

Simplified Step-by-Step Layering Technique for Aesthetic Anterior Composite Buildup

by Dr. Anthony Tay

Abstract

This article describes a simplified approach toward step-by-step layering of the anterior composite restoration. An understanding toward natural aesthetic from composite buildup and the ideal dimensions of individual layers will be presented. This will allow the practitioners to learn the skills required to confidently place anterior composite buildup in a conservative, aesthetic and predictable manner.

A common scenario that general dental practitioners face involves the rehabilitation of lost dental tissue in the anterior teeth. This can be in response to dental trauma from an accident or replacement of a defective restoration. With today's composite material in the dental market, it is possible to restore the lost dental tissue in a conservative and predictable approach. For this purpose, this presentation describes a simplified technique for such aesthetic anterior composite buildup. The individual steps will be described logically, including the layering details. To create surface anatomies that will mimic nature and lifelike aesthetics, the protocols for finishing and polishing will be given. With some practice, such anterior composite buildup can be routinely placed in a conservative, aesthetic and predictable manner.

Educational Objectives

At the end of this program, participants will be able to:

- Understand the workflow required for anterior composite buildup in a simplified manner.
- Determine the thickness of the different composite layers for ideal aesthetic outcome.



Fig. 1: Anterior composite buildup with the simplified layering technique.

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- c. Restore a fractured anterior tooth with minimal adjustment and finishing, using a putty matrix.
- d. Create primary, secondary and tertiary anatomies for aesthetic anterior restoration.
- e. Understand and master the polishing techniques for teeth of different surface textures.

Introduction

One of the most common aspects of a general dental practitioner's work involves the rehabilitation of lost dental tissue in the anterior teeth. This can sometimes be a result of accident trauma, or simply a replacement of a defective restoration that was placed previously. With the advancement in adhesive technology, coupled with the improvement in mechanical property of the restorative composite material, such rehabilitation can now be routinely done in a fairly conservative and predictable manner, often without the consideration for conventional prosthodontics. This minimalist approach reduces the destruction of healthy tooth structure, while preserving the remaining tooth strength and extending to its longevity. With this in mind, composite restoration of the lost anterior dental tissue thus takes on an increasingly important role.

There are many composite materials in the market, with as many clinical techniques dedicated to their applications. Central to most of these techniques involves the comprehension of the theoretical, practical and clinical aspects of the composite rehabilitation. A theoretical understanding of the mechanical property of the composite, its translucency, chroma and opacity, allows the practitioner to modulate the composite layering and thickness successfully. The practical aspect involves the familiarization of the material's handling, the sensitivity to ambient light and the best tools to manipulate it to the practitioner's advantage. Finally, the all-important clinical restorative steps must be staged and streamlined to ensure maximum efficiency for the practitioner and his practice.

In this article, I describe a simplified layering technique for aesthetic anterior composite buildup, using 3M ESPE Filtek Supreme Ultra (Filtek Z350XT in the Asia Pacific region) restorative composite. Filtek Supreme Ultra is a nano-filled composite that is suitable for both anterior and posterior uses.

Tooth Preparation

A central incisor was used in this presentation, with an enamel-dentine fracture simulated at the mid-body section, without the pulp being exposed. In such clinical setting, when no sign of irreversible pulpitis or pulpal necrosis is encountered,

composite restoration should first be attempted to replace the lost dental tissue.

In emergency situations, two common techniques are usually employed, i.e., freehand composite buildup or palatal "gloved finger matrix" techniques. The "gloved finger matrix" technique involves placing the clean-gloved index finger behind the palatal surface of the tooth, and using it as a matrix for the initial placement of the composite. This technique allows a better control of the subsequent layering process than the freehand technique. However, since it is not precise in its dimension and form, it requires experience and practice to get a satisfactory aesthetic outcome.

For routine situations, however, when there is no urgency of time, I prefer the commonly used silicon putty matrix technique.

