



CODEN [USA]: IAJPB

ISSN: 2349-7750

**INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES**<http://doi.org/10.5281/zenodo.2388945>Available online at: <http://www.iajps.com>

Research Article

ESTHETIC RESTORATIVE DENTISTRY WITH COMPOSITES

Sarah Sulaiman Alajlan¹, Rayed Mayah Alshammari¹, Abdullah Hussain Abdullah Al-Rashah², Mousa Hamdan Alsagri², Mohammed Mutlaq ALNawmasi², Fahad AL-Nashmy AL-Shammri², Ibrahim Mohammed al Yami³, Abdullah Obaid Hamad Alharbi⁴, Sabah thani alanazi⁵, Tagreed Mohammed Bin Salman⁵,

¹University of Hail, ²Ministry of Health, ³Najran University, ⁴Taibah University, ⁵Riyadh College for Dentistry and Pharmacy

Abstract

Introduction: Smile is determining feature of face and it also predicts the attractiveness and need for esthetics thus will motivate patients to seek dental treatment. Re-establishing a patient's lost dental esthetic appearance is one of the most important and challenging task of contemporary dentistry. Every patient wants a functional, healthy and esthetically appealing smile. Immense improvements have taken place in response to growing demand of patients for esthetics and the consequent demand of clinician for materials with similar optical characteristics to those of the natural teeth. Recent advancement in resin composite display a wide variety of color and effects, which helps in different combination of translucence and opacities. With these improvements, interventions with composite resins have made possible the reestablishment of specific and individual details existing in the natural dentition.

Aim of work: In this study, the aim was to understand the advancement in aesthetic dentistry using composite restoration which includes direct, indirect resin veneer technique.

Materials and methods: This review is comprehensive search of PUBMED, MEDLINE, and EMBASE from year 1993 to 2014. The following search items were used: direct composite, Indirect Composite, shade matching, shade guides, material selection, placement and layering techniques.

Conclusion:

Composite resin serves as esthetic alternative to amalgam and cast restorations. When compare to ceramic restoration with a disadvantage of being expensive, brittle, prone to fracture and can produce wear with opposite natural teeth, composite restoration becomes the next best option for providing appropriate esthetics and provide proper form and contour of lost structure of tooth in any form, in a visit or two.

Keywords: Esthetic restorative dentistry, direct composite, Indirect Composite, shade matching, shade guides

Corresponding author:**Sarah Sulaiman Alajlan,**Email: ssaj-@hotmail.com

Mobile: +966505839090

QR code



Please cite this article in press Sarah Sulaiman Alajlan et al., *Esthetic Restorative Dentistry with Composites.*, Indo Am. J. P. Sci, 2018; 05(12).

INTRODUCTION:**DIRECT COMPOSITE TECHNIQUE:**

Function, form and esthetic are adequately restored in direct procedures with composite resins. In direct veneering technique, composite is directly applied to defective or lost tooth structure and artistically sculpted to correct colour and contour defects [1].

Material Selection

A wide range of composites is available for the restoration of anterior teeth, all with subtly different formulations, which can be confusing [2]. Filler particle composition and filler/resin refractive index mismatch are the most important variables in determining the optical properties of individual materials. Where high functional forces are not anticipated, resins containing low average filler particle size (microfills) is a choice of material because of their superior polish ability properties [3].

Shade Selection Criteria and Shade Guides

Various criteria have been identified to precisely select the shade of composite:

1. Shade should be taken immediately before the procedure before dehydration has occurred.
2. Assessing the cavity with regard to relative quantities of missing enamel and dentine [4].
3. Any discoloration will require masking with opaque material [5]
4. When assessing control teeth, use the middle third to record the basic shade [4]
5. Shade should be taken quickly in 5 seconds (after 5 seconds staring at tooth or shade guide , subtle colors blend) [6] and hence it is recommended to look at complementary color to re-sensitize eyes [6,4]
6. The use of color-corrected light source and less bright light source for selecting value is recommended [7]

Shade Guides:

Most of the shade guides are included in composite system but are generally considered to be inaccurate because of shade guides are not fabricated from restorative materials, less translucent than natural teeth and the restorative materials used. [5,2] . The different shade guides are [8]:

