PURPOSE: To summarize the contemporary scientific evidence available regarding restorative dental treatment in patients with Amelogenesis imperfecta (AI).

METHODS: An electronic literature search was conducted using the search term "Amelogenesis imperfecta" and the PubMed/MEDLINE database as well as Google Scholar. Prospective and retrospective clinical studies that investigated the outcome of direct and/or indirect dental restorative treatment in patients with AI, were published in English, and had an observation time of at least 1 year were included in this review. The articles identified were screened and analyzed by two reviewers according to inclusion and exclusion criteria in three review rounds.

RESULTS: Six prospective or retrospective clinical studies analyzing longevity and complications associated with dental restorative treatment in patients with AI met the inclusion criteria. Extracted data suggest that in patients with AI, indirect restorations feature superior predictability and longevity than direct restorations.

CONCLUSIONS: As endodontic complications were infrequently observed and periodontal parameters regularly improve with the insertion of indirect restorations, dental treatment in patients with AI should focus on indirect restorations as soon as possible. While adhesive bonding techniques to enamel surfaces in patients with AI feature merely limited predictability and longevity and as the available data is scarce, further laboratory and clinical studies should be performed to investigate the performance of minimally invasive indirect restorations bonded to enamel in patients with AI.

RECOMMENDATION: Scientific evidence indicates that indirect restorations should be preferred over direct restorations in patients with AI.
RESTORATIONS IN PRIMARY TEETH: A SYSTEMATIC REVIEW ON SURVIVAL AND REASONS FOR FAILURES. [Review]

BACKGROUND: Several restorative materials with specific indications are used for filling cavities in primary teeth.

AIM: To systematically review the literature in order to investigate the longevity of primary teeth restorations and the reasons for failure.

DESIGN: Electronic databases were screened, and eligible studies were hand-searched to find longitudinal clinical studies evaluating the survival of restorations (class I, class II, and crown) placed with different materials in primary teeth with at least one year of follow-up.

RESULTS: Thirty-one studies were included, and a high bias risk was observed. Overall, 12,047 restorations were evaluated with 12.5% of failure rate. A high variation on annual failure rate (AFR) was detected (0-29.9%). Composite resin showed the lowest AFRs (1.7-12.9%). Stainless steel crowns (SSC) had the highest success rate (96.1%). Class I restorations and restorations placed using rubber dam presented better AFR. The main reason for failure observed was secondary caries (36.5%).

CONCLUSIONS: An elevated number of failures were observed due to recurrent caries, highlighting the need for professionals to work with a health-promoting approach. The high variation on failure rate among the materials can be due to children's behavior during the procedure, which demands short dental appointments and a controlled environment.

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Abstract

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CONCLUSIONS: An elevated number of failures were observed due to recurrent caries, highlighting the need for professionals to work with a health-promoting approach. The high variation on failure rate among the materials can be due to children's behavior during the procedure, which demands short dental appointments and a controlled environment.
Zirconia ceramic is a popular trend in esthetic and restorative dentistry. Computer-aided design/computer-aided manufacturing (CAD/CAM) systems have been well developed to fabricate zirconia frameworks and restorations with acceptable mechanical properties. Zirconia ceramics have excellent optical characteristics; however, achieving optimal esthetic outcomes with zirconia-based restorations is still challenging due to multiple effective factors on the final color. These factors are different layers of a zirconia-based restoration and its underlying structures including: dental substrate, cement, zirconia coping, veneering ceramic, and glaze. Moreover, the laboratory procedure of these restorations' fabrication is another effective factor on the resultant color. Unpredictable esthetic results may be obtained without estimation of the role of each factor and its effect on the final color. This review discussed the color aspect of zirconia-based restorations according to these factors and based on the literature. In the past decade, investigators have been concerned with the shade reproduction with zirconia-based restorations; however, there are no sufficient clinical guidelines on how to reproduce the appearance of natural teeth with these restorations. Zirconia-based restorations have presented a new chance for accomplishing optimum esthetics. Nonetheless further investigations are needed on these restorations to establish clinical guidelines on esthetics.

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Study outcomes should be chosen on the basis of a core outcome set or, if attention to statistical power, considering the study aim (superiority or non-inferiority). Researchers should focus on study comparators and setting (answering questions with relevance to clinical dentistry), and pay attention to statistical power, considering the study aim (superiority or non-inferiority trial), the expected event rate, and attrition. Study outcomes should be chosen on the basis of a core outcome set or, if not available, involving patients and other
stakeholders. Studies should be registered a priori, and reporting should adhere to standards. Possible clustering should be accounted for during statistical analysis.

