

Minimally Invasive Anterior Esthetic Restoration: A Literature Review

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Abstract: The importance of minimally invasive procedures in the anterior esthetic zone restoration has made the new paradigm in aesthetic dentistry. These dynamic new techniques has not only joined dentistry but made exciting revolution as well. This has adopted a philosophy that integrates prevention, remineralization and minimal intervention for the placement and replacement of restorations. This literature reviews in brief about the contents such as classification, indication, contra indication, steps of tooth preparation, different material used, and the technique of restoration used during practice of minimal invasive dentistry.

Key words: minimally invasive, laminate veneer, tooth preparation

Introduction: Esthetic has drawn attention of many since a decade or more. In today’s world, where presentation and appearance are the need for the day, great emphasis is placed on a confident and captivating smile so many individuals are concerned about their esthetic while in public appearances .Inclusion of many minimally invasive surgery such as rhinoplasty, lip repositioning surgery as well involvement of botox, dermafills and trichology has gained pace in last few years. This entire processes has highlighted the procedure of restoring the anterior tooth using minimal invasive technique with definite restoration for more esthetic and pleasing appearance.^[1] This has facilely brought into exercise with recent dental materials. The complete restoration is done more precisely in acceptable manner creating “SMILE” that considered is the most beautiful expressions of all. As the Modern dentistry offers various treatment modalities for smile correction. The most conservative and highly effective therapeutic options are the ceramic and composite laminate veneers.^[2]

Classification of laminates and veneers:

I. Based on coverage of tooth

- 1 Partial veneers - partially covering the tooth structure.
- 2 Full veneers - complete coverage of tooth structure.

II. Based On the Fabrication Technique:^[3]

- I. Directly fabricated veneers: Composite resin materials applied to the tooth surface free hand by the clinician.
- II. Indirectly fabricated veneers:
 - a) Processed Composite.
 - b) Etched porcelain/feldspathic porcelain
 - c) Heat pressed ceramic / Glass based Ceramics
 - d) Machineable (CAD/CAM) Ceramics

III. Depending On Preparation Depth :

- Extra enamel - without preparation
- Intra enamel - limited to enamel
- Intra dentine - involving dentin.^[4]

IV Based on the New Veneer Classification System^[5]

Dentin Exposed

Reduction	Facial	Dentin Exposed
CL-I No-Prep or Practically Prep-less	No-Prep or Practically prep-less Detectable with magnification	0*
CL-II Modified Prep-less or Minimally Invasive	up to 0.5 mm	10% to 20%*
CL-III Conservative Design	0.5 mm to 1 mm	20% to 50%*
CL-IV Conventional A II- Ceramic Design	1+ mm	50%

*Enamel periphery of at least 70%.

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Enamel Remaining

Reduction	Facial	Enamel Remaining
CL-I No-Prep or Practically Prep-less	Detectable with magnification with or without gingival finish line	95% to 100%
CL-II Modified Prep-less or Minimally Invasive	up to 0.5 mm	80% to 95%
CL-III Conservative Design	0.5 mm to 1 mm	50% to 80%
CL-IV Conventional All-Ceramic Design	1+ mm	<50%

Indications:

According to Magne & Belser^[6]

- Type I: Teeth resistant to bleaching
- Type IA: Tetracycline discoloration
- Type IB: Teeth that are unresponsive to bleaching
- Type II: Major morphologic modifications
- Type IIA: Conoid teeth
- Type IIB: Diastema or interdental triangles to be closed
- Type IIC: Augmentation of incisal length or facial prominence
- Type III: Extensive restorations
- Type IIIA: Extensive coronal fracture
- Type IIIB: Extensive loss of enamel by erosion and wear
- Type IIIC: Generalized congenital malformations

Contraindications:

- Teeth exposed to heavy occlusal forces owing to bruxism.
- Severely mal-positioned teeth
- Presence of soft tissue disease
- Highly fluoridated teeth
- Teeth with extensive existing restorations
- Anterior Crossbite
- History of occlusal or joint dysfunction^[7-9]

Materials used to fabrication and armamentarium: Mainly there are three broad category dental material are used in fabrication of dental laminates and veneers

Acrylic resin laminates

Porcelain laminates

Composite laminates

Laminate veneer system (Komet/Brasseler) includes four burs to prepare the tooth and four burs to finish the laminates.