1. For the situation of the fractured anterior dental tissue, this will involve taking an impression of the dental arches, followed by an extra-oral wax-up of the fractured site. The details of the wax-up are then captured and transferred to a silicon putty matrix (Virtual, Ivoclar Vivadent), to form the scaffold for the composite layering process.
2. For the situation of the defective restoration replacement, the wax-up stage might not be necessary if the existing restoration has a satisfactory form and outline. This can thus be directly captured and transferred to the silicon putty matrix, before the actual composite rehabilitation treatment.

In such cases, the silicon putty matrix is very useful as it allows stable placement of the initial composite layer. In addition, its highly accurate impression nature allows the capturing of the wax-up details in a precise manner and minimizes the eventual occlusal adjustment.

Prior to the commencement of the clinical restorative procedure, the tooth shade is taken to assist in the composite shade selection, for the creation of invisible margin between composite and tooth structure. This is critical, as the tooth dehydrates with prolonged period of moisture control, and its value subsequently increases. When this happens, the tooth will appear more opaque. Hence, any attempt to match this higher opacity with the composite restoration immediately, will cause a visual mismatch of the tooth-composite complex upon rehydration of the tooth a few hours later.

After the shade taking process is completed, a suitable local anesthesia may be given, followed by rubber dam isolation. Tooth preparation involves the placement of buccal and palatal bevels to assist in the aesthetic blending of the composite to the tooth, as well as increasing the surface area for composite bonding. This is followed by



Fig. 2: A central incisor with a simulated enamel-dentine fracture. Rubber dam is placed to mimic moisture control.

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etching, priming and bonding of the prepared tooth surface, according to the practitioner's preferred choice and system of etchant, primer and bonding agent. In this presentation, 3M ESPE Scotchbond Etchant Gel and 3M ESPE Adper Singlebond 2 primer adhesive were used, according to the manufacturer's instruction. The tooth surface is now ready for composite restoration.

Composite Layering

To begin, the silicon putty matrix that was made prior to the clinical procedure is now being used to construct the palatal surface with composite. This layer will determine the palatal dimension of the tooth, and allow the buildup of the remaining layers anteriorly. A thin layer of A1E (3M ESPE Filtek Supreme Ultra A1 Enamel shade) composite is placed on the putty surface, corresponding to the missing dental tissue of the affected incisor. A common error that practitioners encounter is to layer the composite on the putty in either excess or inadequate cervico-coronal width. Excess width will result in excessive composite flash at the beveled palatal margin, while inadequate width might cause reduced adhesive contact with the beveled palatal margin. A better approach, just prior to any composite placement here, is to place and approximate the putty matrix to the affected incisor and inscribe the beveled palatal tooth margin onto the putty matrix surface, via a sharp explorer.

The A1E composite is then placed in thin amount onto the matrix surface, between 0.3 to 0.5mm in thickness, and slightly extended beyond the inscribed line of the sharp explorer. A microbrush and a ball burnisher are most suitably used to ensure

an even thickness of the layer. It is important to keep this layer thin to minimize polymerization shrinkage of the composite, and to allow slight translucency for visual effect. The putty with the composite is transferred back onto the palatal surface of the incisor, with a gentle pressure on the putty directed towards the palatal surface of the tooth, to allow the approximation of the composite to the beveled palatal margin of the tooth.

Following 20 seconds of light-curing, the putty is gently peeled away to reveal the adhesion of the composite to the tooth unaided. The composite should reveal slight translucency, which will assist in the reproduction of incisal halo subsequently. For more dramatic translucency, CT (3M ESPE Filtek Supreme Ultra Clear Translucent shade) composite can sometimes be used instead of A1E here. This can result in a greater incisal halo effect.

An optional, but useful step involves the use of flowable composite to fill in any potential void created between the palatal composite layer and the palatal beveled tooth margin. This will reduce any trapped air bubbles. In this illustration, a thin layer of 3M ESPE Filtek Supreme Ultra Flowable Restorative shade A2 is placed and light-cured for 20 seconds.

