A Narrative Review on the Survival and Success Rates of Veneers in Contemporary Dentistry

Keywords

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ABSTRACT

Objective: This study aims to investigate the survival and success rates of dental veneers based on different material types and preparation designs. Methods: A comprehensive search was conducted to identify relevant studies. Inclusion criteria limited articles to English language published in the last 27 years, resulting in 63 studies. Results: Veneers with minimal preparation designs showed higher survival rates than extensive preparation. Incisal overlap re-establishes anterior guidance, distributing occlusal forces with the most predictable outcomes. Survival and success rates range based on material type and preparation design. Ceramic veneers demonstrated the highest survival and success rates, followed by composite veneers. Indirect composite veneers showed higher survival and success rates than direct composite veneers. Conclusion: Scientific evidence favors minimal preparation designs for better survival rates, with clinician preference guiding design choice. Ceramic veneers consistently demonstrated higher survival and success rates than composite veneers, with both remaining viable options. Indirect composite veneers exhibited higher survival and success rates than direct composite veneers. Decision-making should consider patient needs, operator experience, and restoration longevity goals. Clinical Significance: Selecting an effective and durable prosthodontic treatment is essential in dental practice. Ceramic veneers with minimal preparation design emerged as the most preferable material.

INTRODUCTION

Dental veneers are thin, tooth-colored restorations bonded to the facial surfaces of anterior teeth to enhance aesthetics and restore form and function.[1] As patient demand for aesthetic yet conservative treatments continues to rise, veneers have become a cornerstone of contemporary restorative dentistry, offering minimally invasive solutions with high patient satisfaction and predictable outcomes.

Veneers are indicated in a variety of clinical situations, including discoloration (such as tetracycline staining, fluorosis, or amelogenesis imperfecta), worn, damaged or fractured teeth, abnormal tooth morphology, minor malpositions, and intraoral repairs of fractured crowns or bridges.[2,3] Relative contraindications include parafunctional habits, edge-to-edge occlusion, poor oral hygiene, and insufficient enamel.[2,3] However, these are not absolute, and must be considered within the context of individual case planning. Poor oral hygiene, while a concern, should not categorically preclude veneer placement. Rather, it highlights the need for appropriate pre-restorative intervention to stabilize the periodontium

and reinforce patient compliance. Once adequate hygiene is achieved, veneers may be considered a suitable treatment option, provided the patient demonstrates ongoing compliance with oral hygiene practices and routine maintenance.[4,5] Similarly, while enamel is the most reliable substrate for long-term adhesion, advancements in adhesive technologies and bonding protocols have significantly improved the predictability of dentin bonding. When appropriate techniques are employed, veneers bonded to dentin can still achieve functional and aesthetic outcomes. Consequently, the insufficient enamel should not preclude treatment, but rather prompt clinical consideration that necessitates careful case selection and treatment planning.[6,7]

Veneers are classified based on four main categories. Firstly, veneers are classified based on the method of fabrication, differentiating between direct and indirect techniques. Secondly, the extent of coverage classifies veneers into either partial or full veneers. Partial veneers are used for localized defects or areas of intrinsic discoloration that involve only a portion of the clinical crown whereas full veneers are used when most of the facial surface or the entire clinical crown of the tooth is discolored or in need of restoration for generalized defects.[2] Thirdly, the tooth preparation for full veneers includes full veneer with incisal lapping and full veneer with window preparation. Finally, veneers are classified based on the materials and techniques used: (1) directly fabricated resin composite veneers which include both direct partial and full veneers; (2) indirectly fabricated veneers which include etched porcelain veneers, processed resin composite veneers, and castable ceramic veneers; and (3) veneers designed for metal restorations.[2]

The evolution of veneer materials has paralleled advances in adhesive dentistry. Early laminate veneers introduced in the 1970s were composed of cross-linked polymers and prioritized aesthetics and chairside efficiency.[8,9] In the 1980s, the etching of both enamel and ceramic enabled stronger bonds, solidifying porcelain veneers as a durable and aesthetic treatment option.[3,10] Etched ceramic veneers have established themselves as a durable and aesthetic form of therapy since their introduction more than 20 years ago. Modern advancements in adhesive technologies and cementation procedures allow for a minimally invasive preparation, conserving tooth structure while fulfilling the patient's restorative and aesthetic needs.[11]

As materials, techniques and preparation designs have advanced, dental veneers have become one of the most predictable, aesthetic and least invasive treatment modalities. Despite widespread use, existing studies on veneer performance often differ in definitions of success and survival, and frequently lack standardization in reporting critical factors such as tooth vitality, occlusal conditions, or preparation design. This variability complicates direct comparisons across material types and techniques, and underscores the need for a structured review of the evidence. The review presents data regarding their survival and success rates across different materials and techniques. Resin composite veneers, while affordable and easily repairable, are more technique-sensitive and show variable long-term performance, heavily influenced by operator skill and patient compliance.[12] Direct resin composite veneers allow single-visit application and require minimal preparation, while indirectly fabricated ceramic or zirconia veneers offer enhanced durability, improved aesthetics, and long-term color stability.[13] In contrast, ceramic veneers, particularly those fabricated from feldspathic or lithium disilicate ceramics, have consistently demonstrated high survival and success rates in long-term clinical studies.[14] Zirconia veneers, especially in monolithic form, are gaining popularity due to their strength and fracture resistance, however, clinical data on their longevity and performance remain limited.[15]