1. Hyashi shade guides
2. Clark shade guide
3. VITA shade guide
4. Vitapan 3D master shade guide

Composite Resin Selection:

The percentage of light transmission on the enamel is nearly 70.1%, which gives translucent characteristics to this tissue and on dentin is 52.6%, which makes it opaquer [9]. In order to obtain natural characteristics, more transparent resins should be used in the fabrication of artificial enamel, whereas more opaque resins should be used to reproduce artificial dentin. Manufacturers divide their restoration kits in resins specific for enamel (E-enamel, T-translucent) and for dentin (D-dentin, B-body, O-opaque) and also provide resins with specific colours that allow characterization of special effects such as incisal transparency, opalescent halo, hypocalcified and fluoride stains as well as the manipulation of the value in the restoration [10].

Steps in direct composite placement:Cavity Preparation

In certain situation tooth preparation maybe avoided completely (e.g. Diastema closure, fracture repair). When preparation is needed it should be minimized and confined to enamel to enhance adhesion. Natural cavity undercuts or pulp chambers/root canals of endodontically treated teeth may also be used to enhance retention [11]. Particle air abrasion may be employed to clean cavities and increase the surface area available for micro-mechanical and chemical retention [5].

Isolation methods

1. Rubber dam
2. Gingival retraction cord soaked in astringent [11]

Matrix Technique

There are variety of matrices design commonly made up of translucent polyester material referred to by the brand name *Mylar*, available in in different shapes: full contour crown forms, strips and specially designed sectional matrices to aid in restoration of anterior teeth according to its curvature [4].

Etching

Before etching cavity should be thoroughly washed and carefully inspected for the debris and etchant should be applied in entire cavity. Excessive etchant should be avoided to prevent excessive composite adhering. Enamel should be etched for 30-60 seconds to optimize adhesion, rinsed and dried properly. Etched enamel gives a 'frosty' appearance. [12,13,14].

Bonding

A successful adhesion is a fundamental requirement

for the long-lasting composite restoration. Self-etching adhesives are not recommended when restoring cavities that lack sufficient resistance and retention form (e.g. Class IV), as they contain weaker acids that will not sufficiently penetrate enamel to a depth that maximizes resin-tag formation [15]. Before light-curing, all cavity surfaces should appear glossy/shiny [13].

Placement and Layering Techniques

A wide range of placement protocols have been proposed for anterior resin composites. The general recommendation is to restore the central incisors first, one at a time [11]. Once complete, restoration of lateral incisors and then canines are carried out. Composite increments may be injected from compules or applied using a variety of instruments.

The thickness relationship of opaque dentine composites and translucent enamels is the key to successful layering techniques [16,17]. The overall outcome is determined by the propagation of light as it passes through these layers to create an illusion of depth, equivalent to that seen in natural teeth [10,3,2].

The following are the basic layering techniques:

1. Dual-shade layering technique

Inexperienced clinicians are recommended to use this technique using two shades i.e. dentine and enamel shade. Following etching and adhesive application dentine layer is applied and light cured. Palatal, labial and proximal enamel increments are then placed, contoured and light cured. [17]

