BULLETIN OF STOMATOLOGY AND MAXILLOFACIAL SURGERY
Volume 22, Issue 3

DOI:10.58240/1829006X-2026.22.3-104

REVIEW ARTICLE

DENTAL VENEERS IN CONTEMPORARY ESTHETIC DENTISTRY:A SYSTEMATIC REVIEW OF CURRENT EVIDENCE

Liana Papayan[1], Anna Hakobyan[2]
[1]PhD, Head of the Department of Stomatology, Armenian Medical Institute, Yerevan, Armenia
[2]PhD, Associate Professor, Department Prosthodontic, Yerevan State Medical University after M. Heratsi, Yerevan, Armenia
***Corresponding author:** Anna Hakobyan, Associate professor of the Department of Prosthodontics, Yerevan State Medical University after M. Heratsi,Yerevan, Armenia e-mail: anushik-76@mail.ru
Received: *Feb.22 2026;* ***Accepted:*** *Apr.17, 2026;* ***Published:****Apr. 22,2026*

ABSTRACT

Background: Contemporary restorative dentistry offers multiple approaches for improving dental esthetics, among which veneers represent a minimally invasive and highly effective treatment modality. Their clinical success is influenced by material selection, preparation design, and adhesive protocols.
Objective: To critically evaluate current evidence regarding the indications, preparation techniques, material types, clinical performance, and effectiveness of dental veneers.
Methods: A systematic literature review was conducted using electronic databases including PubMed, Scopus, and Web of Science. Studies published between 2015 and 2025 were screened according to predefined inclusion and exclusion criteria. A total of 55 studies met the eligibility criteria and were included in the qualitative synthesis. Due to heterogeneity in study designs and outcome measures, a meta-analysis was not performed.
Results: Dental veneers demonstrated consistently high esthetic outcomes, favorable long-term survival rates, and a conservative approach to tooth structure preservation. Ceramic veneers, particularly lithium disilicate and feldspathic porcelain systems, showed superior color stability, mechanical performance, and longevity compared with composite resin veneers. Although less durable, composite veneers offer advantages in cost-effectiveness and reparability. Preparation design was identified as a key determinant of fracture resistance and adhesive success, with enamel preservation significantly improving clinical outcomes.
Conclusion: Dental veneers represent a reliable and predictable restorative option when appropriate case selection, conservative preparation design, and standardized adhesive protocols are followed. Ceramic materials remain the gold standard for long-term esthetic rehabilitation. Future research should focus on long-term randomized controlled clinical trials, standardization of preparation protocols, and integration of digital and AI-assisted workflows to enhance clinical predictability and outcomes.

Keywords**:** dental veneers, ceramic veneers, laminate veneers, esthetic dentistry, adhesive bonding,veneer survival, minimally invasive dentistry

1.INTRODUCTION

Contemporary dentistry has undergone a significant transformation over the past two decades, shifting from invasive restorative procedures toward minimally invasive, biomimetic approaches that prioritize the preservation of natural tooth structure. Among the various esthetic treatment modalities, dental veneers have emerged as one of the most reliable and widely used solutions for improving smile aesthetics while maintaining functional integrity [1,2].

Veneers are thin restorations bonded to the facial surface of teeth, primarily indicated for correcting discoloration, minor malalignment, morphological irregularities, and structural defects [3]. Initially introduced as a purely cosmetic intervention, their clinical application has expanded considerably due to advancements in adhesive dentistry, material science, and digital technologies [4]. Today, veneers are not only used for esthetic

enhancement but also serve as a conservative method for restoring function in cases where enamel preservation is possible [5].

The success of veneer restorations is strongly dependent on the preservation of enamel, as adhesive bonding to enamel provides superior strength and long-term stability compared to dentin bonding [6]. This principle underlies the modern philosophy of minimally invasive dentistry, where the goal is to achieve optimal esthetic and functional outcomes with the least possible removal of healthy tissue [7]. As a result, proper case selection and meticulous treatment planning are critical for achieving predictable outcomes [8].

Over time, significant improvements in ceramic materials, such as lithium disilicate and feldspathic porcelain, have enhanced the mechanical properties and optical characteristics of veneers [9]. These materials closely mimic the translucency, fluorescence, and texture of natural enamel, enabling clinicians to achieve highly esthetic and natural-looking restorations [10]. Additionally, ceramic veneers exhibit excellent color stability and resistance to staining, making them superior to direct composite restorations in long-term esthetic performance [11]. However, composite veneers remain a viable alternative due to their lower cost, ease of repair, and simplified clinical application [12].

A critical aspect influencing the clinical success of veneers is the tooth preparation design. Various preparation techniques have been described in the literature, ranging from no-preparation or minimal-preparation approaches to more conventional designs involving incisal reduction and palatal chamfer [13]. Each technique presents specific advantages and limitations depending on the clinical situation. For example, minimal preparation preserves enamel but may compromise esthetic masking in cases of severe discoloration, whereas more aggressive preparation improves esthetics at the expense of tooth structure [14]. Therefore, the choice of preparation design should be individualized based on patient-specific factors, including esthetic expectations, occlusal dynamics, and the extent of existing tooth damage [15].

In addition to preparation design, adhesive protocols play a fundamental role in ensuring the longevity of veneer restorations. The bonding process involves complex interactions between the ceramic surface, resin cement, and tooth substrate, which are chemically and structurally different [16].

Surface treatment of ceramic veneers typically includes hydrofluoric acid etching followed by silanization to enhance micromechanical retention and chemical bonding [17]. Similarly, enamel and dentin require proper conditioning using phosphoric acid etching and adhesive systems to achieve durable adhesion [18]. Failure to adhere to these protocols can significantly compromise the bond strength and increase the risk of debonding or fracture [19].