Given the ongoing development of restorative materials and techniques, there is a pressing need to synthesize the available literature and provide a structured, comparative analysis of veneer outcomes. Dentists are tasked with selecting materials and methods that not only ensure minimally invasive treatment but also satisfy the patient's biological, structural, and aesthetic needs. The clinical survival and success of veneers can be attributed to meticulous attention to detail, including case planning with the correct indication; conservative tooth preparation; appropriate selection of materials and methods of cementation; and thoughtful planning for the ongoing maintenance of these restorations.[11]

The purpose of this research is to conduct a comprehensive literature review that aims to synthesize the available literature on the survival and success rates of dental veneers fabricated from resin composites, ceramics, and zirconia. In doing so, it will also explore variations in preparation design and clinical protocols. By critically appraising the current evidence, this review seeks to contribute to the existing knowledge and provide valuable insights that can assist dentists in making informed evidence-based clinical decisions regarding material selection, preparation techniques, and to identify areas where further investigation is needed to inform best practice. In turn, ultimately improving patient outcomes in aesthetic restorative dentistry.

MATERIALS AND METHODS

A comprehensive search of electronic publications was made using the electronic databases PubMed, Google Scholar, Cochrane Library, and Elsevier to identify relevant studies from 1970 to 2024. The first light-cured resins used in dentistry date to the early 1970s, marking a significant advancement in dental materials and restorative techniques.[16]

The search used a combination of the following key words: "resin composite", "ceramic", "zirconia", "veneer", "survival", "success", "rate", "preparations". The search included only English-language articles published in peer-reviewed dental journals. The selection process involved a two-phase screening: initial review of titles and abstracts, followed by full-text evaluation. Data from the included studies were extracted using a standardized spreadsheet, capturing variables such as

study design, veneer material, preparation type, follow-up duration, and outcome measures. Reference management software was used to organize citations and detect duplicates. Additionally, the reference lists of all included articles were reviewed to identify further eligible studies. Studies were excluded if they lacked clinical outcome data, were not peer-reviewed, or were case reports, letters, or non-English articles. The articles selected met the inclusion criteria of studies that reported on the survival and success rates of dental veneers based on different material types and preparation designs. A total of 63 studies were included in this review.

It is important to note that for this literature review, the term "success" is defined by achieving certain predefined criteria. This includes elements such as retention, function, aesthetics, as well as the absence of fractures and displacement. Whilst the term "survival" in the context of dental veneers refers to the presence of the original restoration after its placement. In contrast, "failure" of dental veneers occurs when the veneer causes dysfunction, dislodgment, or inability to fulfill its intended purpose. This encompasses issues such as documentation, debonding, fracturing, chipping, dislodgement, or shade correction, which necessitates replacement.

RESULTS

PREPARATION TYPES

There are four primary tooth preparation designs that are frequently referenced (as shown in figure 1): a) incisal overlap preparation, in which the tooth's incisal edge is prepared bucco-palatable, and its length is decreased (about 2 mm), thus the veneer is extended palatally; b) bevel preparation, in which the tooth's incisal edge is prepared bucco-palatable and its length is slightly decreased (0.5-1 mm); c) window preparation, which preserves the tooth's incisal edge; and d) feather preparation, in which the tooth's incisal edge is prepared bucco-palatable but the length of the incisor is left unaltered.[3]

Examining the effect various tooth preparation designs have on the success and survival of dental veneers, such as fracture resistance and abutment tooth reinforcement is fundamental. Unfortunately, there is a scarcity of clinical trials assessing the survival rates of dental veneers based on different preparation designs. However, there are numerous *in vitro* studies on the influence of various preparation designs. Despite not precisely replicating clinical conditions, they continue to offer valuable insights.[18,19] Within the confines of the available literature, clinician preference is the determining factor in selecting a preparation design. However, among the various tooth preparation designs, incisal overlap appears to have the most predictable outcomes.[3]

According to various studies, features of preparation designs that are recommended include: (1) confining the preparation to enamel for enhanced bonding strength and a more durable outcome; and (2) preserving interproximal contacts as it conserves