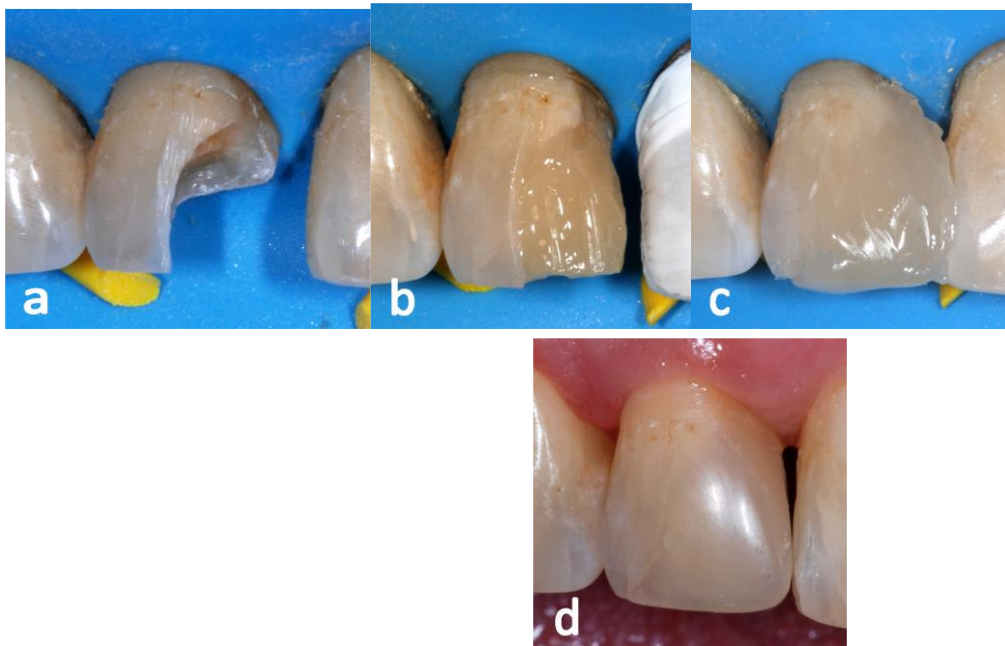


Figure 1: cavity preparation, B. dentine layer, C. enamel layer and D. completely restored composite in anterior tooth [17]

2. Multi-layered (polychromatic) placement technique

When aesthetic demands are high, the widely accepted stratification technique proposed by Lorenzo Vanini is recommended. [18] The fundamental principle of polychromatic layering technique is to use different composite shades to replicate the layers seen in natural teeth, [3,4]. A palatal 'shell' of translucent enamel composite is

light cured using silicone template. Dentine build-up is done to avoid monochromatic appearance, dentine lobes are restored using progressive chromatic increments [4,17,18]. When the translucent enamel material is subsequently applied and polished, it produces very natural appearances, such as the incisal 'halo effect' [10]. Finally, a thin labial enamel layer is placed and light cured [18].

