

# A Technique for Simple and Aesthetic Treatment of Anterior Toothwear

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**Abstract:** This article describes a technique for treating anterior toothwear. The technique allows the placement of direct composite on the palatal surfaces of upper anterior teeth in an efficient and accurate manner. The advantages of an indirect wax-up technique and a direct intra-oral approach are combined to give an aesthetic and conservative result.

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**Clinical Relevance:** The aim of treatment of anterior toothwear should be to replace the missing tooth without loss of additional tooth structure and to prevent further wear of the natural teeth occurring.

## CONSERVATIVE TREATMENT OF WEAR OF PALATAL SURFACES OF UPPER ANTERIOR DENTITION

There are reports indicating that localized wear of palatal surfaces of upper anterior dentition is an increasingly common phenomenon.<sup>1,2</sup> With the reduction of tooth decay, it is not uncommon for patients to present with a minimally or unrestored dentition in conjunction with advanced palatal tooth surface loss. Depending on the severity and duration of this tooth surface loss, the incisal edges may also show signs of wear and shortening due to loss of enamel support and subsequent chipping. This then becomes an

aesthetic problem related to shortening of the clinical crown or increased incisal translucency, and it is often only at this late stage that the patient notices the problem and seeks treatment.

The primary cause of this wear pattern is usually erosion and is associated with saliva and diet. In addition, intrinsic acid from gastroesophageal reflux may be involved. Attrition and abrasion may be superimposed secondary factors. Before embarking on any form of treatment, the patient's diet should be assessed and any necessary changes made.

### Space Limitations

Despite the fact that both upper and lower anterior opposing surfaces are worn, there is usually no or minimal space available for restorations to be placed. This may be due to forward posturing of the mandible and/or

compensatory eruption of the worn teeth as the wear progresses.

The space available for palatal restorations may be obtained by restorative means, involving reduction of palatal tooth structure or restoration of the occlusal surfaces of the posterior teeth at an increased vertical dimension of occlusion (VDO).

Space may also be gained by orthodontic treatment which involves realignment of the anterior teeth or opening of the bite posteriorly.

Invasive restorative treatment has the disadvantage of further tooth reduction and orthodontic space creation is a time consuming process. Restorative procedures that are conservative and do not involve more destruction of tooth substances should be attempted.<sup>3</sup>

### An Alternative Solution

An alternative solution is to build up the palatal surfaces of the upper anterior teeth without creating space and allowing the remaining posterior teeth to re-establish occlusal contact over a period of time. In addition, by placing what is in effect an anterior bite plane, the mandible may reposition posteriorly into centric relation which will also contribute to the formation of additional space anteriorly.

This concept was described by Dahl in 1975 and the technique originally described consisted of a removable chrome cobalt covering of the palatal surfaces of the upper anterior teeth. It was made to provide even contact

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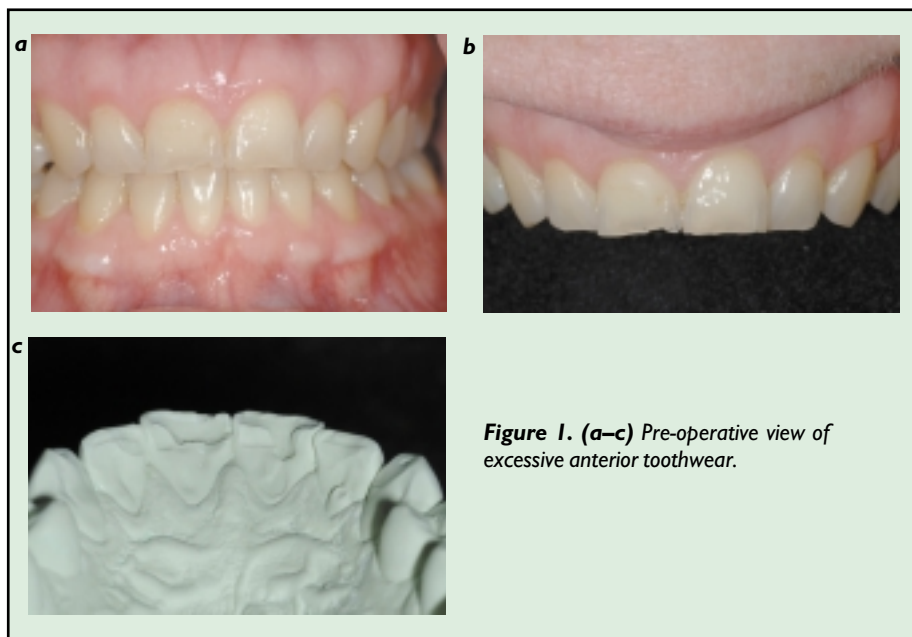


Figure 1. (a-c) Pre-operative view of excessive anterior toothwear.

with the lower teeth and separate the back teeth. In that patient, the back teeth re-established occlusal contact over a period of 8 months.<sup>4</sup> Analysis of a further 20 patients showed that the re-establishment of posterior occlusal contact usually takes 6–14 months and relies on a combination of passive



Figure 2. Wax-up showing prominent cingulum. Note how wax does not extend all the way to the borders of the teeth.



