pro for home use.



Fig. 14: Remin Pro Forte for home use.



Fig. 15: Stone model with resin on the vestibular aspects of the teeth for tray reservoirs.



Fig. 16: Bifluorid 10 for in-office fluoride application.

Cost of materials and treatment fee

For in-office application, an Opalescence Office kit costs approximately €90. Generally, the kit contains two syringes, enough for two appointments with the same patient or two different patients. For at-home application, if the office owns a thermoforming machine, the dental assistant prepares the trays, and two thermoforming sheets cost €2. Otherwise, a dental technician usually charges €50 to produce a pair of custom trays. The Opalescence PF kit with carbamide peroxide costs about €60 for the 10% or 16% concentration. If the orthodontist does not wish to spend time and money on custom trays, the ready-to-use kit should be used. It costs €70 for the trays already loaded with tooth whitening gel.

In-office application requires one hour. The practitioner does not need to be with the patient throughout the entire procedure, but applies the gel and leaves it to complete its cycle. For custom trays, a first appointment is necessary for the impressions and another to deliver the trays and the product, taking altogether less than

15 minutes. Otherwise, the pre-filled trays are delivered to the patient and the dental assistant explains the process in a short appointment. In my experience, having custom trays with good fit will significantly reduce any saliva ingress and always provide optimal results.

The fee depends on the financial strategy of the office. The treatment may be free, in order to offer a gift after a long and/or expensive orthodontic procedure, or to compensate for an imperfect final result. If this is a gift, the patient feels privileged. Otherwise, the fees are calculated according to the hourly cost of the office, based on the time spent on the process as estimated by the specialist. A final possibility is for the practice owner to determine the fee based on that charged by competing practices. The mean cost is €700 for in-office application, €400 for at-home application with custom trays and €200 for the Opalescence Go kit.

Tips and tricks

Previously, it was noted that thermal hypersensitivity can occur. It is better to prevent this, and to this end, the specialist has a great deal of

choice. Among the plethora of products on the market, we have found Profluorid Varnish (VOCO; Fig. 12) to offer particular stability. This varnish, which is applied to the tooth surface, has desensitising properties. Its use is entirely suitable for tooth whitening. We also recommend sending the patient home with a prophylaxis kit (Remin Pro or Remin Pro Forte, VOCO; Figs. 13 & 14).

Another tip is to use orthodontic aligners to perform the at-home whitening. The only disadvantage is that the whitening product will be squeezed between the tray and the teeth and can flow to the gingivae when positioning the tray in the mouth. That is the reason to prefer custom trays. The limits follow the gingival margin in order to avoid potential excess. Moreover, we strongly recommend reading the manufacturer's instructions and preparing a reservoir in the tray according to the manufacturer's instructions. To this end, one need only add some resin to the vestibular aspects of the teeth on the stone model (Fig. 15). The advantage is double, since the reservoirs will guide the patient to put the exact quantity of gel in the correct place with no excess.

During the whitening, the patient should not smoke or consume staining drinks like coffee and tea to avoid any re-colouration of the teeth. The best solution is to perform fluoride application after the treatment. The fluoride kit (Bifluorid 10, VOCO; Fig. 16) contains single doses to apply to the vestibular aspects of the teeth. This fluoride varnish will protect the tooth surface against staining in order to maintain a long-term result.

What about the law?

In Europe, hydrogen peroxide is limited to 6% (18% carbamide peroxide) for vital teeth. This concentration is really enough for a tooth whitening, but not sufficient if the patient comes to the office expecting a Hollywood smile. Since hydrogen and carbamide peroxide are efficient, there is no reason to use sodium perborate, but it is not prohibited. Finally, the dental assistant is allowed to be involved in the process. He or she can take the photographs, measure the dental shade before and after the treatment, prepare the trays and even explain the instructions of use. All of this is simple and accessible. The orthodontist should refer to national regulations to determine whether the dental assistant can take impressions or apply the gel to the teeth. However, diagnosis and responsibility remain the duties of the practitioner.

Conclusion

Tooth whitening is a procedure that complements orthodontic finishing. It is a final touch that makes a visible difference. The technique is simple and does not require long and fastidious training, only strict adherence to the protocol. The practitioner's rigour is enough to understand the protocol. This aesthetic dentistry tool adds value to the orthodontic office and to the dental team involved in the process, from the front desk to the chair, not to mention that it significantly improves the before and after photographs. Finally, everybody, the patient and the team, is satisfied at the end of the treatment.

Conflict of interest and acknowledgements

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