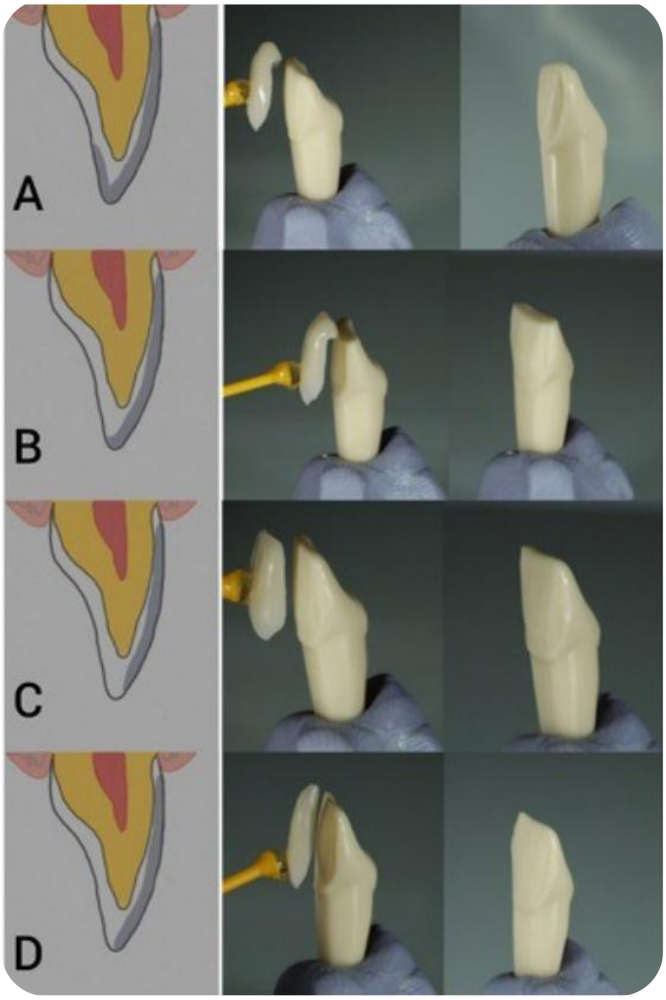

Figure 1: Tooth preparation designs of veneers, modified from Walls, Steele & Wassell (2002)[17]

enamel and tooth structure, facilitating cementation in a conservative approach.[3,20] However, despite recommendations, situations may arise where removing the interproximal contact can enhance aesthetic results, such as in cases of misaligned teeth or diastema.[3] Additionally, adhering to specific labial reduction ranges, particularly 0.4-0.7 mm for ceramic veneers, is emphasized due to variations in enamel thickness across different tooth regions.[3,10]

While there are varying opinions and results on the influence preparation designs have on the survival of the restoration, notably, using incisal overlap preparation, anterior guidance is re-established, which provides the most optimal support, distributing occlusal forces over a larger surface area. Considering the relatively low biting force of anterior teeth and the absence of robust clinical studies, ultimately, the choice of preparation design is predominantly influenced by clinician preference, while incisal overlap, in particular, is highlighted for its potential to re-establish anterior guidance.[3] In contrast, the window preparation concentrates occlusal stress on the incisal third, potentially leading to restoration fracture.[20] Additionally, achieving incisal translucency is associated with reducing the incisal edge. However, the decision between whether it is favorable to add a chamfer finish line, or a shoulder finish line (butt-joint) remains

contentious. Some studies argue in favor of a chamfer finish line for improved tolerance to occlusal stress, while others dispute its impact on restoration longevity.[21] Moreover, some studies have reported that veneers with shoulder finish lines, in contrast, may provide multiple paths of insertion, potentially aiding in longevity. However, having a single path of insertion is deemed advantageous for preventing displacement during cementation.[3]

SURVIVAL AND SUCCESS RATES

Today, a variety of materials are available for aesthetic and functional veneer restorations, including resin composites, ceramics and zirconia. As a result, the treatment results and longevity vary depending on the material used. Table 1 demonstrates the survival rates of resin composite and ceramic veneers from various clinical studies whereas table 2 presents their success rates.

In this review, survival is defined as the restoration remaining in situ without total failure (e.g., debonding or fracture requiring replacement), whereas success refers to both the functional and aesthetic performance of the restoration without the need for repair, and absence of complications such as marginal defects, discoloration, or patient dissatisfaction. These distinctions are important to accurately evaluate clinical performance over time.

The foundation of evidence-based dentistry lies in systematic reviews and meta-analyses. Tables one and two above encompass a collection of studies conducted over varying durations, investigating the survival and success rates of ceramic and resin composite veneers, and providing a comprehensive overview of their performance and longevity. The survival and success rates should be evaluated carefully due to variations in their definitions, follow-up periods, varying years of data collection and operator expertise across studies underscores the need for cautious interpretation of these data.

DISCUSSION

RESIN COMPOSITE: INDIRECT AND DIRECT

Resin composites have been fundamental to conservative dentistry since their introduction in the 1940s, offering an aesthetic and minimally invasive approach to anterior restorations. Resin composites are composed of an organic resin matrix, inorganic fillers, and coupling agents, with advancements in their formulation continuously improving their mechanical and aesthetic properties.[22,23] While it was believed that porcelain veneers would eventually replace anterior resin composite restorations, recent advancements in aesthetic properties, wear resistance, and mechanical performance of resin composites have led to their extensive application clinically.[3,24]

Over the years, a variety of fillers have been added to enhance resin composites. Their inclusion has many advantages, including (1) a reduction in polymerization shrinkage and the monomer's coefficient of thermal expansion; (2) enhancement of mechanical properties, handling, and aesthetics; and (3) the use of metallic additives (such as barium) offer greater radiopacity.[3] Resin composite veneers can be applied via direct or indirect techniques, each with differing clinical outcomes. The direct technique offers reduced chair time while maintaining aesthetics, lower cost, and allows for enamel preservation which facilitates more reliable adhesion.[24-26] However, the aesthetic outcome is highly dependent on the clinician's ability in layering, contouring, finishing and polishing the restoration.[25,26] In contrast, the indirect technique provides enhanced control over contours and aesthetics, as well as improved wear resistance, though it is more time-consuming and costly.[27]