Next, the mesial and distal walls are built up to the required dimensions with A1E and lightcured for 20 seconds. In the clinical intra-oral setting, this dimension is usually determined by the immediate neighboring teeth contacts (Fig. 6). The tooth is now effectively converted to a large Class V cavity.

The dentine mass is reproduced with the layering of A3D (3M ESPE Filtek Supreme Ultra Dentine A3 shade) composite within this new Class V cavity.

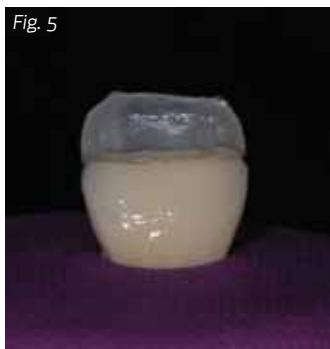
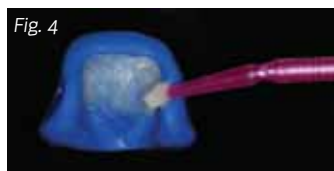


Fig. 3: A sharp explorer, such as a Ash No. 6 probe, can be used to inscribe the palatal tooth margin onto the silicon putty (Virtual, Ivoclar Vivadent) surface.

Fig. 4: Microbrush is used to even the surface of the palatal composite layer (A1E), as well as to minimize trapped air bubble.

Fig. 5: First layer completed with A1E.

Fig. 6: A2 Flowable is placed between the composite and palatal bevel margin interface.

Fig. 7: Mesial and distal walls completed with A1E.

Fig. 8: Three hyperchromatic mamelons, built up with A3D, are clearly visible.

Fig. 9: CT placed to simulate the desired incisal halo.

To mimic the higher chroma of the natural dentine, the dentine composite shade chosen should be ideally one or two shades darker than the enamel composite shade. This also allows the dentine composite layer to be seen clearly through the subsequent buccal enamel composite layer. In this illustration, the enamel shade chosen was A1, while the dentine shade was A3. When placing the A3D composite, care should be taken to ensure a smooth transition slightly onto the buccal bevel of the natural tooth, to mask any visible restorative margin. At the same time, three distinct mamelons are placed at the incisal third to mimic that seen in a natural central incisor.

For optimum aesthetic, the overall dentine shade composite should be kept 0.5mm short of the intended buccal enamel surface (in a palato-buccal manner), to allow the final buccal placement of 0.5mm of enamel shade composite. There are a few ways to make this thickness assessment, such as using a sectioned buccal silicon putty matrix or just visual estimation. Recently, a new tool called LM-Arte Misura (LM Arte instruments from Style Italiano) was developed to make this assessment of final enamel composite thickness more predictable. The dentine composite is now ready to be light-cured for 20 seconds.

For the creation of incisal halo, we next placed CT composite between the mamelons and around the mamelons (slightly within the incisal, mesial and distal margins of this “Class V cavity”). This is light-cured for 20 seconds.

To complete the final enamel layering, we placed 0.5mm thickness of A1E composite onto the buccal surface. It is important to keep this layer thin and evenly spread out so that we can

minimize the finishing process. I recommend the use of size three brush, with a thin amount of wetting resin on the brush (Brush & Sculpt, Cosmedent) to ensure a uniform spread of the layer, improve handling characteristic and minimal trapping of air bubbles. Avoid using bonding agent in place of wetting resin, as bonding agent may contain HEMA and thus can affect the polymerization and also the final color of the composite. We followed this with 20 seconds of light-curing.