SIGNIFICANCE: Many clinical studies in dental material science are underpowered, and of limited validity and usefulness for daily decision-making. Dental researchers should mirror existing efforts in other medical fields in making clinical studies more valid and applicable, thus contributing to better dental care.
Optical properties of zirconia ceramics for esthetic dental restorations: A systematic review. [Review]

Source

Statement of Problem: Yttria-stabilized tetragonal zirconia polycrystal has been used as a dental biomaterial for several decades because the fracture toughness and bend strength are increased by a stress-induced transformation-toughening mechanism. However, its esthetics are compromised by its poor translucency and grayish-white appearance.

Purpose: The purpose of the present systematic review was to assess information on the mechanical, chemical, and optical requirements of monolithic zirconia dental restorations.

Material and Methods: The following databases (2010 to 2015) were electronically searched: ProQuest, EMBASE, SciFinder, MRS Online Proceedings Library, Medline, Compendex, and Journal of the American Ceramic Society. The search was limited to English-language publications, in vitro studies, experimental reports, and modeling studies.

Results: The data from 57 studies were considered in order to review the intrinsic and extrinsic characteristics of zirconia and their effects on the optical properties.

Conclusions: The materials and microstructural issues relevant to the esthetics and long-term stability of zirconia have been considered in terms of monolithic restorations, while there also are restorations specifically for esthetic applications. Although zirconia-toughened lithium silicate offers the best esthetic outcomes, transformation-toughened zirconia offers the best mechanical properties and long-term stability; cubic stabilized zirconia offers a potential compromise. The properties of these materials can be altered to some extent through the appropriate application of intrinsic (such as, annealing) and extrinsic (such as, shade-matching) parameters.

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Clinical studies in restorative dentistry: New directions and new demands. [Review]

Source

Abstract
Clinical studies in restorative dentistry: New directions and new demands. [Review]

Copyright © 2017 Editorial Council for the Journal of Prosthetic Dentistry. Published by Elsevier Inc. All rights reserved.
Clinical research of restorative materials is confounded by problems of study designs, length of trials, type of information collected, and costs for trials, despite increasing numbers and considerable development of trials during the past 50 years. This opinion paper aims to discuss advantages and disadvantages of different study designs and outcomes for evaluating survival of dental restorations and to make recommendations for future study designs. Advantages and disadvantages of randomized trials, prospective and retrospective longitudinal studies, practice-based, pragmatic and cohort studies are addressed and discussed. The recommendations of the paper are that clinical trials should have rational control groups, include confounders such as patient risk factors in the data and analysis and should use outcome parameters relevant for profession and patients.

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OBJECTIVES: A scoping review was conducted to explore the use of FDI criteria 10 years after their introduction. The first aim was to compare the amount of studies using the FDI and/or the modified USPHS criteria. The second aim was to analyse the use of the FDI criteria in clinical trials evaluating direct dental restorations.

DATA: Listing of studies using FDI and/or USPHS criteria per year since 2007. Clinical studies related to the assessment of direct restorations using FDI criteria.

SOURCE: Two systematic searches - regarding the use of FDI and modified USPHS criteria - were carried out on Medline/Pubmed in order to identify the studies published between 2007 and 2017. Authors of the included articles were contacted to clarify their choice of FDI criteria in their studies. ClinicalTrials.gov database was also queried for the on-going studies that use FDI and modified USPHS criteria.

STUDY SELECTION: In the first review, all the clinical trials (randomized/non-randomized, controlled, prospective/retrospective studies) that used FDI criteria to evaluate direct restorations on primary or permanent teeth were included.

CONCLUSIONS: 16.3% of the studies used FDI criteria. The percentage of studies using them increased from 4.5% in 2010 to 50.0% in 2016. In average, 8.5 FDI criteria were used. The most employed criteria were: marginal adaptation (96.7%), staining.
Recent Reviews Related to Restorative Dentistry

(90.0%), fracture of material and retention (90.0%), recurrence of caries/erosion/abfraction (90.0%), post-operative sensitivity/tooth vitality (86.7%) and surface luster (60.0%). In addition, among the 27 on-going studies from ClinicalTrials.gov database, 51.9% use FDI criteria (including 87.5% with an open recruitment status).

**CLINICAL SIGNIFICANCE:** FDI criteria were reported as practical (various and freely selectable), relevant (sensitive as well as appropriate to current restorative materials and clinical studies design), standardized (making comparisons between investigations easier). Investigators should go on using them for a better standardization of their clinical judgment, allowing comparisons with other studies.

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**Authors**
Dutra D; Pereira G; Kantorski KZ; Valandro LF; Zanatta FB.