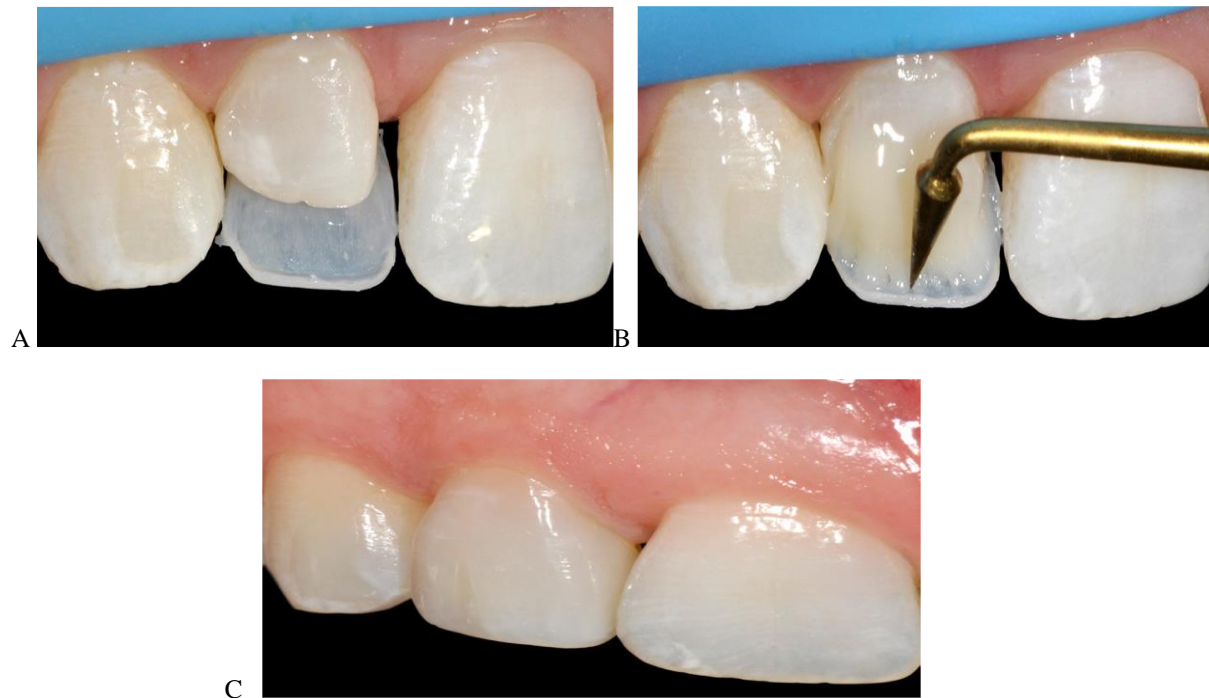


Figure 2: A. palatal 'shell' of translucent enamel composite, B. Dentine build-up, C. Final translucent layer of enamel in a composite restored tooth [17]

Shaping

Shaping is a defining aspect in final appearance of the restoration [17]. Initial shaping may be carried out using red-stripe (30-40 μm) composite finishing burs. When shaping a single central incisor, the

adjacent tooth should be taken as reference for symmetry by making the reflective face of both teeth equal. Functional surface should be designed and contour in a way that both restoration and tooth can withstand occlusal forces [4].

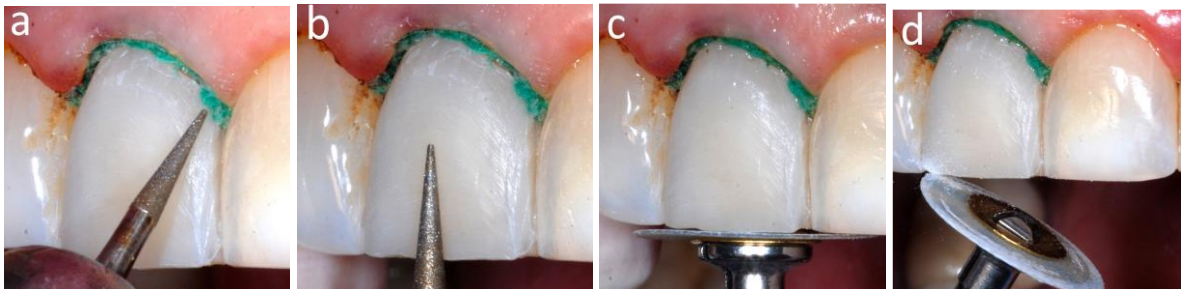


Figure 3: (A) Cervical bulge/transition line(B) Labial face(C) Incisal edge(D) Incisal line angles^[17]

Finishing and Polishing

Surface texture features may all be simulated in direct restorations, using a variety of equipment including Finer diamond or tungsten carbide composite finishing burs (yellow/white/purple stripe) to refine shape, Medium finishing discs to smooth the restoration and refine line angles, Fine polishing discs to create the attractive surface lustre, Silicone rubber

points and cups to introduce secondary anatomical features, Abrasive finishing strips to remove proximal excess and Sharp instruments, e.g. scalpels or scalers to remove unbonded excess, Goat's hair/chamois/felt wheels and brushes to develop a high shine, Specialized polishing pastes of varying particle size, e.g. Aluminium oxide [10].

INDIRECT COMPOSITE TECHNIQUE:

The direct composite technique when compared to indirect technique possess disadvantage inherent in material, including colour instability, excessive wear and polymerization shrinkage. Other disadvantages include surface roughness, marginal discoloration, loss of marginal integrity, postoperative sensitivity, secondary caries, cusp flexure, technique sensitive, less-than-ideal bonding to dentin, and low fracture toughness. Indirect technique refers to fabrication of the restoration outside the oral cavity in the laboratory following which it is luted to the tooth with resin cement [19].

Steps in indirect composite technique:

1. In first appointment proper diagnosis and treatment plan is done with an alginate impression taken and impressions were poured in type IV dental stone
2. The preliminary mock-up of desired tooth is performed by the technician using bisacrylic resin [20].