Survival rates for resin composite veneers vary significantly depending on the mode of application. Direct resin composite veneers demonstrate 5-year survival rates ranging from 79% to 89%, decreasing significantly to approximately 52% at 10 years.[13,24,28,29] This highlights the importance of considering long-term durability when selecting this material. In contrast, indirect resin composite veneers demonstrate higher survival rates, with reported survival rates between 75% and 90% over a 10-year period, making them a more predictable option for restorations requiring greater longevity.[13,30]

Notably, one study reported an 89% survival rate for direct resin composite veneers over a five-year period.[14] This aligns with findings from a randomized controlled trial which reported a survival rate of 87.5% after more than three years.[31] Moreover, a retrospective study on 327 direct resin composite veneers reported a 79% survival rate over five years.[24] These results are comparable to a more recent study on resin composite veneers which showed a 79% and 66% survival rate over 5.6 and 10 years respectively.[13] Despite comparable initial performance, long-term studies consistently show a decline in the survival rates for direct techniques. One investigation showed a notable decline from 85% over five years to 52% over 10 years, emphasizing the importance of long-term follow-ups in assessing durability.[29] Contrastingly, an examination of indirect resin composites over a 10-year period reported a survival rate of 75%. While fewer in sample size, one can infer that indirect resin composite veneers exhibit superior survival rates than direct resin composite veneers.[27] Moreover, a comparative study which focused on both direct and indirect resin composite veneers, indicated a higher survival rate for indirect resin composites at 90%, compared to 74% for direct resin composites over two and a half years, suggesting the potential advantage of indirect resin composites in terms of longevity.[30] Nevertheless, despite being a common practice since the 1990s, the current body of literature lacks published evidence comparing direct and indirect resin composite veneers.[12] Overall, the use of resin composites to veneer anterior teeth is reasonable due to its quick procedure, favorable aesthetic results, and longevity.

Table 1. The survival rate of composite and ceramic veneers.

Reference	Study Design	Patients	Veneers	Time Frame	Survival Rate
Composite Veneers: Direct (DC) and Indirect (IC)					
Peumans et al., 1997[14]	Prospective	23	87	5 years	89% (DC)
Meijering et al., 1998[15]	Prospective	112	263	2.5 years	90% (IC) 74% (DC)
Wolff et al., 2010[16]	Retrospective	101	327	5 years	79% (DC)
Gresnigt et al., 2012[17]	Prospective	23	96	3.4 years	87.5% (DC)
Gresnigt et al., 2019[18]	Prospective	11	24	10 years	75% (IC)
Van de Sande et al., 2019[19]	Retrospective	144	408	5 years 10 years	85% (DC) 52% (DC)
Mazzetti et al., 2022[20]	Retrospective	341	1043	5.6 years 10 years	79.1% (DC) 66% (DC)
Ceramic Veneers:					
Meijering et al., 1998[15]	Prospective	112	263	2.5 years	100%
Peumans et al., 1998[21]	Prospective	25	87	5 years	93%
Dumfahrt & Schäffer, 2000[22]	Retrospective	72	191	10 years	91%
Magne et al., 2000[23]	Prospective	16	48	4.5 years	100%
Aristidis & Dimitra, 2002[24]	Prospective	61	186	5 years	98.4%
Smales & Etemadi, 2004[25]	Retrospective	50	110	Up to 7 years	95.8% incisal 85.5% not incisal
Chen et al., 2005[26]	Retrospective	54	546	2.5 years	99%
Fradeani et al., 2005[27]	Retrospective	46	182	12 years	94.4%
Murphy et al., 2005[28]	Retrospective	29	62	5 years	89%
Layton & Walton, 2007[29]	Prospective	100	304	5-6 years 10-11 years 12-13 years 15-16 years	96% 93% 91% 73%
Guess & Stappert, 2008[30]	Prospective	25	66	5 years	100% full 97.5% overlap
Burke & Lucarotti, 2009[31]	Retrospective	1,177	2,562	10 years	53%
Granell et al., 2010[32]	Retrospective	70	323	11 years	94% simple 85% functional
Beier et al., 2012[33]	Retrospective	84	318	5 years 10 years 20 years	94.4% 93.5% 82.93%
D'Arcangelo et al., 2012[34]	Prospective	30	119	7 years	97.5%
Layton & Walton, 2012[35]	Prospective	155	499	10 years 20 years	96% 91%
Gresnigt et al., 2013[36]	Prospective	20	92	3.3 years	94.6%
Gurel et al., 2013[37]	Retrospective	66	580	6 years 12 years	92% 86%
Rinke et al., 2013[38]	Retrospective	37	130	3 years	95.1%
Öztürk & Bolay; 2014[39]	Prospective	28	125	2 years	91.2%
Aslan et al., 2019[40]	Retrospective	51	413	5 years 10 years 15 years 20 years	98% 95% 91% 87%
Gresnigt et al., 2019[18]	Prospective	11	24	10 years	100%
Mazzetti et al., 2022[20]	Retrospective	341	416	6.6 years 10 years	92.3% 89%

Table 2. The success rate of composite and ceramic veneers.

