## **Original Research**

## Ceramic Lumineers and Periodontal Diseases: A Review of Current Literature

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## **Abstract:**

## **Background:**

Ceramic lumineers, also known as porcelain veneers, have gained popularity in recent years as minimally invasive cosmetic dental procedures. While the primary goal of lumineers is to improve the appearance of teeth, there is growing interest in their potential impact on periodontal health. This review aims to summarize the current literature on the influence of ceramic lumineers on inflammatory periodontal parameters.

## **Methods:**

A comprehensive search of electronic databases was conducted to identify relevant articles published between 2010 and 2022.

#### **Results:**

The results suggest that ceramic lumineers have a limited impact on periodontal health, with no significant changes observed in measures of gingival inflammation or periodontal attachment levels. However, there are some concerns regarding the potential for plaque accumulation and difficulty in maintaining proper oral hygiene with lumineers. The literature also suggests that careful patient selection, adequate preparation, and appropriate cementation techniques are critical to minimizing any potential negative effects on periodontal health.

## **Conclusion:**

In conclusion, while ceramic lumineers appear to have minimal impact on inflammatory periodontal parameters, more long-term studies are needed to fully understand their potential impact on periodontal health. Dentists should carefully consider patient selection and appropriate placement techniques to ensure the best possible outcomes.

Keywords: Ceramic Lumineers, Periodontal Diseases, Review of Literature.

Submitted: 6 Jan 2023, Revised: 23 Jan 2023, Accepted: 8 Feb 2023

#### Introduction

Dental veneers are thin, custom-made shells made from materials such as porcelain or composite resin that are placed over the front surface of teeth to improve their appearance. Veneers are designed to cover imperfections such as discoloration, chipped or misshapen teeth, and gaps between teeth (1,2). They can also be used to improve the overall size and shape of teeth (2).

There are two main types of dental veneers: porcelain veneers and composite resin veneers (3). Porcelain veneers are more durable and long-lasting, and they have a more natural appearance (4,5). They are also more expensive and require more preparation of the tooth surface before placement (4,5). Composite resin veneers are less expensive and require less preparation, but they are not as durable as porcelain veneers and may need to be replaced more often (6).

The process of getting veneers typically involves several appointments with a dentist. During the first appointment, the dentist will prepare the tooth surface by removing a small amount of enamel. Then, an impression of the teeth will be made, and the veneers will be custom-made to fit the teeth. During the second appointment, the veneers will be bonded to the teeth using a special adhesive (7).

Lumineers are a brand of ultra-thin, custommade dental veneers that are used to improve the appearance of teeth (8). They are made from a patented type of porcelain called Cerinate, which is extremely thin and strong (9). Lumineers are designed to be minimally invasive and require little to no preparation of the tooth surface, making them a popular choice for patients looking to improve the appearance of their teeth without extensive dental work (9).

Ceramic veneers are designed to improve the appearance of teeth that are discolored, misshapen, chipped, or otherwise aesthetically unappealing. Ceramic veneers are typically

considered a more durable and long-lasting option than other types of veneers, such as composite resin veneers. They are also more resistant to staining and discoloration, and they have a natural, translucent appearance that mimics the look of natural teeth (9,10). This review aims to summarize the current literature on the influence of ceramic lumineers on inflammatory periodontal parameters.

#### **Methods**

## **Search strategy:**

A comprehensive literature search was conducted using electronic databases such as PubMed, Embase, and Cochrane Library, to identify relevant studies published from January 2010 to September 2022. The following search terms were used: "ceramic veneers," "porcelain veneers," "dental "cosmetic veneers." dentistry." "tooth preparation," "bonding," "adhesive," "cementation," With the keywords of the "gingivitis", "gingiva", "periodontal", "inflammation". The search was limited to studies published in English.

## **Inclusion criteria:**

Studies were included if they meet the following criteria: (1) they report on the use of ceramic veneers in humans; (2) they evaluate the outcomes of ceramic veneers, including inflammatory factors, incidence of periodontal diseases, and progression of periodontal diseases; (3) they have a sample size of at least 10 patients; (4) they have a follow-up period of at least 6 months; (5) they are published in peer-reviewed journals.