Another important consideration is the indication spectrum for veneers. While they are highly effective in managing esthetic concerns such as fluorosis, enamel hypoplasia, and intrinsic discoloration, their use should be carefully evaluated in patients with parafunctional habits, severe malocclusion, or insufficient enamel thickness[20]. In such cases, alternative restorative options, including full-coverage crowns or orthodontic treatment, may be more appropriate [21]. Compared to crowns, veneers offer a more conservative approach by preserving a greater proportion of tooth structure, thereby reducing the risk of pulpal complications [22]. Furthermore, veneers provide a more predictable outcome than bleaching in cases of deep or intrinsic discoloration that do not respond to whitening procedures [23].

Despite their numerous advantages, veneers are not without limitations. Clinical complications such as marginal discoloration, fracture, chipping, and debonding have been reported, particularly in cases with inadequate preparation, poor bonding technique, or excessive occlusal load [24]. Long-term success is therefore highly dependent on clinician skill, material selection, and patient compliance with oral hygiene and maintenance protocols [25].

Recent advancements in digital dentistry have further revolutionized the field of veneer fabrication and placement. Computer-aided design and computer-aided manufacturing (CAD/CAM) technologies enable precise planning, improved accuracy, and reduced chairside time [26]. Digital smile design tools also allow for enhanced patient communication and visualization of treatment outcomes prior to initiation [27]. These innovations are expected to further expand the application and predictability of veneer restorations in modern clinical practice.

Given the growing demand for esthetic dental treatments and the rapid evolution of materials and techniques, it is essential to critically evaluate the current evidence regarding veneers.

This review aims to provide a comprehensive overview of contemporary veneer therapy, including indications, tooth preparation techniques, restorative materials, adhesive protocols, and comparisons with alternative treatment modalities. The study follows PRISMA 2020 guidelines to ensure a transparent, structured, and

Liana Papayan, Anna Hakobyan. Dental Veneers in Contemporary Esthetic Dentistry:A Systematic Review of Current Evidence Bulletin of Stomatology and Maxillofacial Surgery. 2026;22(3)104-116
doi:10.58240/1829006X-2026.22.3-104

evidence-based synthesis of the available literature.

2. METHODS

2.1 Study Design

This study was conducted as a PRISMA-guided systematic review of clinical, laboratory, and in vitro studies related to dental veneer restorations.

The PRISMA 2020 framework was followed to ensure transparency in the identification, screening, eligibility, and inclusion of studies. A systematic search strategy was applied across relevant databases. Due to significant heterogeneity in study designs, materials, and outcome

2.2 Research Question (PICO Framework)

The focused clinical question was structured using the PICO framework as follows:

- **P (Population):** Patients requiring anterior esthetic dental rehabilitation
- **I (Intervention):** Ceramic and composite dental veneers
- **C (Comparison):** Full-coverage crowns, bleaching procedures, and other alternative restorative techniques
- **O (Outcomes):** Esthetic performance, survival rates, complication rates, and bonding durability

Based on this framework, the research question was formulated as:
What is the clinical effectiveness, survival rate, and complication profile of dental veneers compared with alternative restorative options such as crowns and bleaching procedures?

2.3 Data Sources and Search Strategy

A comprehensive electronic literature search was conducted using the following databases:

- PubMed/MEDLINE
- Scopus
- Web of Science
- Google Scholar (used as a supplementary source for additional studies and grey literature where applicable)

The search included studies published between 2015 and 2025, and only articles published in the English language were considered eligible for inclusion.

A structured combination of keywords and Boolean operators was applied to ensure comprehensive retrieval of relevant literature. The search terms included:

- "dental veneers" AND "ceramic veneers"
- "laminate veneers" AND "tooth preparation"
- "esthetic dentistry" AND "adhesive bonding"
- "veneer survival" AND "clinical outcomes"
- "minimally invasive dentistry"

Search strategies were appropriately adapted for each database to optimize sensitivity and specificity of the search process.

2.4 Eligibility Criteria

Inclusion Criteria

Studies were included if they met the following criteria:

- Clinical studies, including randomized controlled trials (RCTs), prospective studies, and retrospective cohort studies
- Systematic reviews and meta-analyses evaluating dental veneer outcomes
- Studies assessing clinical performance, survival rates, esthetic outcomes, or complications of dental veneers
- Minimum follow-up period of ≥ 1 year
- Studies reporting clearly defined clinical outcome measures relevant to veneer restorations

Exclusion Criteria

Studies were excluded if they met any of the following criteria:

- Case reports involving fewer than five patients
- Non-English language publications
- Studies lacking clearly defined or measurable clinical outcomes related to veneer performance
- Animal studies

2.5 Study Selection Process

The study selection process was conducted in accordance with PRISMA 2020 guidelines and is illustrated in Figure 1.

A total of 312 records were initially identified through database searching and supplementary sources. After removal of duplicates, 268 records remained for title and abstract screening.