Reference	Study Design	Patients	Veneers	Time Frame	Success Rate
Composite Veneers: Direct (DC) and Indirect (IC):					
Coelho-de-Souza et al., 2015[41]	Retrospective	86	196	3.5 years	80.1% (DC)
van de Sande et al., 2019[19]	Retrospective	144	408	5 years 10 years	74% (DC) 38% (DC)
Nazar et al., 2021[42]	Retrospective	60	60	0.5 years (6 months)	83.3% (IC)
Mazzetti et al., 2022[20]	Retrospective	341	1043	4.9 years 10 years	48.5% (DC) 35% (DC)
Ceramic Veneers:					
Peumans et al., 2004[43]	Prospective	25	87	5 years 10 years	92% 64%
Guess & Stappert, 2008[30]	Prospective	25	66	5 years	85% full 72% overlap
D'Arcangelo et al., 2012[34]	Prospective	30	119	7 years	84.3%
Rinke et al., 2013[38]	Retrospective	37	130	3 years	92.8%
Karagözoğlu et al., 2016[44]	Prospective	12	62	2 years	100%
Mazzetti et al., 2022[20]	Retrospective	341	416	6.3 years 10 years	83.4 % 75%

Factors influencing the survival rates of resin composite veneers are multifaceted and can pose challenges like compromised adhesive bonding and destructive occlusal force, highlighting the need for careful case selection. These factors include tooth vitality, parafunctional habits such as bruxism, amelogenesis imperfecta, occlusal forces, jaw characteristics, type of tooth involved, and the skill level of the clinician.[32] Despite these challenges, resin composite laminate veneers remain a viable interim restorative option for such cases. Lower survival rates were observed for laminate veneers bonded onto existing resin composite restorations compared to those bonded onto intact teeth, possibly due to difficulties in achieving strong bonds on reduced intact tooth structure, dentine, and mixed substrate.[31] This is consistent with other studies indicating decreased survival rates for nonvital teeth after significant tooth structure removal and reduced fracture resistance following root canal therapy.[12,30] Risk factors identified by previous studies include the maxilla and central incisors for resin composite laminate veneers.[13,29] Imperfections in veneers in this region are more noticeable, potentially requiring intervention. Additionally, the increased masticatory load and parafunctional habits contribute to more complications for laminate veneers. Overall, long-term follow-up studies consistently report lower survival rates compared to shorter follow-up periods, emphasizing the vital role of effective restoration maintenance for optimal aesthetic outcomes in the long term.[13] Despite these challenges, when maintained appropriately, resin composite veneers can provide aesthetically pleasing and functionally acceptable outcomes for a considerable period.

In addition to survival, the success rates of resin composite veneers provide valuable insights into their clinical efficacy.[29,33,34] One study of 196 direct resin composite veneers reported an 90.1% success rate over 3.5 years, with failures often involving veneer fracture or issues on non-vital teeth.[33] Notably, compared to studies where experienced dentists placed the restorations, these veneers were placed by post-graduate students, possibly accounting for the lower success rates.[33] This emphasizes the importance of considering the operator's skill level in evaluating success rates. Moreover, this study highlighted that veneers placed on non-vital teeth have a higher risk of failure over time compared to those placed on vital teeth.[33] The primary cause of failure was reported as the fracture of the veneer. Furthermore, another study conducted over a span of 10 years reported a decline in success rates from 74% at 5 years to 38% at 10 years, with repairs being considered a failure.[29] This decline raises questions about the long-term durability of direct resin composite veneers, highlighting the necessity of extended follow-up. Moreover, a retrospective study observed an 83.3% success rate over 6 months for indirect veneers, citing improved colour stability and greater resistance to fractures and abrasions.[34] The authors highlighted the significant developments in indirect veneers over the past few decades, emphasizing their predictability in terms of patient satisfaction, periodontal response

and longevity. Finally, according to a more recent study, direct resin composite veneers showed a much lower success rate of 48.5% over 4.9 years and 35% over 10 years.[13]

Ultimately, while both techniques have clinical value, indirect resin composite veneers demonstrate more favorable long-term outcomes in terms of survival and success. Careful case selection is critical. Factors such as tooth integrity, vitality, location and parafunctional activity must be considered. Bonding to enamel remains more durable than bonding to existing restorations or dentin.[29,31] Given these findings, resin composite veneers—particularly indirect—remain a viable treatment option when applied in appropriately selected cases and maintained over time.

CERAMIC

Ceramic veneers, first introduced in the 1980s, have gained popularity as a conservative treatment modality for aesthetic restoration of discolored, fractured, worn or damaged, malformed, and malpositioned anterior teeth.[35] Feldspathic porcelain, a common material used to fabricate ceramic veneers, remains a popular material due to its excellent translucency and enamel-like optical properties.[11] Despite the growing variety of ceramic systems, including lithium disilicate (Ivoclar Vivadent's IPS e.max press) and leucite-reinforced ceramics, they all share the goal of combining superior esthetics with long-term durability.[11] Clinical studies have highlighted their exceptional aesthetic durability, high patient satisfaction, and the absence of any adverse impacts on gingival health.[11] However, despite the more conservative and minimally invasive nature, a veneered tooth nonetheless embarks a never-ending cycle of restorative dentistry.[36] Success can be attributed to meticulous attention to detail, including case planning with the correct indication, conservative tooth preparation, appropriate ceramic selection, a suitable choice of materials and methods of cementation, and appropriate planning for ongoing maintenance.[11]