Figure 3. Injectible silicone bite registration material for making matrix.

eruption of the posterior teeth and intrusion of the anterior teeth.<sup>5,6</sup>

The concept has been refined further, by placing composite resin on the palatal surfaces of the upper anterior teeth and has been successful to date.<sup>7-13</sup>

### Material of Choice

The incisal edges of the anterior teeth are rebuilt and as such a tooth-coloured material is used. Composite resin is the material of choice because it can be applied directly in the mouth and is therefore cheaper than porcelain. Although composite may not be as durable as porcelain, it is easier and cheaper to replace or repair.

### Direct vs. Indirect Fabrication

The advantage of an indirect technique is that it is easier to obtain accurate morphology in the dental laboratory rather than directly in the mouth. This is especially true on the palatal aspects of upper anterior teeth. However, because there is usually no tooth preparation, relocating these palatal veneers accurately on the teeth may be difficult.

The advantage of a direct technique

is that it saves money by reducing the laboratory fees. However, the chairside finishing of direct composite is time consuming, which may balance the costs involved in the indirect technique.

Following is a description of a technique that combines the advantages of achieving accurate occlusal contacts via a wax-up, yet allows direct intra-oral placement of the composite resin.

### Technique

Before commencing treatment, patients should be informed that, following treatment, their posterior teeth will not be in contact. They should be reassured that the teeth usually re-establish contact over a period of about 6–9 months and their chewing

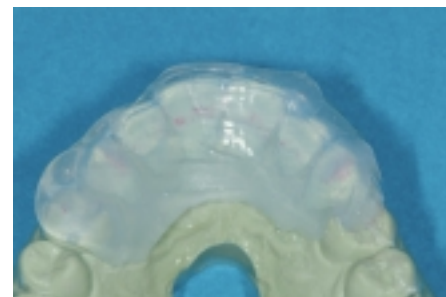


Figure 4. Silicone applied directly over wax-up.



Figure 5. Plastic heat/vacuum formed matrix formed over silicone matrix.



Figure 6. Silicone and plastic matrix.



Figure 7. Matrix trimmed to palato-incisal line angle.



Figure 8. Preparation of alternate teeth.



Figure 9. Composite resin applied to matrix.



Figure 10. Matrix seated on teeth.



Figure 11. Portion of inciso-palatal scaffolding of composite in place.

will not be significantly affected. They should be informed that slight speech alteration may be present for a few days owing to the bulky cingulum areas on the upper anterior teeth. They should also be informed that transient discomfort may occur.

*Pre-operative Extra-oral Preparation*

- Upper and lower alginate impressions are made, together with a jaw registration record and a facebow registration. The study casts and working models are then mounted on an articulator in centric relation (Figures 1a–c). A wax-up is carried out on the palatal and incisal surfaces of the upper six anterior teeth. The lingual surfaces need to be restored with a prominent cingulum and a flat occlusal stop onto which the lower incisors can occlude. This flat surface will help minimize future wear of the opposing lower incisors. In addition, it directs forces down the long axis of the tooth, thereby reducing the possibility of labial tooth movement.<sup>14</sup> A small rim of stone should be left around the areas of wax, especially in the interproximal area. This allows good adaptation of the overlying matrix and prevents excess material in the final restoration (Figure 2).
- A clear silicone material (*Memosil*, Heraeus Kulzer, Newbury, Berks) is injected around the wax-up ensuring accurate adaptation, especially in the interproximal areas. This eliminates inherent inaccuracies that occur when a heat/vacuum formed matrix is made over a duplicate cast of the wax-up. (Figures 3, 4).
- The silicone matrix is left in place over the wax-up and a heat/vacuum formed matrix is then made over the silicone and the entire upper arch. A fairly rigid material of about 1 mm thickness should be used. This will give rigidity to the silicone matrix and allow for accurate seating of the



Figure 12. Preparation of remaining teeth.



Figure 13. Application of resin to remaining teeth.