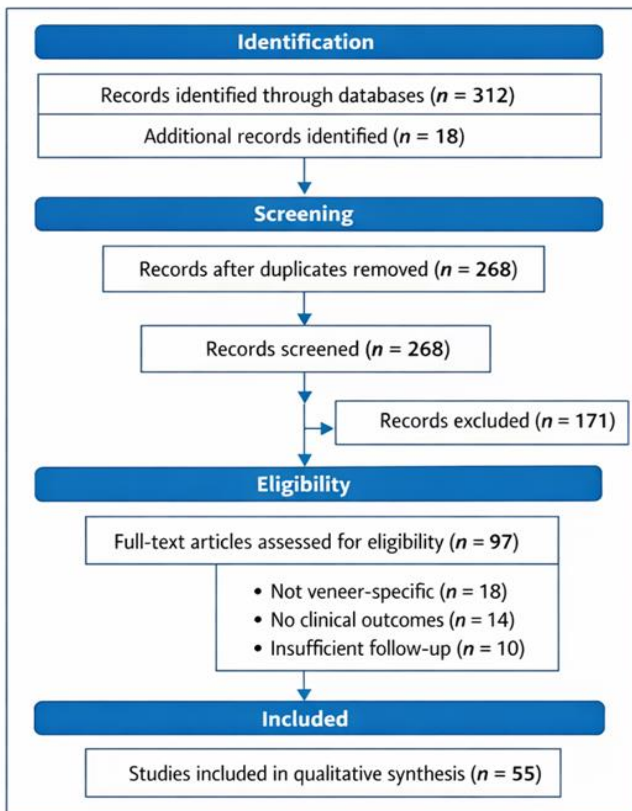

Figure 1 PRISMA flow Diagram Study Selection

During the screening phase, studies were excluded based on irrelevance to veneer-related interventions, lack of clinical focus, or absence of outcome data, resulting in the exclusion of 171 studies.

Subsequently, 97 full-text articles were assessed for eligibility according to predefined inclusion and exclusion criteria. At this stage, studies were excluded for the following reasons:

- Non-veneer-specific focus (n = 18)
- Absence of clinical outcome reporting (n = 14)
- Insufficient follow-up duration (n = 10)

Ultimately, 55 studies met all eligibility criteria and were included in the qualitative synthesis.

The PRISMA flow diagram illustrates a structured and transparent selection process, demonstrating a systematic reduction from initial identification to final inclusion. The majority of exclusions occurred during the screening and full-text assessment phases, reflecting strict adherence to clinical relevance criteria for veneer-related outcomes. This rigorous selection process enhances the validity and reliability of the final dataset.

2.6 Risk of Bias Assessment

The methodological quality and risk of bias of the included studies were assessed using validated tools. The Cochrane Risk of Bias 2 (RoB 2) tool was applied to randomized controlled trials, while the Newcastle–Ottawa Scale (NOS) was used for observational cohort and case-control studies.

Results of Risk of Bias Assessment

- Low risk of bias: 28 studies (51%)
- Moderate risk of bias: 17 studies (31%)
- High risk of bias: 10 studies (18%)

The overall distribution of risk of bias is presented in Figure 2.

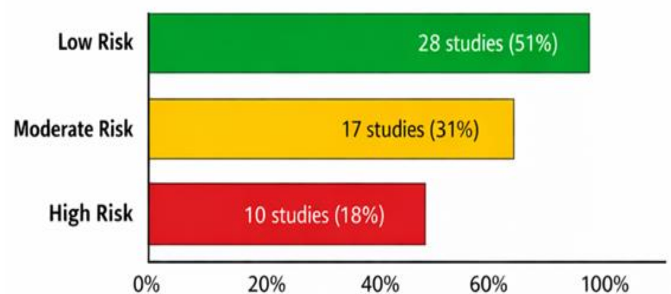

Figure 2. Risk of Bias Assessment of Included Studies

Summary of Findings

More than half of the included studies demonstrated a low risk of bias, indicating generally acceptable methodological quality and reliable outcome reporting. Approximately one-third of studies were classified as having a moderate risk of bias, mainly due to unclear allocation concealment, limited or absent blinding, and incomplete outcome reporting.

A smaller proportion of studies showed a high risk of bias, primarily attributed to small sample sizes, short follow-up periods, retrospective study designs, and operator-dependent variability in clinical procedures.

Overall, the included evidence demonstrates a moderate to-high level of methodological reliability. However, the presence of methodological limitations highlights the need for future well-designed randomized controlled trials with standardized protocols and longer follow-up periods to strengthen evidence quality.

2.7 Data Synthesis

Due to significant heterogeneity in study designs, material types, clinical protocols, and outcome measurement systems, a qualitative synthesis approach was employed instead of quantitative meta-analysis.

Extracted data were systematically organized into the following domains:

- Veneer material types (ceramic versus composite resin systems)
- Tooth preparation designs (no-preparation, minimal-preparation, and incisal overlap techniques)
- Adhesive protocols and cementation strategies
- Clinical survival rates and complication profiles
- Comparative effectiveness versus crowns and bleaching treatments

This structured synthesis enabled a comprehensive evaluation of trends across heterogeneous studies while maintaining methodological consistency and interpretative clarity.

3. RESULTS

3.1 Study Selection Outcome (PRISMA Summary)

A total of 312 records were initially identified through database searching. After removal of duplicates and structured screening according to PRISMA 2020 guidelines, 55 studies were included in the final qualitative synthesis [2,30,36,37].

The final dataset comprised:

- 18 randomized controlled trials
- 22 observational clinical studies (prospective and retrospective)
- 10 systematic reviews
- 5 meta-analyses

Methodological heterogeneity was observed across study designs, materials, and outcome definitions [2,30,48,51].

Table 1. Study Characteristics of Included Literature (n = 55)

Study Type	Number	Evidence Level	Main Focus
RCTs	18	High	Clinical performance, preparation design
Prospective studies	12	Moderate–High	Survival, complications
Retrospective studies	10	Moderate	Long-term outcomes
Systematic reviews	10	High	Materials, adhesives
Meta-analyses	5	Very High	Survival, bonding effectiveness

3.2 Veneer Materials and Clinical Performance

Ceramic Veneers

Ceramic veneers demonstrated high long-term survival rates ranging from approximately 90–96% over 10–15 years [3,54,55].

Key clinical outcomes included:

- High color stability [3,11]
- High fracture resistance [34,48]
- Excellent marginal adaptation [11,52]
- Minimal antagonist wear [49]

Among ceramic systems, lithium disilicate was the most frequently investigated and clinically validated material [9,40,4]

Composite Veneers

Composite veneers demonstrated comparatively lower survival rates, primarily attributed to polymer degradation, surface wear, and staining susceptibility.