Clinical survival rates for ceramic veneers are consistently high across long-term studies. A retrospective clinical investigation, reported a survival rate of 94.4% after five years, 93.5% after 10 years and 82.93% after 20 years.[37] They discovered the primary cause of failure is a ceramic fracture.[33] Similar outcomes were observed in a randomized controlled trial, which had survival rates of 96% after 10 years and 91% after 20 years.[14] This is further supported by a retrospective study conducted over a span of 20 years, which reported a survival rate of 98% after five years, 95% after 10 years, 91% after 15 years, and 87% after 20 years.[38] Additionally, another retrospective study conducted over 5-6 years reported a survival rate of 96%, decreasing to 93% after 10-11 years, 91% after 12-13 years and 73% after 15-16 years.[39] These findings suggest ceramic veneers maintain their functional and aesthetic integrity over extended periods when proper case selection and bonding protocols are followed. Furthermore, a retrospective clinical investigation reported a survival rate of 94.4% over 12 years.[40] Similarly, another retrospective study conducted over 11 years reported a 94% survival rate for simple veneers and 85% for functional veneers.[41] The comparatively lower survival rate of the functional design restorations, in contrast to findings from other studies, could be due to the specific dental preparation used.[40,42] This involved extending the restoration to the posterior aspect of the tooth while maintaining a fine bevel.[40-42] Consequently, other authors changed the design of the functional restorations to a "butt joint", by reducing the incisal aspect without a palatal chamfer.[40,42] Furthermore, over the course of seven years, one study observed a 95.8% (incisal) survival rate for porcelain veneers while another reported a 97.5% survival rate.[43,44] Another retrospective study reported survival rates of 92% after six years and 86% after 12 years.[45] These findings were similar to another study which reported a survival rate of 92.3% at 6.6 years, decreasing to 89% after 10 years.[13] Other researchers observed that the long-term survival rates of the feldspathic porcelains were comparable. Over a five-year period, one prospective study noted a 93% survival rate, another observed a 98% survival rate, whilst another reported a 100% and 97.5% survival rate for full and overlap veneers respectively.[46-48] Moreover, a retrospective study conducted over five years reported a 89% survival rate.[49] Over 10 years, an investigation reported 91% survival rate whilst another reported a 100% survival rate.[31,50] Additionally, another study also reported a 100% survival rate over two and a half years which is comparable to a study which reported a 99% survival rate for the same duration.[30,51] Moreover, another investigated reported a 100% survival rate over four and a half years.[42] Furthermore, a study conducted over three years reported a survival rate of 95.1%, while another study over 3.3 years observed a survival rate of 94.6%.[52,53] In a prospective study over two years, a survival rate of 91.2% was reported.[54] Finally, a study reported a survival rate of 53%, however it is important to note that the veneers were done by the general dental services, and this low survival rate could be due to the fact that the preparations of teeth did not meet the criteria of a specialist's level.[36]

The longevity of ceramic veneers has been extensively investigated across various studies, with differing survival rates over different times spans. The studies investigated consistently reported high survival rates, indicating that ceramic veneers offer a reliable and effective treatment option for various dental conditions. Factors such as the design of functional restorations and the dental preparation techniques can influence these rates. Moreover, non-vital teeth showed a higher risk of failure compared to veneers placed on vital teeth, suggesting the importance of considering tooth vitality in treatment planning.[30] Additionally, specific factors such as bruxism and nonvital teeth were associated with increased failure rates, while patients who smoked exhibited exacerbated marginal discoloration.[37] Ceramic veneers provide a predictable and effective treatment modality for the conservative and aesthetic treatment of discolored, tetracycline-stained, malformed and mal-aligned anterior teeth, offering excellent results while

preserving maximum sound tooth structure.[41,44,46,47,50,51] The preparation, cementation and finishing procedures are considered the fundamental elements in the long-term survival of veneers.[34] Porcelain veneers must be bonded with a correct adhesive technique to reach adequate survival rates.[27] When bonded to enamel substrate, porcelain veneers offer a predictable long-term restoration with low failure rates, preserving tooth structure.[14,39,45] However, an increased risk of failure is evident when veneers are partially bonded to dentin, thus extensive dentin exposure should be avoided.[21,54]

The success rates of ceramic veneers as demonstrated by various studies highlight their reliability and durability in clinical practice. One study reported a 92.8% success rate over three years.[53] Similarly, another study reported a 92% success rate over 5 years which decreased to 64% over a decade, emphasizing the considerable longevity of ceramic veneers.[4] The main reasons for failure were fractures of porcelain and large marginal defects, particularly at locations ending in an existing resin composite filling. Issues such as severe marginal discoloration and caries recurrence were exhibited in vulnerable areas.[4] Additionally, after five years, a prospective study which investigated full veneers and overlap restorations, revealed clinically satisfying success rates of 85% and 72%, respectively.[48] Cracks, ceramic-cohesive fractures, and loss of adhesion were identified as relative failures, with no statistically significant differences between the two veneer groups.[48] Key factors for long-term success included reliable adhesive bonding and ceramic fatigue and fracture resistance.[48] Similarly, a study over 7 years reported a success rate of 84.3%.[44] Furthermore, over a 2-year period, one study reported an exceptional 100% success rate for ceramic veneers, providing further evidence of the short-term reliability of ceramic veneers.[55] Finally, a prospective noted a 83.4% and 75% success rate at 6.3 and 10 years respectively.[13]

