

Advances in Esthetic Dentistry

Prashanth Kumar Katta

Abstract

Esthetic dentistry deals with the smile designing, the shape and form of teeth that best improves the esthetics in harmony with the surrounding hard and soft tissues and must be in sync with orofacial elements. Cosmetic dentistry refers to a range of dental treatments formulated to improve the smile and rectify chipped, cracked, discoloured and malposed unevenly spaced teeth. It ranges from ceramic veneers to tooth-colored restorations; patients can select from a wide range of cosmetic dentistry treatment procedures for restoring and or improving the health and vitality of their smile.

Keywords: Esthetics; Smile; Bleaching; Oro-facial; Cosmetic dentistry.

Introduction

Everyone smiles in the same language. The smile of an individual attracts every person he meets. More people are growing consciousness about dental esthetics. Advancements in esthetic treatment modalities have resulted in more reliable and less invasive procedures. This article describes the various methods available to improve the esthetics [1].

Balance between the prominent features of a face adds to create a beautiful face. The "Facial prominent Features" are the smile with its components, teeth, gingiva and lips; eyes and facial frame.

The word aesthetic speaks about an understanding of beauty. Hence, it is necessary to have a comprehensive knowledge of beauty and the artistic instruments available to create a beautiful smile [2].

Esthetic restorative materials [3,1]

The four main types of direct esthetic restorative materials include:

1. Silicate cements (no more used)

2. Acrylic resins
3. Composite resins and sealants
4. Glass Ionomers

Identify the available esthetic restorative materials

Direct

1. Composites
2. Gionomers
3. Compomers
4. Resin-modified glass ionomer

Indirect

- a. Ceramics
- b. Indirect composites
 - ▲ Understand the esthetic and strength characteristics of current materials
 - ▲ Describe the bonding & cementation requirements for specific materials
 - ▲ Identify Material Selection choices for discolored preps
 - ▲ Define the parameters of anterior veneer preparation
 - ▲ Describe full coverage preparations
 - ▲ Understand the preparation requirements for posterior all ceramic onlays

Esthetic Post Systems

Author's Affiliation: Reader, Department of Conservative Dentistry and Endodontics Bapuji Dental College & Hospital Davangere-577004.

Reprints Requests: Prashanth Kumar Katta, Reader, Department of Conservative Dentistry and Endodontics Bapuji Dental College & Hospital Davangere-577004.
Email: drprashanthkumar@yahoo.com

Advantages of Fiber-Resin Post Systems

1. Metal-free, more esthetic result
2. Ability to transmit curing light
3. May provide flexibility to decrease root stresses
4. Bondable, not cemented, which may aid in retention
5. Will never corrode and are relatively easy to remove for endodontic or restorative failure
6. Biocompatible

Table 1: Uses of Composites, Compomers, Resin-Modified Glass Ionomers, and Glass Ionomers [4,2,6]

Type	Uses
All-purpose composite	Class I, II, III, IV, V, patients with low risk of caries
Microfilled composite	Class III, V
Nanofilled composite	Class I, II, III, IV, V
Packable composite	Class I, II, VI (mesial, occlusal, distal = MOD)
Flowable composite	Cervical lesions, pediatric restorations, small, low-stress-bearing restorations
Laboratory composite	Class II, three-unit bridge (with fiber reinforcement)
Compomer	Cervical lesions, Class III primary teeth, Class I, II restorations in children, Class II (with sandwich technique), patients with medium risk of caries
Resin-modified glass ionomer	Cervical lesions, Class III, V, II (with sandwich technique), pediatric restorations primary teeth, Class I restorations in children, sandwich technique (Class II), patients with a high risk of caries
Glass ionomer	Cervical lesions, Class V restorations in adults in whom esthetics are less important than that of other types, patients with a high risk of caries

Keys to Increase Success of Esthetic Post Placement [5,3]

1. Always remember that posts merely aid in restoration retention. Instead of strengthening the tooth, they may weaken it.
2. Choose systems that are organized, color-coded, and offer multiple diameters.
3. Err on the side of tooth conservation; post length is more retentive than diameter.
4. Prepare a post depth as long as the intended finished crown length.
5. Prepare the tooth margin at least 1 mm to 2 mm below the build-up.
6. Use dual-cure bonding agents and luting materials to ensure material cure regardless of post light transmission.
7. Communicate final build-up shades so the ceramist can limit restoration opacity.