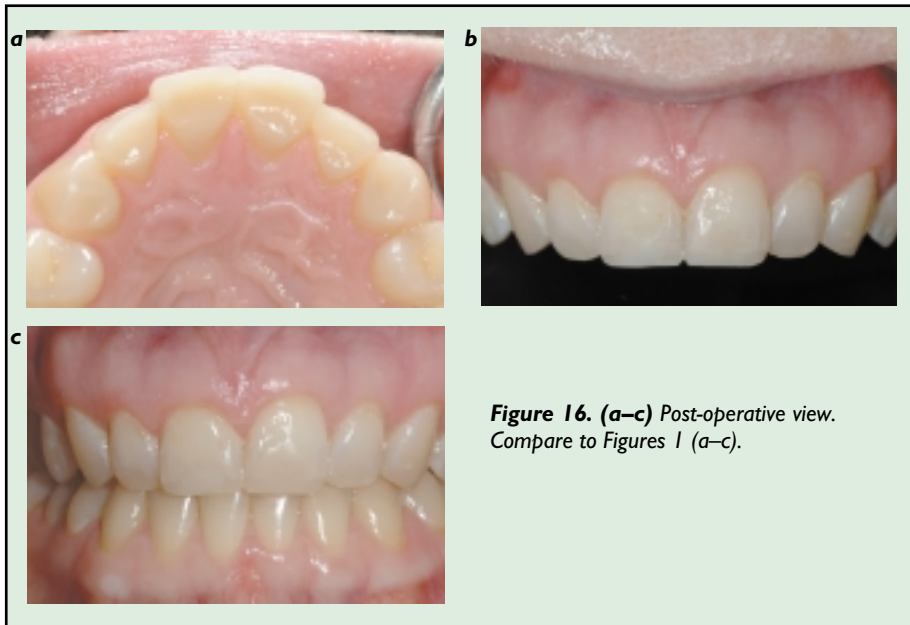
Figure 14. Completed inciso-palatal scaffolding of composite in place.



Figure 15. Preparation of labio-incisal edges for freehand application of composite resin.

double matrix in the mouth (Figures 5, 6).

- The double matrix is trimmed to the inciso-palatal angle of the teeth to be bonded. This allows the final composite build-up on the labial aspect of the incisal edges to be applied freehand once



**Figure 16. (a-c) Post-operative view.**  
Compare to Figures 1 (a-c).

the double matrix has been removed. This freehand application allows for improved colour matching on the visible labial surface (Figure 7).



**Figure 17. Pre-operative view of posterior occlusion on right.**



**Figure 18. Post-operative view of posterior occlusion on right (immediately after treatment).**

*Intra-oral Phase*

- To prevent bonding of adjacent teeth, alternate teeth are restored at the same time. Each alternate tooth is etched and a bonding agent is applied and light-cured (Figure 8).
- Composite resin is warmed up to reduce viscosity and applied to the matrix (Figure 9). The resin can be warmed in warm tap water while it is still in the syringe. Care is taken to ensure the syringe is tightly closed so no water comes into contact with the composite resin. As an additional precaution, the composite syringe can be placed inside a plastic bag before submerging it in warm water.
- The matrix is then seated on the teeth (Figure 10). Excess material is removed from the labio-incisal aspects of the teeth. The composite is cured through the transparent matrix. The palato-incisal aspects are left intact to act as a scaffold for the freehand restoration of the labio-incisal aspects (Figure 11).
- The matrix is removed and any interproximal excess is removed carefully to ensure interproximal separation. At this stage it is only necessary to ensure interproximal

separation. Final finishing is not carried out as it will induce interproximal bleeding which will affect bonding to the remaining teeth.

- The procedure is repeated for the remaining teeth (Figures 12, 13, 14).
- Once all the teeth have been bonded on the palatal aspects, the labio-incisal aspects are restored (Figure 15). This is done freehand allowing the practitioner to characterize the incisal edge using a variety of shades to achieve a good match.
- Once the restorations have been completed, interproximal finishing is carried out with abrasive interproximal strips where necessary (Figures 16a-c).
- The occlusion is refined to ensure even contact on anterior teeth and canine guidance. The amount of separation of the posterior teeth is usually about 1–2 mm (Figures 17, 18, 19, 20)

A follow-up visit may be scheduled



**Figure 19. Pre-operative view of posterior occlusion on left.**



**Figure 20. Post-operative view of posterior occlusion on left (immediately after treatment).**

for about 7 days later to refine the occlusion and assess patient comfort.

**Discussion**

The technique presented is simple and inexpensive. It uses direct composite placement based on a diagnostic wax-up to build-up the palatal surfaces of the anterior teeth.

The dentist can remain in control of the entire process or delegate some aspects to the technician. This technique should only be carried out in patients with sound periodontal health. Teeth with reduced bone support may undergo orthodontic movement.

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