Finishing

Primary and Secondary Anatomy:

Anatomies creation should ideally be done after the light-curing of the final enamel composite layer. Gross-contouring is done using coarse and medium coarse discs (Soft-lex, 3M ESPE) to achieve the desired primary anatomy. For buccal secondary anatomy, there are many techniques available. I favor the technique from Dr. Newton Fahl Jr., using a pencil to mark vertical and horizontal lines on the tooth. This serves as a guide for the rotary contouring. With the line markings, a long flame-shaped diamond bur is used in a controlled manner, to reproduce the three subtle developmental lobes as well as the two triangular-shaped shallow depression at the incisal third of the buccal surface. A silicon polishing cup (Astropol P, Ivoclar Vivadent) is used to smooth the transition of the secondary anatomy created.

Tertiary Anatomy:

If tertiary anatomy is desired, especially in young teeth that require perikymata characterization, the same long flame-shaped bur can be used to achieve this effect. This bur should be placed parallel to the buccal surface, and moved between mesial and distal slowly one or two times, at a very slow rotary speed with feather-light pressure. It is important to use magnification for this purpose, as there is a tendency for many practitioners to overdo it. The tertiary anatomy, when created, is smoothened again with Astropol P, to make the appearance subtle and natural.

Polishing

The restoration is finally polished with aluminum oxide polishing paste (Enamelize, Cosmedent) and felt polishing disc (FlexiBuff, Cosmedent) at slow-medium speed, light-medium pressure, to achieve the desired luster. In my experience, I favor the use of electric micromotor, with slow-speed conventional



Fig. 10: Completed layering.

Fig. 11: Computer overlay image of the desired pencil line markings on the tooth image of Figure 10. This gives us the guide for producing primary and secondary anatomy.

Fig. 12: Primary, secondary, tertiary anatomies created.

Fig. 13: Completed – Natural tooth color reproduction.

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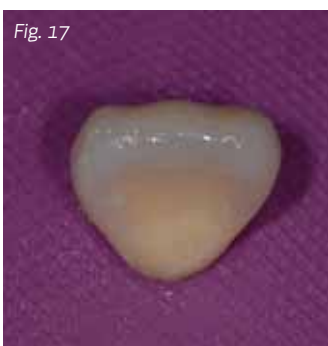


Fig. 14: Completed – Subtle incisal halo resented.

Fig. 15: Completed – Harmonious blending of the different layers.

Fig. 16: Completed – Palatal tooth margin clinically invisible.

Fig. 17: Completed – Developmental grooves created in a natural manner.

Fig. 18: Left model shows a smooth but matte surface. Right model shows a smooth and highly shiny surface. No surface resin glaze is needed.



contra-angled handpiece for this polishing stage. The high torque from the electric micromotor allows the polishing to be done in a controlled manner without causing micro-gouging of the polished surface.

Alternative Finishing and Polishing Method

In older teeth that have lost their surface microtexture (perikymata) and acquired a smooth and sometimes shiny surface, tertiary anatomy is not indicated. Instead, after the secondary anatomy stage, this restoration can be polished with 3M ESPE Soflex Fine and Superfine polishing discs, at medium-high rotary speed, to achieve a matt, smooth surface. If high shine is desired, Enamelize and FlexiBuff can subsequently be used with the technique described above.

In this simple demonstration, two composite tooth models were built up to identical dimensions, using 3M Filtek Supreme Ultra Body A2 shade (A2B). They were finished to the secondary anatomy stages (under the section *Finishing – Primary and Secondary Anatomy*). Both models were then subjected to further polishing with 3M ESPE Soflex fine and superfine polishing discs. However, only the right model was additionally polished

to a high shine with Enamelize and FlexiBuff. The results show that a matte or shiny surface can be easily created, depending on the aesthetic outcome desired. Both models, with the slightly different polishing protocols, do produce a clinically acceptable smooth surface, as seen in older teeth.