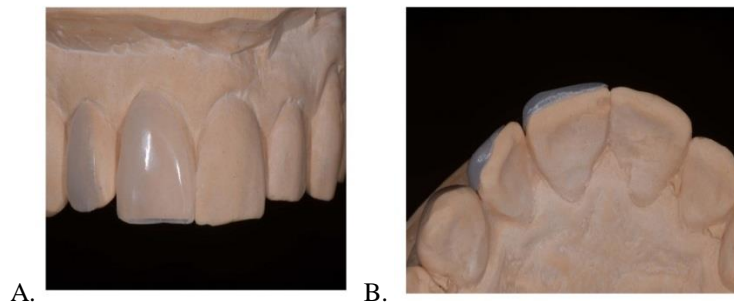


Figure 4: (A) and (B) Frontal and occlusal view of mock-up made in PMMA resin of teeth [20]

3. In second appointment the preliminary resin mock-up is tried, checked, and provisionally luted for further adjustment and alteration

suggested by patient. Static and dynamic dentofacial aspects were evaluated, considering lip line and maxillary teeth exposure [20].



Figure 5: showing Intraoral try-in of the mock-up and provisional cementation [20]

4. A silicon index was also provided for the clinician in order to evaluate the veneers space requirements. Minimal or least invasive tooth

preparation is done using coarse/medium finishing strips and Medium grit (100 μm) and fine grain (30 μm) tapered diamond burs [20].



Figure 6: (A) Interproximal preparation using finishing strip,(B) Refined and polished surfaces before final impression [20]

5. Following the preparations, a small diameter retraction cord was placed in the bottom of the sulcus to obtain an adequate gingival displacement and secondary impression is taken polyether precision material to take a one-step, double mix final impression; a

light body is applied at the gingival margin and gently blown over the preparations. A full metallic tray was loaded with the heavy body impression material inserted in the oral cavity [20].

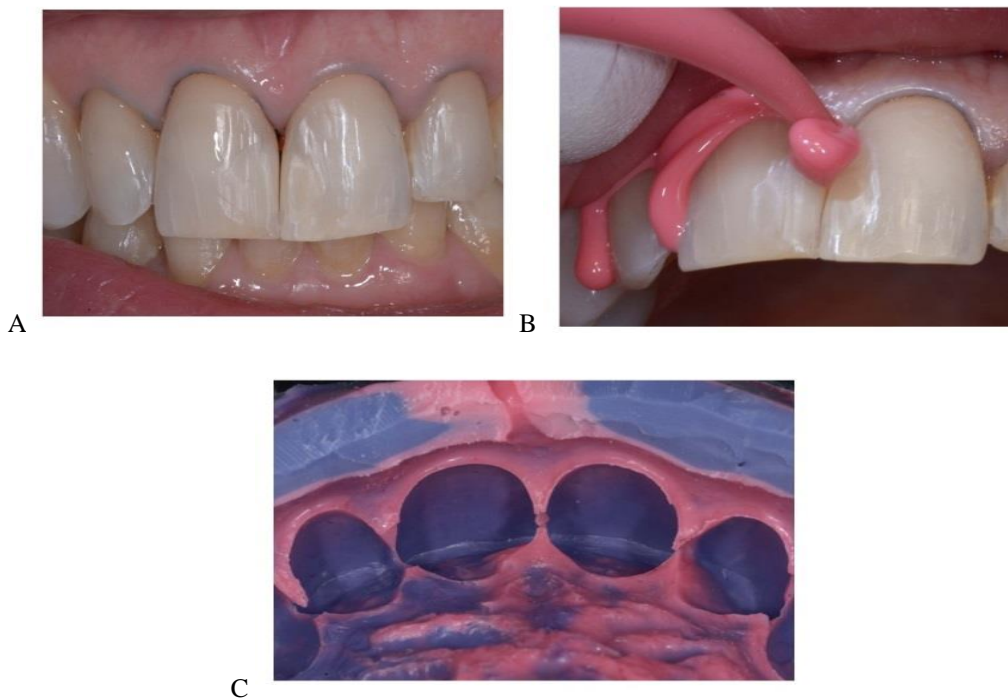


Figure 7: (A) Retraction cord placement prior to impression, (B)Light body material injected onto tooth,(C)Final intraoral impression taken with heavy body impression material [20]

6. Post laboratory fabrication, veneers are luted on prepared tooth.



Figure 8: (A)Wax-up of definitive restoration,(B),(C)(D)Finished and polished restorations luted intraorally [20]

CONCLUSION:

Successful anterior composites are satisfying for both patients and clinicians. Direct adhesive procedures have almost limitless potential to restore function and aesthetics, while preserving healthy tooth tissue and, as such, anterior composites are at the very forefront of contemporary minimally invasive aesthetic dentistry.

