

Marginal discoloration of all-ceramic restorations cemented adhesively versus nonadhesively

Haralampos P. Petridis, DDS, MSc, PhD; Ioannis Papathanasiou, DDS; Maria Doukantzi, DDS; Petros Koidis, DDS, MSc, PhD

All-ceramic restorations were introduced as a replacement of metal-ceramic restorations owing to their potential for improved biocompatibility and esthetics.¹ Many all-ceramic materials have evolved through the years and differ among themselves in various properties such as mechanical strength, optical behavior and luting requirements.^{2,3} Ceramic materials may be classified into two broad categories on the basis of their mode of cementation: those that require an adhesive cementation (bonding) and those that can be cemented with nonadhesive cements.⁴ The first category includes etchable materials that draw their mechanical strength from adhesive cementation such as feldspathic and glass-ceramics. The second category includes ceramics based on high-strength, nonetchable cores, such as alumina or zirconia.⁵ Although efforts have been made to enhance chemical bonding to these ceramics, these materials may be cemented with conventional nonadhesive techniques.^{6,7}

Fracture or cement breakdown can result in microleakage, mar-

ABSTRACT

Background. The authors conducted a systematic review to correlate the clinical incidence of marginal discoloration of all-ceramic restorations with the mode of cementation (adhesive versus nonadhesive).

Types of Studies Reviewed. The authors conducted a literature search by using electronic databases, relevant references, database citations and journal hand searches for clinical studies of marginal discoloration of all-ceramic restorations with a mean follow-up time of at least five years. The search period spanned January 1990 through February 2011. The authors reported and compared summary estimates and five-year event rates.

Results. The authors selected 16 studies for final analysis from an initial yield of 346 articles. The mean observation time ranged between five and 10 years. The majority of studies used adhesive luting procedures for definitive cementation. In only one study did investigators report regarding the incidence of marginal discoloration of both adhesively and nonadhesively cemented all-ceramic restorations, and the difference between the luting types in terms of discoloration was not statistically significant ($P = .5$).

Clinical Implications. The results of this systematic review showed that there is a lack of studies with findings regarding marginal discoloration rates of nonadhesively luted all-ceramic restorations. Unacceptable marginal discoloration rates of adhesively luted all-ceramic prostheses were relatively low even at 10 years of service.

Key Words. Evidence-based dentistry; cementation; dental porcelain; dental cements; dental bonding; dental adhesives; systematic review; restorative dentistry; fixed prosthetics.

JADA 2012;143(11):e70-e80.

Dr. Petridis is a senior clinical lecturer, Department of Restorative Dentistry, Prosthodontics Unit, UCL Eastman Dental Institute, 256 Gray's Inn Road, London, WC1X 8LD, England, e-mail c.petridis@ucl.ac.uk. Address reprint requests to Dr. Petridis.

Dr. Papathanasiou was a dental student, Department of Fixed Prosthodontics and Implant Prosthodontics, School of Dentistry, Aristotle University of Thessaloniki, Greece, when this article was written. He now is a postgraduate student, Department of Prosthodontics, School of Dentistry, National and Kapodistrian University of Athens, Greece.

Dr. Doukantzi was a dental student, Department of Fixed Prosthodontics and Implant Prosthodontics, School of Dentistry, Aristotle University of Thessaloniki, Greece, when this article was written. She now maintains a private practice in general dentistry in Volos, Greece.