Conclusion

A simplified layering technique, as described here, allows practitioners to create natural-looking anterior composite with predictability. With the improvement of the restorative composite over the years, we must, as dedicated caregivers to our patients, take advantage of this, and be able to offer minimally invasive and conservative restorative treatment. With practice, we will be able to do so confidently. ■

Author's Bio

Dr. Anthony Tay received his Bachelor of Dental Science from the University of Melbourne, Australia, in 2005. He returned to Singapore in 2006, where he has been involved in full-time metropolitan private practices. As a general practitioner, he delivers a comprehensive range of dental services, with special interest in composite rehabilitation, restorative dentistry and minimal intervention dentistry. He is a current committee member of the Academy of Cosmetic Dentistry (Singapore) and the Continuing Dental Education committee of the Singapore Dental Association, and is actively involved in continuing dental education for his peers. He can be contacted at dr.anthonytay@gmail.com



1. Devoto W, Saracinelli M, Manauta J. "Composite in everyday practice: how to choose the right material and simplify application techniques in the anterior teeth." *Eur J Esthet Dent*. 2010 Spring;5(1):102-24.
2. Fuhr Jr, N "Mastering Composite Artistry to Create Anterior Masterpieces - Part 2." *Journal of Cosmetic Dentistry* 2011: 42-55, Winter.
3. Fuhr Jr, N "Mastering Composite Artistry to Create Anterior Masterpieces - Part 1." *Journal of Cosmetic Dentistry* 2010: 56-68, Fall.
4. Dietschi D "Layering concepts in anterior composite restorations." *J Adhes Dent*. 2001 Spring;3(1):71-80.
5. Dietschi D "Optimising aesthetics and facilitating clinical application of free-hand bonding using the 'natural layering concept.'" *Br Dent J*. 2008 Feb 23;204(4):181-5.

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1. Which of the following about the use of silicon putty matrix is true?
 - a. It allows the stable placement of the initial composite layer.
 - b. It captures the wax-up details to allow accurate transfer of tooth form and dimension.
 - c. It minimizes finishing and occlusal adjustment.
 - d. All of the above
2. What is the role of the sharp explorer in this presentation?
 - a. To inscribe the palatal tooth margin onto the silicon putty matrix so that the palatal composite layer can be predictably placed.
 - b. To allow the creation of perikymata at the finishing stage.
 - c. To stabilize the composite layering when using the light-cure.
3. Shade-taking of the tooth is taken before the placement of the rubber dam...
 - a. because the eyes become tired and lose the ability to differentiate chroma at the end of the restorative procedure.
 - b. because the tooth dehydrates and its value increases for a few hours after rubber dam placement, resulting in inaccurate shade match.
 - c. because the debris and saliva from the tooth preparation after rubber dam placement can interfere with the perception of hue.
4. What can be done to create invisible margins between the composite and tooth structure?
 - a. Place bevels on the tooth preparation margin.
 - b. Select a composite shade that is similar to the tooth structure, prior to dehydration from rubber dam placement.
 - c. All of the above
5. Why is flowable composite useful in this presentation?
 - a. It fills in any potential void between the initial palatal layer of composite and the palatal tooth margin, thereby reducing any air bubble trapped.
 - b. It is used as a bulk-fill agent.
 - c. It provides the halo effect.
6. When restoring anterior composite with the technique described in this article, the dentine shade should ideally be:
 - a. The same shade as enamel shade.
 - b. One or two shades darker than enamel shade.
 - c. One or two shades lighter than enamel shade.
7. After the placement of the dentine composite layer, what is the ideal thickness of the buccal, final enamel layer of composite for optimum aesthetic?
 - a. 0.5mm
 - b. 1.0mm
 - c. 1.5mm
 - d. 2.0mm
8. Which of the following about the role of the wetting resin is false?
 - a. It reduces air bubbles being trapped during layering.
 - b. It improves the handling of the composite.
 - c. It improves the polishing quality of the composite.
9. For anterior restoration, secondary and tertiary anatomies should be created...
 - a. after the light-curing of the final enamel composite layer.
 - b. before the light-curing of the final enamel composite layer.
 - c. before the light-curing of the dentine composite layer.
10. Old teeth tend to appear smoother and shinier than young teeth.
 - a. True
 - b. False

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