REFERENCES:

1. **Christensen G J (1985):** Veneering of teeth. State of the art. *Dental Clinics of North America*, 29(2): 373-391.
2. **Dietschi D (2008):** Optimizing smile composition and esthetics with resin composites and other conservative esthetic procedures. *European Journal of Esthetic Dentistry*, 3(1): 14-29.
3. **Jackson R D (2003):** Understanding the characteristics of naturally shaded composite resins. *Practical Procedures Aesthetic Dentistry*, 15(8): 577-85.
4. **Hugo B and Denner W (2009):** Esthetics with Resin Composite: Basics and Techniques. London: Quintessence Publishing Co Ltd, ISBN 978-1-85097-183-2.
5. **Fahl N (2007):** A polychromatic composite layering approach for solving a complex Class IV/direct veneer/diastema combination: Part II. *Practical Procedures and Aesthetic Dentistry*, 19(1): 17.
6. **Aschheim, K. W. (2014).** *Esthetic Dentistry-E-Book: A Clinical Approach to Techniques and Materials*. Elsevier Health Sciences. Copyright @ Mosby. eBook ISBN: 9780323225052.
7. **Touti B, Miara P, Nathanson D (1999):** . *Esthetic Dentistry and Ceramic Restorations*. ???????: Martin Dunitz., ISBN 9781853171598.
8. **Smitha AJ, Savitha PN (2017):** Shade matching in aesthetic dentistry—from past to recent advances. *J Dent Oral Care Med.*, 3(1): 102.
9. **Lopes LG, Franco EB, Pereira JC, Mondelli RL (2008):** Effect of light-curing units and activation mode on polymerization shrinkage and shrinkage stress of composite resins. *Journal of Applied Oral Science*, 16(1): 35-42.
10. **Chan DK (2008):** Accreditation clinical case report. Case type IV. Anterior direct resin restoration. *J Cosmet Dent.*, 24(1): 46-51.
11. **Mackenzie L, Parmar D, Shortall AC, Burke FT (2013):** Direct anterior composites: a practical guide. *Dental update*, 40(4): 297-317.

12. **Burke T, Lucarotti P (2009):** How long do direct restorations placed within the general dental services in England and Wales survive? *British Dental Journal*, 206(1): 2.
13. **Vanini L (2010):** Conservative composite restorations that mimic nature. *The journal of Cosmetic Dentistry*, 26(3): 80.
14. **Strydom C (2004):** Self-etching adhesives: review of adhesion to tooth structure part I. *Journal of the South African Dental Association*, 59(10): 413-415.
15. **Frankenberger R, Lohbauer U, Roggendorf M J, Naumann M, Taschner M (2008):** Selective enamel etching reconsidered: better than etch-and-rinse and self-etch? *Journal of Adhesive Dentistry*, 10(5): 339-44.
16. **Villarroel M, Fahl N, De Sousa AM, De Oliveira OB (2011):** Direct esthetic restorations based on translucency and opacity of composite resins. *Journal of Esthetic and Restorative Dentistry*, 23(2): 73-87.
17. **Mackenzie L, Shortall AC, Burke F T (2009):** Direct posterior composites: a practical guide. *Dental Update*, 36(2): 71-95.
18. **Chiche G J, Pinault A (1994):** Esthetics of anterior fixed prosthodontics, pp. 97-113. Chicago, IL, Quintessence.
19. **D'arcangelo, C., De Angelis, F., Vadini, M., & D'Amario, M. (2012).** Clinical evaluation on porcelain laminate veneers bonded with light-cured composite: results up to 7 years. *Clinical oral investigations*, 16(4), 1071-1079..
20. **Re D, Augusti G, Amato M, Riva G, Augusti D (2014):** Esthetic rehabilitation of anterior teeth with laminates composite veneers. *Case Reports in Dentistry*, <http://dx.doi.org/10.1155/2014/849273>.