ZIRCONIA

In the twentieth century, the advancement of new high-strength dental ceramics that appear to be less brittle, less restricted in tensile strength, and less susceptible to time-dependent stress failure predominates. These properties appear to be particularly appealing in prosthetic dentistry, where strength and esthetics are critical.[56] Zirconia (zirconium dioxide, ZrO2), also known as “ceramic steel” is a polycrystalline material that can display structural polymorphism (monoclinic, tetragonal, and cubic forms).[57] Over the last decade, zirconia has emerged as a prominent material in restorative dentistry due to its exceptional mechanical properties, including high flexural strength, fracture toughness, fatigue resistance as well as good wear characteristics and biocompatibility.[58] These properties make it especially suitable for cases demanding high durability, such as in patients with bruxism or significant tooth wear.[58]

Despite its widespread use in crowns and bridges, the application of zirconia for veneers remains relatively limited, and clinical data specific to zirconia veneers are sparse. The available evidence suggests promising potential, but the lack of long-term, high-quality studies hinders definitive conclusions about survival and success rates.

Zirconia veneers are typically fabricated using either the traditional layering technique or the hot-pressing method, both of which require bonding porcelain to a zirconia core. While some studies have suggested that limited chemical interactions may occur at the porcelain–zirconia interface may help with bonding, it is still unknown whether true chemical bonding will develop.[58,59] As a result, the primary mechanism of porcelain zirconia bonding is thought to be micro-mechanical or nano-mechanical interlocking.[60] To facilitate this, surface treatments such as sandblasting are commonly employed to increase micromechanical retention. Most publications recommend using a moderate pressure (about 0.4 MPa) and small particle size.[58,61] However, concerns have been raised that sandblasting may promote monoclinic phase transformation in zirconia, potentially affecting material properties, though this effect may be reversed during the veneering process.[58] Additionally, primers and liners have been proposed to enhance surface wettability and improve bonding efficacy, though their clinical effectiveness remains under investigation.[58] Despite these measures, porcelain fractures remain a significant limitation of veneered zirconia restorations, with failure rates ranging from 6% to 25% after just three years, substantially higher than those observed in porcelain-fused-to-metal systems.[58] These failures are often attributed to insufficient bonding strength at the interface between the zirconia core and veneering porcelain.To mitigate these challenges, monolithic zirconia veneers, which eliminate the veneering porcelain layer, have been introduced. Monolithic zirconia offer superior strength and reduced fracture risk, making them suitable for patients with high occlusal loads, significant structural loss and parafunctional habits such as bruxism However, due to its opacity compared to feldspathic or lithium disilicate ceramics, monolithic zirconia may limit aesthetic outcomes, especially in highly translucent zones.[58] However, achieving durable outcomes depends heavily on proper case selection, meticulous surface preparation, and effective bonding protocols. Sandblasting and the use of surface primers may enhance adhesion, but further evidence is needed to confirm their long-term benefits.[58]

Finally, this literature review aimed to provide insights into the survival and success rates of zirconia veneers. However, a notable gap exists in the existing body of research concerning the specific survival and success rates of zirconia veneer remains. Existing literature primarily focuses on the general attributes, benefits, and drawbacks of zirconia restorations, but a dedicated investigation into the longevity and success remains surprisingly scarce. While zirconia crowns and bridges have demonstrated survival rates exceeding 90% at

5-10 years,[56] these findings cannot be directly extrapolated to veneer applications due to differences in thickness, bonding substrate, and functional loading. However, the lack of robust survival and success data remains a major limitation in the current literature. Consequently, current evidence does not provide a reliable basis for assessing the longevity of zirconia veneers. While they offer promising mechanical performance and may be suitable for high-load cases requiring durability, until robust longitudinal data is available, zirconia veneers, particularly monolithic forms, should be reserved for carefully selected patients where strength and durability outweigh aesthetic demands. Further clinical studies are essential to clarify their survival and success rates and to optimize bonding and surface preparation protocols.

CLINICAL CONSIDERATIONS

A clear distinction between success and survival is critical in evaluating veneer performance and should be consistently applied in future studies. Several factors influence the longevity of veneer restorations, including preparation design, adhesive systems, occlusal forces and operator expertise. Enamel bonding is strongly associated with higher survival and success rates, particularly in ceramic and resin composite veneers, reinforcing the importance of conservative preparation techniques.