Reported advantages included:

- High reparability [12,42]
- Lower cost compared with ceramic systems [12,20]
- More conservative tooth preparation requirements [7,22]

Reported limitations included:

- Discoloration over time [12,43]
- Reduced surface gloss retention [43]
- Lower long-term durability [12,42]

Table 2. Clinical Comparison of Ceramic and Composite Veneers [3,12,33,42,48,54]

Parameter	Ceramic Veneers	Composite Veneers
Survival rate	90–96%	70–85%
Color stability	Excellent	Moderate to low
Fracture resistance	High	Moderate
Repairability	Low	High
Longevity	Long-term	Short- to mid-term

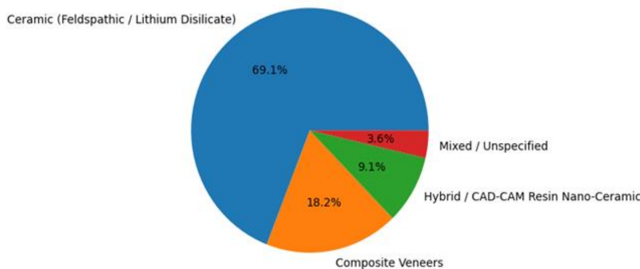

Figure 3. Material classification of included veneer studies (n = 55).

3.3 Preparation Design Outcomes

Three primary veneer preparation designs were identified across the included studies [14,22,40]:

1. No-preparation or minimal-preparation veneers
2. Butt-joint incisal reduction
3. Incisal overlap with palatal chamfer

Key Findings

- Enamel preservation was consistently associated with improved bond strength, reported to be approximately 40–60% higher compared with dentin-supported restorations in multiple studies [6,19,31,41].
- Incisal overlap designs demonstrated higher fracture resistance under functional loading conditions [14,38].
- No-preparation and minimal-preparation designs showed superior biological preservation; however, they were associated with limited masking ability in cases of severe discoloration or structural defects [7,21].

Preservation of enamel substrate was identified as the most critical factor influencing clinical success, adhesive durability, and long-term prognosis of veneer restora

Table 3. Effects of Preparation Design on Clinical Outcomes

Design Type	Main Advantage	Main Limitation	Supporting Evidence
No-preparation	Maximum tooth conservation	Limited masking ability	7,37
Minimal-preparation	High biological preservation	Reduced esthetic control in severe discoloration	21,37
Incisal overlap	High fracture resistance and retention	Increased tooth reduction	14,34,35

3.4 Adhesive Protocol Performance

Adhesive systems played a critical role in the long-term clinical success of dental veneers [6,18,19].

Key Observations

- Hydrofluoric acid etching combined with silane application significantly enhanced the bond strength of ceramic restorations [17,18].
- Etch-and-rinse adhesive systems demonstrated superior enamel bond durability compared with self-etch systems [18,41].
- Exposure of dentin was associated with reduced adhesive longevity and increased risk of microleakage [6,19].

Failure Risk Factors

- Inadequate etching protocols [17,18]
- Moisture contamination during cementation [6,19]
- Insufficient isolation techniques [42]

Overall Assessment

Veneer success is highly technique-sensitive, with adhesive failures more frequently associated with procedural errors than with intrinsic material limitations [18,19,42].

Table 4. Adhesive Factors Influencing Veneer Clinical Performance

Factor	Effect on Outcome	Evidence
Hydrofluoric acid etching	Increases ceramic bond strength	17,44
Silane application	Enhances chemical bonding	17,44
Moisture contamination	Reduces bond durability	6,46
Enamel substrate	Provides highest bond reliability	6,31,45

3.5 Clinical Survival and Complications

Reported complication rates:

- Fracture: 2–7% [38,54]
- Debonding: 1–6% [45,54]
- Marginal discoloration: 5–12% [44]
- Secondary caries: <3% [47,50]

Primary etiological factors:

- Parafunctional habits (bruxism) [47,38]
- Occlusal imbalance [14,38]
- Insufficient enamel support [6,21]
- Cementation errors [19,42]

Overall survival rates:

- Ceramic veneers: **90–96% (10–15 years)** [3,54,51]
- Composite veneers: **70–85% (5–7 years)** [12,33]

Assessment

Most failures are biomechanical or operator-dependent rather than material-related, confirming findings from long-term clinical analyses [38,47,54].

3.6 Comparison With Crowns and Bleaching

Veneers vs Crowns

- Veneers preserve 50–70% more tooth structure than crowns [21,22]
- Crowns provide superior mechanical reinforcement but require extensive preparation [21]
- Veneers maintain higher pulpal safety due to enamel preservation [7,21]

Veneers vs Bleaching

- Bleaching is effective for mild discoloration [23]
- Veneers are superior for:
  - Severe discoloration
  - Structural defects
  - Morphological corrections [13,28]

Assessment

Bleaching remains first-line therapy, while veneers represent definitive aesthetic rehabilitation in advanced cases [23,28].

3.7 Digital Dentistry Outcomes

CAD/CAM systems and digital smile design (DSD) demonstrated improved clinical outcomes in veneer rehabilitation [26,39,55].

Reported advantages

- Enhanced marginal accuracy
- Improved esthetic predictability
- Reduced laboratory-related errors
- Increased patient satisfaction

Overall assessment

Digital workflows improve reproducibility, precision, and treatment planning efficiency. However, clinical success remains dependent on operator experience, proper case selection, and material choice [26,39,55].