Color and integrating color into direct and indirect restorations

Color has two basic characteristics: Hue and Chroma. Natural tooth color also displays these same characteristics. Hue can be defined as the actual color such, as yellow or gray. Chroma is the intensity of that color and is sometimes called saturation. Value is the brightness of a tooth [2].

Shade taking

1. If patient is wearing bright colored clothing, drape him or her with a neutral colored cover.
2. Have patient remove lipstick and other make-up, as well as eyewear.
3. Teeth must have been cleaned.
4. The shade taking should be done at the beginning of the appointment, so that teeth are moist (the patient must lick their teeth constantly to keep them moist) and your eyes fresh.
5. The operatory light should be turned off or pointed in another direction. It must not focus on the patient.
6. The room light conditions should have a temperature of 5500-6500° K. (when pictures are taken, these parameters are no longer relevant, because the light of the flash will prevail).
7. Obtain value levels by squinting.
8. Women are far less likely to be color blind than men, so it is a good idea to have your assistant assist in shade taking decisions (assuming that the assistant is a woman and not color blind) [6,7,2]

Fundamental adhesive concepts

How to select and integrate restorative materials and adhesive protocols with sound fundamental

design principles for direct /indirect composite and ceramic restorations How to develop an anatomical morphological thinking Anterior and Posterior Composites.

Depigmentation

While the normal gum color is pale pink, abnormally high amounts of melanin can cause dark spots and patches to appear on the gum tissue [7].

Techniques:

1. Radiosurgery
2. Scalpel Surgery
3. Electrosurgery

Treatment of gummy smile

Gummy smile (excessive gingival display) is a condition in which a high lip-line exposes an abnormal amount of gingival tissue. Several potential factors could contribute to a gummy smile. For example, the muscle controlling the movement of the upper lip could be hyperactive, resulting in an upper lip that rises higher than normal. When this occurs,

more of the gingival tissue is exposed when smiling[8,6].

Techniques:Depends on etiological factors, perception and patient needs.

1. Orthodontics
2. Orthognathic surgery
3. Periodontal surgery: Apically positioned flap with osteotomy
4. Cosmetic surgery
5. LASER gingivectomy

Gingival enlargements

- a. Gingivoplasty
- b. Gingivectomy
- c. Flap surgery

Crown lengthening

Exposure of a greater height of clinical crown in the esthetic zone may by crown lengthening include an apically positioned flap or gingivectomy (with a scalpel or electrosurgery) or flap surgery with osseous recontouring [9,1].

Table 2: Classification System for Aesthetic Crown Lengthening Procedures[8]

Classification	Characteristics	Advantages	Disadvantages
Type I	Adequate soft tissue allows gingival exposure of the alveolar crest or violation of the biologic width.	May be performed by the restorative dentist. Provisional restorations of the desired length may be placed immediately.	
Type II	Adequate soft tissue allows gingivectomy without exposure of the alveolar crest but in violation of the biologic width.	Will tolerate a temporary violation of the biologic width. Allows staging of the gingival excision and bone contouring technique. Temporary restorations of the desired length may be placed immediately.	Requires osseous contouring. May require a surgical referral.
Type III	Gingivectomy to the desired clinical crown length will expose the alveolar crest.	Staging of the procedures and alternative treatment sequence may minimize display of exposed subgingival structures. Provisional restorations of desired length may be placed at second-stage gingivectomy	Requires osseous contouring. May require a surgical referral. Limited flexibility.
Type IV	Gingival excision will result in inadequate band of attached gingiva.		Limited surgical options. No flexibility. A staged approach is not advantageous. May require a surgical referral.

Gingival Veneers [10]

Periodontal disease, trauma, and congenital defects can result in both soft tissue and hard tissue defects that can present with aesthetic problems. The

gingival veneer is a viable treatment option for restoring anterior esthetics in clinical situations where there are esthetic concerns caused by significant gingival recession.