## **Exclusion criteria:**

Studies will be excluded if they meet the following criteria: (1) they are animal studies or in vitro studies; (2) they evaluate other types of veneers, such as composite resin veneers; (3) they do not report on relevant outcomes; (4) they have a sample size of less than 10 patients; (5) they have a follow-up period of less than 6

months; (5) they are published in languages other than English.

## **Study selection:**

Two independent reviewers screened the titles and abstracts of all identified articles to determine their relevance. Full-text articles were obtained for all potentially relevant studies, and two independent reviewers will assess them for inclusion based on the eligibility criteria. Any discrepancies will be resolved through discussion or consultation with a third reviewer if necessary.

#### Results

To have a proper illustration of the topic, we first need to know about the periodontal diseases. Periodontal disorders are conditions that affect the tissues surrounding and supporting the teeth, including the gums, periodontal ligament, and alveolar bone. There are several factors that can contribute to the development of periodontal disorders. including: poor oral hygiene, tobacco use, genetics, age, systemic diseases, hormonal changes, medications, nutritional deficiencies, stress, and malocclusion (11-13). Periodontal disorders involve inflammation of the tissues surrounding and supporting the teeth. Inflammation is the body's natural response to injury or infection, and it is an essential part of the healing process. However, if inflammation is not properly controlled, it can lead to tissue damage and disease (14-15). In periodontal disease, the inflammatory response is triggered by the presence of bacteria in dental plaque, a sticky film that forms on the teeth. As plaque accumulates, the bacteria produce toxins and other harmful substances that irritate the gums and cause them to become red, swollen, and tender. This early stage of periodontal disease is known as gingivitis (12-15). If left untreated, gingivitis can progress to periodontitis, a more severe form of periodontal disease. In periodontitis, the inflammation spreads from the gums to the ligaments and bone that support the teeth, causing them to become damaged and eventually leading to tooth loss (15). The inflammatory response in periodontal disease is characterized by the infiltration of immune cells, such as neutrophils and macrophages, into the affected tissues. These immune cells release inflammatory mediators, such as cytokines and prostaglandins, that contribute to tissue damage and bone loss (16,17).

There is limited research on the specific inflammatory factors in patients with veneers, especially the ceramic ones. However, several studies have evaluated the impact of veneers on overall oral health and inflammation (table 1). Alrahlah et al. study found that ceramic lumineers increased the levels of TNF- $\alpha$  in GCF after 24-week follow-up, which suggests inflammatory response. However, an periodontal parameters and GCF volume were comparable between the baselines and followup in patients treated with ceramic Lumineers (18).

Ariaans et al. (19) study found that all-ceramic restorations made from lithium disilicate and zirconia did not induce inflammatory reactions in periodontally healthy patients. No differences between the gingiva reactions of lithium disilicate and zirconia restorations could be shown.

Nejatidanesh et al. (20) study found that chairside computer-aided design/computer-aided manufacturing ceramic laminate veneers were clinically successful restorations with a high survival and success rate after 5 years. The periodontal parameters were not changed after 5 years except plaque index (20).

Zhang et al. (21) study found that unprepared porcelain veneers had a higher diversity of microbial species in the gingival crevicular flora compared to the prepared group, which could suggest a potential association with inflammatory oral health.

Sanan et al. study compared two different methods of preparing teeth for veneer restorations in terms of their impact on periodontal health. The group with feather edge vertical preparation with gingittage showed better results in terms of plaque index and bleeding index, indicating less inflammation in the surrounding tissue. However, there was no significant difference in gingival recession between the two groups. The study suggests that the feather edge vertical preparation with gingittage may lead to better long-term gingival health and esthetic outcomes for veneer restorations (22).

The preparation of the teeth for veneers may involve removing a small amount of enamel from the surface of the teeth, which can lead to some temporary sensitivity and irritation of the gums. Two study showed that different methods of preparation of the teeth for veneers may affect periodontal parameters (20,22). However, this is typically a minor and shortlived issue that can be managed with proper oral hygiene practices and over-the-counter pain relievers. It is important to note that while veneers do not cause inflammation themselves, maintaining good oral hygiene practices after their placement is essential to prevent the development of periodontal disease and other oral health issues. This includes regular brushing and flossing, as well as routine dental check-ups and cleanings. In cases where veneers are being used to improve the appearance of teeth that have been damaged or discolored due to periodontal disease, it is important to address and manage the underlying inflammation before proceeding with the placement of the veneers. This may involve treatment such as scaling and root planing, which removes plaque and tartar from the teeth and promotes healing of the gums.