Table 5. Traditional vs Digital Veneer Workflow [15,25,26,27,38]

Feature	Conventional	Digital (CAD/CAM + DSD)1
1Accuracy	Moderate	High
Planning	Manual	Virtual simulation
Time efficiency	Lower	Higher
Predictability	Variable	High
Communication	Limited	Enhanced

3.8 Veneer Preparation and Clinical Workflow Algorithm

A standardized clinical workflow for indirect veneer treatment was identified across the included studies, encompassing preoperative assessment, digital or conventional shade selection, minimally invasive tooth

Liana Papayan, Anna Hakobyan. Dental Veneers in Contemporary Esthetic Dentistry:A Systematic Review of Current Evidence Bulletin of Stomatology and Maxillofacial Surgery. 2026;22(3)104-116
doi:10.58240/1829006X-2026.22.3-104

preparation, provisionalization (when indicated), final adhesive cementation, and occlusal adjustment.

As illustrated in Figure 3, the veneer workflow follows a minimally invasive and stepwise clinical protocol designed to optimize esthetic predictability, biological preservation, and long-term adhesive stability.

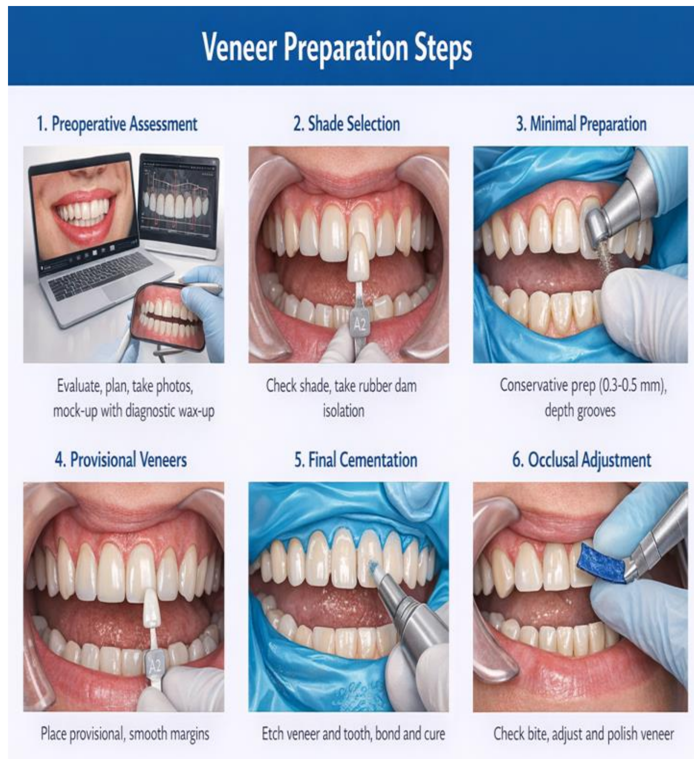

Figure 3. Veneer preparation and clinical workflow algorithm.

A standardized veneer workflow was consistently reported across the included studies, reflecting a multiphase and minimally invasive clinical protocol integrating diagnostic, preparatory, and adhesive stages.

Preoperative assessment and planning

The initial phase included clinical examination, photographic documentation, digital smile design analysis, and diagnostic wax-up. This stage was considered essential for accurate case selection, functional evaluation, and esthetic planning.

Shade selection and isolation

Shade selection was performed prior to dehydration of tooth structure to ensure optical accuracy. Rubber dam isolation was consistently recommended to provide a controlled, contamination-free environment for adhesive procedures.

Tooth preparation

Minimal enamel-preserving preparation (approximately 0.3–0.5 mm) with depth orientation grooves was commonly reported. This conservative approach was associated with improved enamel bonding substrate availability and enhanced long-term adhesive performance.

Provisionalization phase

Temporary restorations were used to evaluate esthetics, phonetics, occlusion, and gingival tissue response. This phase allowed functional and esthetic validation and permitted necessary contour modifications prior to definitive restoration.

Definitive cementation

Final adhesive cementation involved ceramic surface conditioning (etching and silanization), followed by adhesive application and resin cement placement. Controlled seating and standardized light-curing protocols were used to optimize marginal adaptation and micromechanical retention.

Occlusal adjustment and finishing

Occlusal equilibration and polishing were performed to ensure functional harmony, eliminate premature contacts, and improve surface smoothness. This step was associated with reduced risks of fracture, debonding, and plaque accumulation.

Overall synthesis of workflow findings

The identified workflow represents a biologically conservative, evidence-based veneer protocol integrating digital diagnostics with adhesive restorative principles. Across studies, enamel preservation was consistently highlighted as a key determinant of long-term bonding success [6,19,44].

In addition, the staged clinical approach—particularly the use of provisionalization—was associated with improved predictability by enabling functional and esthetic validation prior to final cementation [8,13,28].

Overall, the evidence indicates that modern veneer rehabilitation is a structured multiphase clinical process combining digital planning, conservative preparation, adhesive optimization, and functional refinement, contributing to high survival rates and stable esthetic outcomes [3,36,54].

DISCUSSION

Dental veneers represent one of the most predictable and conservative treatment modalities in contemporary esthetic dentistry, with long-term clinical success strongly influenced by material selection, enamel preservation, and standardized adhesive protocols [1–3]. The findings of this systematic review indicate that ceramic veneers—particularly lithium disilicate and feldspathic porcelain systems—demonstrate superior long-term survival compared with composite resin alternatives, consistent with previously published clinical evidence and systematic evaluations [2,3,10,30.]

A key finding of this review is that enamel preservation plays a central role in determining clinical success. Enamel bonding provides higher bond strength, improved hydrolytic stability, and reduced marginal degradation compared with dentin adhesion [6,18,19]. These findings support the minimally invasive philosophy in contemporary restorative dentistry, where conservative preparation strategies are emphasized to preserve biological tooth structure and enhance adhesive predictability [7,21,22].