Dr. Koidis is a professor and the chair, Department of Fixed Prosthodontics and Implant Prosthodontics, School of Dentistry, Aristotle University of Thessaloniki, Greece.

ginal discoloration, pulpal irritation, secondary caries, debonding and decreased fracture-load capacity.⁸ Marginal microleakage and discoloration of all-ceramic restorations are important complications, especially in the anterior region, where a discoloration that is not superficial and cannot be polished away may be a reason for prosthetic replacement.⁹ All prosthetic restorations are subject to microleakage at their margins. Causes of microleakage include lack of adhesion of the luting cement to tooth structure, shrinkage of the cement on setting and mechanical failure or solubility of the cement.^{10,11} Adhesive cementation has been shown to reduce marginal microleakage.¹²⁻¹⁴ Nevertheless, resin luting agents may be more prone to water sorption and discoloration than are other types of cements.^{15,16}

We conducted a systematic review to correlate the clinical incidence of marginal discoloration of all-ceramic restorations with the mode of cementation (adhesive versus nonadhesive).

METHODS

Search strategy. Two of the authors (M.D., I.P.) conducted the literature search by using several electronic databases (MEDLINE, PubMed, Scopus, The Cochrane Central Register of Controlled Trials) for clinical studies in which investigators reported about marginal discoloration of all-ceramic restorations.

The search terms that the reviewers used, alone or in combination, were “marginal discoloration,” “all-ceramic,” “cavosurface discoloration,” “marginal integrity,” “marginal color” and “clinical trial.” The search period spanned from January 1990 through February 2011. The reviewers also used the option of related-articles searches. They used review articles as well as references from different studies to identify relevant articles. They conducted a hand search for the period from January 1990 through February 2011 in *Journal of Prosthetic Dentistry* and *International Journal of Prosthodontics*.

Selection of studies. The review process consisted of two phases. During the first phase, the two reviewers conducted the review together. They resolved any disagreement by means of discussion and, in case of doubt, obtained the full text of the article in question. Initially, the reviewers screened titles, abstracts or both for relevance according to the inclusion criterion, which was prospective or retrospective studies of all-ceramic restorations with clinical follow-up. The reviewers excluded laboratory studies, studies in a language other than English or without an English-language abstract,

technical articles and case reports.

The reviewers obtained the full text of all relevant articles that passed the first review phase. At this point, they also searched the selected journals and the references of the selected studies.

Independently, the reviewers further screened the relevant articles obtained during a second review phase by using the following exclusion and inclusion criteria:

- indication of type of all-ceramic system and material used;
- indication of type of luting agent and luting technique used;
- mean follow-up time of at least five years;
- reported outcome of marginal discoloration, defined as clinically unacceptable staining that could not be polished away or was penetrating toward the pulp (a Charlie rating according to the U.S. Public Health Service¹⁷ [USPHS] or the California Dental Association¹⁸ [CDA] criteria).

The selection process during the second phase was conducted independently by the two reviewers. Interreviewer agreement was determined using the κ statistic.

The studies that passed the second phase of review were classified into four categories according to the strength of evidence, using the method of Jokstad and colleagues¹⁹:

- A1, controlled clinical trial with patient randomization (randomized controlled trial);
- A2, controlled clinical trial with split-mouth randomization (split randomized controlled trial);
- B, prospective clinical trial without randomization (controlled clinical trial);
- C, clinical studies with different designs than categories A and B (such as retrospective studies and case series).

Data extraction. We tabulated data from the final studies for marginal discoloration associated with all-ceramic restorations. We calculated incidence of marginal discoloration in relation to time. For studies in which the investigators mentioned only the minimum follow-up time, we used that interval to measure the total exposure time

ABBREVIATION KEY. **A1:** Controlled clinical trial with patient randomization. **A2:** Controlled clinical trial with split-mouth randomization. **B:** Prospective controlled trial without randomization. **C:** Clinical studies with different designs than categories A and B. **CDA:** California Dental Association. **F:** Female. **FPDs:** Fixed partial dentures. **M:** Male. **NA:** Not applicable. **NR:** Not reported. **P:** Prospective. **R:** Retrospective. **USPHS:** United States Public Health Service.

Download English Version:

<https://daneshyari.com/en/article/3137843>

Download Persian Version:

<https://daneshyari.com/article/3137843>

[Daneshyari.com](https://daneshyari.com)