Table 3: Indications and contraindications for the use of gingival veneers

Indications	Contraindications
Poor aesthetics characterized by interdental "black triangles," exposed root surfaces, and/or crown margins	Poor oral hygiene
Food packing in interdental spaces	Limited manual dexterity
Lack of saliva control	High caries activity/risk
Impaired speech	Incomplete periodontal therapy
Root-dentine sensitivity	Allergy to fabrication materials

Basic consideration in full coverage restorations, indications, contraindications, tooth preparation techniques, gingival tissue management, impression, provisional restoration, lab procedure, try in, cementation of ceramic jacket crown and bridge.

Margins of crowns

The position of the margin relative to the gingiva (i.e. sub, equi- or supra-gingival) is driven by a variety of factors, for example position of the tooth in the mouth, height of lip line, periodontal status and stump shade of the underlying tooth [11,12,4].

Under preparation results in poor aesthetics or an over built crown (dotted line) with periodontal and occlusal consequences. Over preparation of tooth will result in pulp and tooth strength being compromised.

The placement of the crown margin can be supra-gingival, equi-gingival or sub gingival.

Esthetics can be compromised when supra-gingival or equi-gingival preparations are done. In case of zirconia, metal or alumina, the technique will be more cumbersome because the margin itself is more opaque. Anytime you're using a more opaque restorative material of any thickness, there will be a difference in opacity of the margin and tooth shade causing a visible line at the junction where the restoration meets the tooth. It's necessary to go below the tissue to hide discolored teeth and the junction with the restorative material. It should also be noted that whenever you are using more opaque materials, it's ideal to go subgingivally to hide margins [11,5,3].

Conclusion

Esthetic dentistry is a vast field. It encompasses esthetic restorative materials, smile designing and improving the form and function of the teeth by maintaining the harmony with the surrounding

orofacial structures. Thorough understanding of the science of esthetic restorative materials in association with the indications and need for smile enhancement will give the best results.

Conflict of interest

None

Source of funding

Self

Acknowledgements

None

Ethical clearance

Not applicable

References

1. Ernesto A. Lee, DMD, Dr Cir Dent, Aesthetic Crown Lengthening: Classification, Biologic Rationale, and Treatment Planning Considerations, Pract Proced Aesthet Dent 2004; 16(10): 769-778.
2. Camargo PM, Melnick PR, Camargo LM, Clinical crown lengthening in the esthetic zone, J Calif Dent Assoc. 2007 Jul; 35(7): 487-98.
3. Touyz LZ, Raviv E, Harel-Raviv M, Cosmetic or esthetic dentistry? Quintessence Int. 1999 Apr; 30(4): 227-33.
4. Morley J. The role of cosmetic dentistry in restoring a youthful appearance. J Am Dent Assoc. 1999 Aug; 130(8): 1166-72.
5. Weinstein AR, Esthetic applications of restorative materials and techniques in the anterior dentition. Dent Clin North Am. 1993 Jul; 37(3): 391-409.

6. Schmidt CJ, Tatum SA. Cosmetic dentistry. *Curr Opin Otolaryngol Head Neck Surg*. 2006 Aug; 14(4): 254-9.
 7. Setien VJ, Roshan S, Nelson PW. Clinical management of discolored teeth. *Gen Dent*. 2008 May; 56(3):294-300; quiz 301-4.
 8. Davis BK, Dental aesthetics and the aging patient. *Facial Plast Surg*. 2006 May; 22(2): 154-60.
 9. Bloom DR, Padayachy JN. Aesthetic changes with four anterior units. *Br Dent J*. 2006 Feb 11; 200(3): 135-8.
 10. Radz GM, Minimum thickness anterior porcelain restorations. *Dent Clin North Am*. 2011 Apr; 55(2):353-70, ix. doi: 10.1016/j.cden.2011.01.006.
 11. Bryan RA, Welbury RR. Treatment of aesthetic problems in paediatric dentistry. *Dent Update*. 2003 Jul-Aug; 30(6): 307-13.
 12. Cuevas S. Conservatism and predictable dental esthetics. *Compend Contin Educ Dent*. 2005 Aug; 26(8):546-9.
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