From a biomechanical perspective, veneer preparation design significantly influences stress distribution at the tooth–restoration interface. Evidence suggests that incisal overlap designs may improve fracture resistance and load distribution, particularly in anterior teeth subjected to higher functional stress [14,22,38]. In contrast, no-preparation and minimal-preparation approaches, while biologically advantageous, may present limitations in cases requiring significant color masking or morphological correction [13,20]. Therefore, preparation design should be individualized based on occlusal risk assessment, available enamel substrate, and esthetic requirements.

Material selection remains a major determinant of clinical performance. Lithium disilicate ceramics (approximately 360–400 MPa flexural strength) demonstrate a favorable balance between mechanical durability and optical properties, supporting their widespread clinical use in anterior veneers [9,11,50]. Feldspathic porcelain offers superior esthetic integration due to its optical similarity to enamel but exhibits lower fracture resistance, making it more suitable for low-stress esthetic zones [10]. In comparison, composite resin veneers are associated with polymer degradation over time, leading to staining susceptibility, surface roughness, and reduced gloss retention [12,33].

Standardization of adhesive protocols is also critical for long-term success. The combination of hydrofluoric acid etching, silane application, and resin cementation remains the most reliable bonding approach for ceramic veneers [16,17,18]. However, clinical variability—including contamination, inappropriate etching protocols, and inadequate isolation—continues to represent a major cause of early failure [19,42]. These findings reinforce that veneer longevity is highly technique-sensitive and depends not only on material properties but also on strict adherence to clinical protocols.

The complication profile reported across studies remains relatively low when evidence-based protocols are followed. The most commonly reported complications include fracture, debonding, and marginal discoloration, generally occurring in fewer than 10% of cases during long-term follow-up [24,25,54]. These failures are predominantly associated with parafunctional habits, occlusal discrepancies, and insufficient enamel support rather than intrinsic material deficiencies [3,38,47].

When compared with full-coverage crowns, veneers provide significantly greater preservation of tooth structure, thereby supporting pulp vitality and reducing biological complications [21,22]. However, crowns remain indicated in cases involving extensive structural loss or severely compromised tooth integrity. Similarly, bleaching is considered the first-line conservative treatment for mild discoloration, whereas veneers are indicated in cases requiring definitive morphological correction or moderate-to-severe esthetic rehabilitation [23,28].

Recent advancements in digital dentistry, including CAD/CAM systems and digital smile design (DSD), have improved diagnostic accuracy, treatment predictability, and interdisciplinary communication [26,39,55]. These technologies reduce laboratory-related errors and enhance reproducibility; however, they also introduce reliance on software accuracy and require adequate clinical expertise to avoid design and execution errors.

Despite the overall success of veneer therapy, limitations remain in the current evidence base. Most studies are retrospective or observational in nature, with a limited number of long-term randomized controlled trials exceeding 10–15 years of follow-up [30,36]. In addition, heterogeneity in preparation designs, adhesive protocols, and outcome measures limits direct comparability across studies [2,19]. This highlights the need for standardized clinical protocols and well-designed multicenter prospective trials.

From a clinical perspective, veneer success depends on a multidisciplinary approach that includes diagnostic wax-up, digital planning, mock-up procedures, and occlusal analysis. Careful patient selection and

Liana Papayan, Anna Hakobyan. Dental Veneers in Contemporary Esthetic Dentistry:A Systematic Review of Current Evidence Bulletin of Stomatology and Maxillofacial Surgery. 2026;22(3)104-116
doi:10.58240/1829006X-2026.22.3-104

education regarding parafunctional habits are also essential to ensure long-term stability.

Among available materials, ceramic veneers—particularly lithium disilicate systems—demonstrate superior long-term performance compared with composite resin alternatives in terms of esthetics, durability, and survival rates [9,10,50].

Future research should focus on bioactive adhesive systems, AI-assisted treatment planning, and advanced nanoceramic materials with improved fatigue resistance to further enhance clinical predictability. Additionally, long-term (>20 years) prospective studies are required to fully validate the durability of contemporary veneer systems.

In conclusion, dental veneers remain one of the most successful minimally invasive esthetic restorative options in modern dentistry. Their clinical success depends on a synergistic interaction between material properties, adhesive technology, and clinical execution rather than any single isolated factor. Ongoing innovations in biomaterials and digital workflows are expected to further improve their longevity, predictability, and clinical applicability.

Clinical Implications

Dental veneers should be considered a first-line treatment modality for anterior esthetic rehabilitation in appropriately selected cases where enamel preservation is feasible. Based on the synthesized evidence, their primary indications include:

- Mild to moderate intrinsic or extrinsic discoloration resistant to bleaching [23]
- Diastema closure and anterior spacing correction [8,28]
- Morphological and shape modifications (e.g., peg-shaped lateral incisors) [13]
- Restoration of enamel defects such as fluorosis and hypoplasia [1,2]

These indications highlight veneers as a minimally invasive alternative to full-coverage restorations, offering superior tissue preservation with high esthetic outcomes.

However, strict case selection is essential. Veneer therapy should be avoided or carefully managed in the following conditions:

- Severe bruxism without occlusal splint protection [38,47]
- Insufficient enamel substrate for reliable adhesion [6,21]
- High caries risk and poor oral hygiene [47]
- Severe malocclusion requiring orthodontic correction [22]

In such cases, multidisciplinary or alternative restorative strategies are recommended.

Limitations of the Evidence

Despite strong supporting literature, several limitations affect the current evidence base.

A major limitation is methodological heterogeneity, including variability in study design, restorative materials, preparation techniques, and outcome definitions. This significantly limits direct comparison and meta-analytic synthesis [2,30].

Furthermore, there is a scarcity of long-term randomized controlled trials exceeding 15 years, with most available data derived from retrospective or observational studies, which are more susceptible to selection and performance bias [36,37].

Another limitation is inconsistency in adhesive and cementation protocols, including differences in etching time, surface treatment, and resin cement selection, all of which significantly influence clinical outcomes [18,19].