## Conclusion

The results suggest that ceramic lumineers have a limited impact on periodontal health, with no significant changes observed in measures of gingival inflammation or periodontal attachment levels. However, there

are some concerns regarding the potential for accumulation and difficulty plaque maintaining oral hygiene with proper lumineers. The literature also suggests that careful patient selection, adequate preparation, and appropriate cementation techniques are critical to minimizing any potential negative effects on periodontal health. While ceramic lumineers appear to have minimal impact on inflammatory periodontal parameters, more long-term studies are needed to fully understand their potential impact periodontal health. Dentists should carefully consider patient selection and appropriate placement techniques to ensure the best possible outcomes.

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Tables
Table 1: characteristics of included studies

Study	Aim	Participants	Intervention	Outcome	Measures	Results
Alrahlah et al.	To evaluate	Patients with	Patients with	Ceramic	Periodontal	Clinical periodontal
	the effect of	lumineers using	lumineers	lumineers etched	parameters	parameters and GCF
	ceramic	standardized	using	with	(Plaque index	volume among patients
	lumineers on	technique	standardized	hydrofluoric	(PI), bleeding on	treated with ceramic
	periodontal	including	technique	acid and teeth	probing (BOP),	lumineers at baseline and
	parameters,	minimal to no	including	with phosphoric	periodontal	twenty-four week follow-
	GCF flow rate,	preparation	minimal to no	acid followed by	pocket depth	up were comparable. The
	and cytokine	1 1	preparation	adhesive	(PPD), and	GCF TNF-α levels
	profile			cementation	clinical	significantly increased
	-				attachment loss	after ceramic lumineer
					(CAL)), GCF	cementation at 24-week
					flow rate, and	follow-up.
					levels of IL-6 and	_
					TNF-α	
Ariaans et al.	To quantify	Patients out of	All-ceramic	Concentrations	Within the limitation	n of the study, treatment
	inflammatory	three	restorations	of IL1-beta, IL-	with all-ceramic res	storations did not induce
	reaction to	prospective	made from	1ra, and aMMP-	inflammatory reactions in a group of	
	ceramic	cohort-studies	lithium	8, as indicators	periodontal healthy patients. No differences	
	restorations	investigating	disilicate and	of inflammation		a reactions of lithium
	made from	three different	zirconia	in the gingival	disilicate and zirconia restorations could be	
	lithium	all-ceramic		crevicular fluid	shown.	
	disilicate and	restoration		(GCF),		
	zirconia	materials for		periodontal		
		crowns and		status		
		fixed dental				
		prostheses were				
NT. 1.41 11.	T	included	F	Modified CDA	Chaire in	
Nejatidanesh et al.	To compare the survival,	197 ceramic laminate	Empress CAD and		-	r-aided design/computer- g ceramic laminate veneers
et al.	modified CDA	veneers were	emax CAD	guidelines, gingival and	· ·	essful restorations with
	criteria, and	placed in 71	blocks were	plaque indices,		of 99.0% and success rate of
	periodontal	patients in a	used to create	probing pocket	96.4% after 5 years	
	parameters of	private practice	the	depth, bleeding	90.4% after 5 years	•
	laminate	private practice	restorations	on probing,		
	veneers made		restorations	patient's		
	with Empress			satisfaction		
	CAD and					
	emax CAD					
0-3(	over 60					
152-1	months					
SZhang et al.	To analyze the	20 patients (40	Prepared	High-throughput	The gingival crevic	ular flora was significantly
n or	difference	anterior teeth)	porcelain	sequencing	different between th	ne two groups. The
COI	between	with veneer	veneer group			ad a higher diversity of
<u>lug</u>	prepared	restoration of	vs.		microbial species co	ompared to the prepared
	porcelain	anterior teeth	unprepared		group.	
	veneers and	were enrolled	porcelain			
led	unprepared		veneer group			
<u>                                     </u>	porcelain					
Downloaded from intimi.com on	veneers on					
<u>e</u>	gingival					

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	crevicular				
	flora				
Sanan et al.	compared two	Patients with	feather edge	Periodontal	Method of preparing teeth for veneer bonding
	different	lumineers	vertical	parameters	might also affect the periodontal parameters
	methods of		preparation		
	preparing teeth		with		
	for veneer		gingittage		
	restorations				