For resin composite veneers, clinical outcomes vary depending on whether a direct or indirect technique is used. Direct veneers offer advantages such as cost-effectiveness, single-visit application, and minimal tooth structure removal. However, they exhibit lower long-term survival and success rates compared to indirect resin composite or ceramic veneers, particularly due to higher susceptibility to wear, discoloration, and fracture. Operator skill and the vitality of the underlying tooth are also critical determinants of clinical performance. Furthermore, the observed decline in success over time for resin composite veneers further highlights the need for regular follow-up and maintenance. Ceramic veneers, especially those fabricated from feldspathic or lithium disilicate ceramics, demonstrate consistently high survival and success rates over extended periods. They offer excellent aesthetic properties, durability, and functional stability particularly when bonded to enamel. While both resin composite and ceramic veneers can achieve satisfactory results, ultimately the decision between these materials should be guided by a thorough consideration of the patient's needs and expectations, the operator's skill level and the intended longevity of the restoration. Finally, zirconia veneers, though growing in popularity due to their high strength and wear resistance, remain under-researched in terms of long-term survival and success. Monolithic zirconia, in particular, offers an alternative to veneered ceramics for high-load cases such as bruxism or substantial structural loss. However, its relative opacity may compromise aesthetics in visible zones. Until further high-quality longitudinal data is available, zirconia veneers should be used cautiously and selectively, with a focus on appropriate case selection and optimized bonding protocols.

Ultimately, choice of veneer material should be tailored based on clinical context, aesthetic expectations, functional demands and patient preferences. While both resin composite and ceramic veneers can achieve favorable outcomes, ceramic veneers currently offer the most reliable long-term performance. Zirconia veneers show potential, but further research is necessary to establish evidence-based guidelines for their use in aesthetic dentistry. Overall, Ceramic veneers remain the gold standard for anterior restorations with high survival and success rates documented across multiple decades.

LIMITATIONS AND FUTURE RECOMMENDATIONS

While this review offers a comprehensive synthesis of the current literature on the survival and success rates of dental veneers based on different material types (resin composite, ceramic and zirconia) and preparation designs, several limitations must be acknowledged. The most notable limitation lies in the lack of robust clinical data on the survival and success rates of zirconia veneers. Although zirconia is increasingly used in restorative dentistry, studies assessing its long-term survival and success as a veneer material remain scarce. This gap limits the ability to draw definitive conclusions or offer evidence-based guidance on its clinical application as a veneer material in aesthetic zones. Additionally, the inclusion of only studies published in English introduces a potential language bias. This may limit the generalizability of the findings across diverse populations and practice settings, as valuable insights from non-English-language research may have been excluded. Furthermore, many studies reviewed did not provide consistent or detailed information on key clinical variables such as tooth vitality, occlusal loading, and parafunctional habits. These factors are known to significantly influence clinical outcomes, and their omission may influence interpretations of veneer performance, therefore its exclusion may result in an incomplete assessment of factors contributing to the success and survival of dental veneers.

Despite these limitations, it is important to understand that patients' individual requirements and oral conditions may have a substantial influence on the longevity and success rates of dental veneers, emphasizing the necessity for a personalized approach in clinical decision-making.

The recent introduction of 'Vonlays' in dentistry represents a novel concept, combining the advantages of onlays with extended buccal veneers. This approach offers a conservative yet aesthetically pleasing option for bicuspid restorations. Zirconia-reinforced lithium silicate (ZLS), a recently introduced glass ceramic, combines lithium silicate and zirconia ceramics to enhance mechanical and esthetic properties, facilitating a unique chairside alternative for fabricating monolithic posterior all-ceramic restorations. Studies comparing various onlay materials, have highlighted the importance of chemical composition, microstructure, and mechanical properties in relation to the maximum biting force of the restored area. Further testing showed that reinforced-composite and ZLS onlays are preferred in the

premolar region, while hybrid-ceramic was deemed less suitable. The veneer-onlay combination restoration exemplifies how modern dentistry applies current science to clinical situations, following trends of minimally invasive and highly aesthetic restorations, thereby improving patient outcomes.[62,63]

In summary, although this literature review provides valuable insight, care should be used when extrapolating the results, and future studies should aim to resolve these limitations for a more thorough understanding regarding the survival and success rates of dental veneers based on different materials. To address the current evidence gaps, future research should focus on comprehensive longitudinal data that evaluate veneer materials using standardized definitions of survival and success. Such studies should incorporate key clinical parameters, including tooth vitality, occlusal conditions, and preparation design, to enable more accurate and clinically relevant comparisons. Expanding the literature base to include non-English-language studies and exploring the performance of newer materials and techniques will also contribute to a more complete understanding of veneer longevity and clinical effectiveness. Although this review provides important insights into material performance, care should be taken in extrapolating these findings, and further high-quality research is essential to guide optimal clinical decision-making in aesthetic restorative dentistry.

CONCLUSION

This literature review evaluated the survival and success rates of dental veneers focusing on preparation designs and material types. Ceramic veneers demonstrated higher survival and success rates compared to resin composite veneers, though both remain viable clinical options. Among preparation designs, incisal overlap showed favourable outcomes for restoring anterior guidance and enhancing veneer longevity. However, current evidence regarding preparation design remains inconclusive and often largely influenced by clinician preference. Notably, there is a significant gap in the literature regarding zirconia veneers, highlighting an area for future research. Overall, material selection and preparation design should be tailored to individual clinical scenarios, with evidence-based judgment guiding the decision-making process.

CONFLICT OF INTEREST STATEMENT

The authors do not have any financial interest in the companies whose materials are included in this article.

DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no datasets were generated or analyzed during the current study

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