Finally, operator dependency remains a critical confounding factor, as clinical success is strongly influenced by clinician skill, laboratory communication, and execution quality rather than standardized protocols alone [42,47].

Future Directions

Future research in veneer dentistry should focus on improving predictability, longevity, and biological integration through advanced technologies.

Key priorities include:

- Long-term randomized controlled trials (>10–20 years) to strengthen survival evidence [30,54]
- Standardization of preparation protocols (minimal vs incisal overlap designs) [14,22]
- Integration of AI-assisted digital smile design systems for predictive esthetic planning [26,55]
- Development of bioactive adhesive systems with remineralization and antibacterial properties [18]

- Advancement of nanoceramic and hybrid materials with improved fatigue resistance and enamel-like optical behavior [9,50]

These innovations are expected to significantly enhance clinical predictability and broaden minimally invasive treatment indications.

Future research should focus on AI-integrated planning systems, bioactive adhesive technologies, and advanced nanoceramic materials to further enhance predictability and durability. Long-term studies exceeding 20 years are still required to validate the durability of current protocols.

The success of veneer restorations is primarily determined by three essential factors: enamel preservation, appropriate preparation design, and strict adherence to adhesive protocols [6,14,18]. When these principles are respected, veneers provide highly reliable and minimally invasive esthetic rehabilitation with excellent long-term outcomes.

However, clinical success is multifactorial and influenced by patient selection, occlusal dynamics, and operator expertise. Therefore, meticulous diagnosis and treatment planning remain fundamental.

The integration of the veneer preparation algorithm with current evidence demonstrates that dental veneers achieve optimal outcomes when guided by a structured, minimally invasive, and adhesive-driven clinical workflow. The success of this approach depends on the synergistic interaction between material science, digital diagnostics, and clinical execution.

CONCLUSION

Dental veneers represent a predictable, conservative, and highly esthetic restorative option in modern dentistry. Among available materials, ceramic veneers-particularly lithium disilicate systems-demonstrate superior long-term clinical performance compared with composite alternatives. Future developments in digital dentistry, artificial intelligence, and biomaterial engineering are expected to further enhance precision, predictability, and longevity, reinforcing veneers as a cornerstone of modern esthetic dentistry.

DECLARATION

FUNDING

This research did not receive funding from any agency or institution.

Conflict of Interest

None to declare.

Ethical Approval

“Not applicable”

Consent for publication

“Not applicable”

REFERENCES

1. Pini NP, Aguiar FHB, Lima DANL, Lovadino JR, Terada RSS, Pascotto RC. Advances in dental veneers: materials, applications, and techniques. *Clin Cosmet Investig Dent.* 2012;4:9–16. doi:10.2147/CCIDE.S7837
2. Peumans M, Van Meerbeek B, Lambrechts P, Vanherle G. Porcelain veneers: a review of the literature. *J Dent.* 2000;28(3):163–177. doi:10.1016/S0300-5712(99)00066-4
3. Layton DM. Clinical performance of porcelain veneers. *Aust Dent J.* 2012;57 Suppl 1:1–6. doi:10.1111/j.1834-7819.2012.01690.x
4. Magne P, Belser UC. Bonded porcelain restorations in the anterior dentition: a biomimetic approach. *Quintessence Int.* 2002. doi:10.1016/S0022-3913(02)00014-6
5. Friedman MJ. A 15-year review of porcelain veneer survival. *Compend Contin Educ Dent.* 1998;19(7):657–660.
6. Van Meerbeek B, De Munck J, Yoshida Y, et al. Adhesion to enamel and dentin: current status and future challenges. *Oper Dent.* 2003;28(3):215–235. doi:10.2341/05-004
7. Mount GJ, Hume WR. Preservation of tooth structure in restorative dentistry. *Aust Dent J.* 2005;50(4 Suppl):S9–S13. doi:10.1111/j.1834-7819.2005.tb00371.x
8. Spear FM, Holloway JA, Miller CS. Treatment planning for esthetic anterior restorations. *J Am DentAssoc.*2006;137(5):700–710. doi:10.14219/jada.archive.2006.0285
9. Zarone F, Ferrari M, Mangano FG. Current status on lithium disilicate ceramics. *Int J Dent.* 2016;2016:9840594. doi:10.1155/2016/9840594
10. Kelly JR, Benetti P. Ceramic materials in dentistry: historical evolution and current practice. *Aust Dent J.* 2011;56 Suppl 1:84–96. doi:10.1111/j.1834-7819.2010.01299.x
11. Heintze SD. Clinical performance of ceramic materials. *Dent Mater.* 2010;26(12):1195–1202. doi:10.1016/j.dental.2010.08.004
12. Demarco FF, Collares K, Coelho-de-Souza FH, et al. Anterior composite restorations: survival and failures. *Dent Mater.* 2015;31(10):1214–1224. doi:10.1016/j.dental.2015.07.005