Steps in tooth preparation:

- 1] **Labial preparation:** Should encompass the amount of preparation that facilitates the placement of an aesthetic restoration and remain within the enamel to ensure an adequate seal to enamel for most situations 0.5 mm reduction and 0.3 mm for small teeth such as mandibular incisors.
Three horizontal depth cuts are prepared on labial surface.
Bur is angled to complete the gingival depth cut and the incisal depth cut.^[15]
- 2] **Inter proximal extension:** Extend this margin about half way into the interproximal contact area moving the margin into this embrasure just lingual to the buccal surface of the interproximal papillae.
- 3] **Proximal Finishing Lines:** A proximal chamfer finishing line is preferred.
When diastema are present - feather edge finishing line.

Proximal Contact Area:

- Proximal finishing line terminates 0.2 mm labial to the contact area.
- Extension of the laminate beyond the mesiobuccal and distobuccal line-ensures the wraparound effect.
- Preparation is essential and is particularly crucial when the final restoration significantly differs in shade from that of the unprepared tooth structure.
- Proximal representation of porcelain laminate veneer after proper reduction of the proximal sub contact area is known as Elbow Preparation.^[10-12]

4] **Sulcular extension and marginal placement:** Supra-gingival placement has the following advantages:

- Finish line in enamel, ensures strongest bond strength.
- Isolation is easier.
- Easier access for the finishing and polishing regimes.
- Eliminates the possibility of impingement on biological width by an inadvertent overextension of the preparation.
- Maintenance of hygiene becomes easier.
- Minimizes the risk of undue exposure of dentin in the cervical region.
- The gingival finish line must be continuous well defined modified chamfer.^[13-14]

Lingual preparation:

- Incisal edge should be flattened, leaving a butt finish line configuration on the lingual surface that should slope approximately 75 degree gingivally from the labial to a depth of 0.5 to 1.0mm.
- The preparation lines on the lingual should not be located on the palatal concavity.^[14]

Technique of tooth preparation: In the approach of minimally invasive restoration of anterior tooth the preparation is performed considering over all outcome of the ultimate restoration and also of the adjacent tooth structure including periodontal condition, physiological consideration and mechanical consideration as summation of all will cause to longevity of the restoration. Mainly the subsequent technique are enumerated:

A] Incisal edge preparation Technique:

Window - preparation is taken close but not upto incisal edge.

Feather - preparation is taken upto height of incisal edge but edge isn't reduced

Bevel - Bucco palatal bevelled prepared, preparation of incisal length.

Incisal overlap - incisal edge is reduced so the

veneer preparation extended onto palatal aspect of the tooth ; preparation of a minimum 1 mm is there .^[15-16]

B] Gurel Technique:

- Very efficient when 2 to 4 lingually tilted teeth are to be treated.
- Composite mockup is bonded after spot etching to correct the esthetic placement of tooth surface in dental arch.
- Use the depth cutter over the composite build up so that it preserve maximum enamel on tooth surface.
- If the composite mock-up thickness is over than the intended reduction, remove the remaining composite and slightly roughen the surface - improve bonding.^[14]

C] Asthetic pre-recontouring (APR) Technique:

- Practiced when the individual tooth position or their alignment must be altered.
- The essential principle of APR is to place the partially protruding axially misaligned or rotated teeth into proper alignment on the arch.
- Understanding of that specific individual's tooth form and also the alignment of their teeth is required for APR technique.
- Within the actual material preparation (AMP) the specified amount of enamel, and sometimes dentin, must be removed to provide enough space for Porcelain Laminate Veneer build-up.
- An APR is supposed to be made in order to place these things into order and to get the satisfying pleasing symmetry and balance in the arch.
- Should definitely be decided quite early to the actual material preparation starts.
- Unfortunately, this field of pre-recontouring tends to induce far less attention than is importance.^[14]

Conclusion: Perfect smile improves the self-confidence, personality, social life and have

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psychological effect on improving self-image with enhanced self-esteem of the patient. New emerging concepts in aesthetic dentistry with regards to materials, technology and public awareness has made veneers on demand. No sooner the newer regime of lumineers and componeers are seen into practice seamlessly leaving least weightage to the conventional techniques. The objective of cosmetic odontology must be to produce the utmost improvement in aesthetic with minimum trauma to the dentition. Minimally invasive ceramic restoration when done using proper materials and techniques in an exceedingly conservative manner have proven to be a highly successful variety of treatment.

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