13. Gürel G. Porcelain laminate veneers: clinical applications. *J Prosthet Dent.* 2003;89(3):268–274. doi:10.1067/mpr.2003.50
14. Castelnuovo J, Tjan AH, Phillips K, Nicholls JI, Kois JC. Fracture resistance of ceramic veneers based on preparation design. *J Prosthet Dent.* 2000;83(6):620–626. doi:10.1067/mpr.2000.107568
15. Coachman C, Calamita MA. Digital smile design and treatment planning. *Int J Esthet Dent.* 2014;9(3):374–385.
16. Blatz MB, Sadan A, Kern M. Resin-ceramic bonding: a review. *J Prosthet Dent.* 2003;89(3):268–274. doi:10.1067/mpr.2003.50
17. Özcan M, Vallittu PK. Effect of surface conditioning methods on ceramic bonding. *Dent Mater.*2003;19(8):725–731. doi:10.1016/S0109-5641(03)00019-9
18. Pashley DH, Tay FR, Breschi L, et al. State of the art etch-and-rinse adhesives. *Dent Mater.* 2011;27(1):1–16. doi:10.1016/j.dental.2010.10.016
19. De Munck J, Van Landuyt K, Peumans M, et al. A critical review of bonding durability. *J Dent Res.* 2005;84(2):118–132. doi:10.1177/154405910508400204
20. Akoglu B, et al. Clinical indications for porcelain veneers. *Eur J Prosthodont Restor Dent.* 2015;23(4):185–190.
21. Goodacre CJ, et al. Tooth preparations for crowns and veneers. *J Prosthet Dent.* 2001;86(5):507–518. doi:10.1067/mpr.2001.119387
22. Joiner A. Tooth bleaching: a review. *J Dent.* 2006;34(7):412–419. doi:10.1016/j.jdent.2006.02.002
23. Layton DM, Walton TR. Porcelain veneer survival up to 16 years. *Int J Prosthodont.* 2012;25(2):120–127.
24. Beier US, Kapferer I, Burtscher D, Dumfahrt H. Clinical performance of porcelain veneers. *Int J Prosthodont.* 2012;25(1):79–85.
25. Mangano FG, et al. CAD/CAM dentistry and digital workflows. *BMC Oral Health.* 2017;17:69. doi:10.1186/s12903-017-0356-3
26. Coachman C. Digital smile design conceptual framework. *Int J Esthet Dent.* 2017;12(2):210–227.
27. Christensen GJ. Veneers: indications, techniques, and long-term success. *J Am Dent Assoc.* 2005;136(11):1533–1537. doi:10.14219/jada.archive.2005.0075
28. Friedman MJ, Munoz CA. Porcelain veneer longevity: clinical analysis. *J Esthet Dent.* 1995;7(1):21–26.
29. Burke FJT, et al. Survival of porcelain veneers: systematic evaluation. *Br Dent J.* 2011;211(4):169–174. doi:10.1038/sj.bdj.2011.661
30. Heymann HO, et al. Conservative esthetic dentistry principles. *J Prosthet Dent.* 1998;79(5):484–488.
31. Friedman MJ. Porcelain veneer survival: long-term review. *Compend Contin Educ Dent.* 2003;24(8):637–645.
32. Guess PC, Stappert CFJ. Midterm results of lithium disilicate veneers. *Int J Prosthodont.* 2008;21(5):405–413.
33. Calamia JR. Etched porcelain veneers: clinical technique. *Quintessence Int.* 1983;14:143–151.
34. Stappert CFJ, et al. Clinical performance of ceramic veneers. *Dent Mater.* 2005;21(9):799–806. doi:10.1016/j.dental.2005.01.008
35. Gresnigt MMM, et al. Randomized clinical trial of ceramic veneers. *J Dent.* 2016;48:58–63. doi:10.1016/j.jdent.2016.03.002
36. Morimoto S, et al. Survival rate of ceramic veneers: meta-analysis. *J Dent Res.* 2016;95(4):e52–e58.
37. Etman MK, Woolford MJ. Failure modes of porcelain veneers. *J Prosthet Dent.* 2010;104(5):284–291.
38. Fasbinder DJ. CAD/CAM dentistry and digital veneers. *Dent Clin North Am.* 2015;59(3):679–695.
39. Chai J, et al. Resin cement bonding strength. *Dent Mater.* 2010;26(2):e43–e49.
40. Swift EJ Jr. Adhesive dentistry evolution. *Compend Contin Educ Dent.* 2011;32(3):12–18.
41. Van Meerbeek B. Adhesive dentistry update. *J Dent Res.* 2011;90(7):823–829.
42. Peumans M, et al. Clinical effectiveness of veneers. *J Dent.* 2004;32(5):435–442.
43. Aristidis GA, Dimitrouli M. Survival of ceramic veneers. *J Prosthet Dent.* 2000;83(6):615–619.
44. Layton DM, Clarke M. Porcelain veneer survival analysis. *Int J Prosthodont.* 2013;26(1):23–28.
45. Goodacre CJ, et al. Clinical complications in fixed prosthodontics. *J Prosthet Dent.* 2003;90(1):1–12.
46. Meijering AC, et al. Patient satisfaction with veneers. *J Prosthet Dent.* 1998;79(2):122–127.
47. Kokubo Y, et al. Mechanical properties of ceramics. *Dent Mater J.* 2008;27(4):569–573.
48. Guess PC, et al. Fracture resistance of lithium disilicate. *Dent Mater.* 2010;26(6):e107–e114.
49. Sailer I, et al. Clinical success of ceramic restorations. *J Dent Res.* 2007;86(8):733–740.

50. Zarone F, et al. CAD/CAM ceramic systems review. *Int J Comput Dent.* 2019;22(2):101–118.
51. Spitznagel FA, et al. Minimally invasive esthetic dentistry. *J Esthet Restor Dent.* 2018;30(3):187–193.
52. da Costa J, et al. Long-term outcomes of ceramic veneers. *Oper Dent.* 2012;37(4):399–407.
53. Liu PR. Digital workflow in prosthodontics. *J Prosthodont.* 2015;24(6):506–511.
54. Layton DM, Walton TR, et al. Long-term survival analysis of porcelain veneers: a systematic clinical follow-up study. *Int J Prosthodont.* 2013;26(1):23–28.
55. Gresnigt MMM, Kalk W, Özcan M, et al. Clinical performance and complications of ceramic laminate veneers: a long-term follow-up study. *J Dent.* 2012–2016 clinical evidence series.

Copyright © 2026 by author(s) and "ASTRA SCIENCE" L L C This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).
https://creativecommons.org/licenses/by-nc/4.0/