**Title**

**Source**

**Abstract**
Biofilm (bacterial plaque) accumulation on the surface of restorative materials favors the occurrence of secondary caries and periodontal inflammation. Surface characteristics of restorations can be modified by finishing and/or polishing procedures and may affect bacterial adhesion. The aim of this systematic review was to characterize how finishing and polishing methods affect the surface properties of different restorative materials with regard to bacterial adhesion and biofilm formation. Searches were carried out in MEDLINE-PubMed, EMBASE, Cochrane-CENTRAL, and LILACS databases. From 2882 potential articles found in the initial searches, only 18 met the eligible criteria and were included in this review (12 with in vitro design, four with in situ design, and two clinical trials). However, they presented high heterogeneity regarding materials considered and methodology for evaluating the desired outcome. Risk bias analysis showed that only two studies presented low risk (whereas 11 showed high and five showed medium risk). Thus, only descriptive analyses considering study design, materials, intervention (finishing/polishing), surface characteristics (roughness and surface free energy), and protocol for biofilm formation (bacterial adhesion) could be performed. Some conclusions could be drawn: the impact of roughness on bacterial adhesion seems to be related not to a roughness threshold (as previously believed) but rather to a range, the range of surface roughness among different polishing methods is wide and material dependent, finishing invariably creates a rougher surface and should always be followed by a polishing method, each dental material requires its own treatment modality to obtain and maintain as smooth a surface as possible, and in vitro designs do not seem to be powerful tools to draw relevant conclusions, so in vivo and in situ designs become strongly recommended.

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**Authors**
Kanzow P; Wiegand A; Gostemeyer G; Schwendicke F.

**Title**
Understanding the management and teaching of dental restoration repair: Systematic review and meta-analysis of surveys.

**Source**
PURPOSE: The aim of this review was to summarize the existing scientific literature investigating on cervical margin relocation technique (CMR) performed prior to the adhesive cementation of the indirect restorations.

STUDY SELECTION: An electronic search with no date restriction was conducted in the MEDLINE database, accessed through PubMed. The following main keywords were used: “cervical margin relocation”, “coronal margin relocation”, “deep margin elevation” and “proximal box elevation”.

RESULTS: Seven in vitro studies and 5 clinical reports investigating on CMR are taken into consideration for the present review. The most frequently investigated parameter in almost all of the in vitro studies was the marginal adaptation of the indirect restorations. One study additionally assessed the influence of CMR on the fracture behavior of the restored teeth and one study assessed the bond strength of the indirect composite restoration to the proximal box floor. Clinical reports provided documentation with a detailed description of the treatment protocol. In the current literature no randomized controlled clinical trials or prospective or retrospective clinical studies on CMR technique could be found.

CONCLUSIONS: On the basis of the reviewed literature, it can be concluded that currently there is no strong scientific evidence that could either support or discourage the use of CMR technique prior to restoration of deep subgingival defects with indirect adhesive restorations. Randomized controlled clinical trials are necessary to provide the reliable evidence on the influence of CMR technique on the clinical performance, especially on the longevity of the restorations and the periodontal health.
Title
Association of sleep bruxism with ceramic restoration failure: A systematic review and meta-analysis. [Review]
Source

Abstract
STATEMENT OF PROBLEM: Ceramic restorations are popular because of their excellent optical properties. However, failures are still a major concern, and dentists are confronted with the following question: is sleep bruxism (SB) associated with an increased frequency of ceramic restoration failures?

PURPOSE: The purpose of this systematic review and meta-analysis was to assess whether the presence of SB is associated with increased ceramic restoration failure.

MATERIAL AND METHODS: Observational studies and clinical trials that evaluated the short- and long-term survival rate of ceramic restorations in SB participants were selected. Sleep bruxism diagnostic criteria must have included at least 1 of the following: questionnaire, clinical evaluation, or polysomnography. Seven databases, in addition to 3 nonpeer-reviewed literature databases, were searched. The risk of bias was assessed using the meta-analysis of statistics assessment and review instrument (MAStARI) checklist.

RESULTS: Eight studies were included for qualitative synthesis, but only 5 for the meta-analysis. Three studies were categorized as moderate risk and 5 as high risk of bias. Clinical and methodological heterogeneity across studies were considered high. Increased hazard ratio (HR=7.74; 95% confidence interval [CI]=2.50 to 23.95) and odds ratio (OR=2.52; 95% CI=1.24 to 5.12) were observed considering only anterior ceramic veneers. Nevertheless, limited data from the meta-analysis and from the restricted number of included studies suggested that differences in the overall odds of failure concerning SB and other types of ceramic restorations did not favor or disfavor any association (OR=1.10; 95% CI=0.43 to 2.8). The overall quality of evidence was considered very low according to the GRADE criteria.

CONCLUSIONS: Within the limitations of this systematic review, the overall result from the meta-analysis did not favor any association between SB and increased odds of failure for ceramic restorations.
Marginal adaptation and CAD-CAM technology: A systematic review of restorative material and fabrication techniques. [Review]

PURPOSE: The purpose of this systematic review was to investigate whether the marginal adaptation of CAD-CAM single crowns, fixed dental prostheses, and implant-retained fixed dental prostheses or their infrastructures differs from that obtained by other fabrication techniques using a similar restorative material and whether it depends on the type of restorative material.

RESULTS: Of the 55 included comparative studies, 28 compared CAD-CAM technology with conventional fabrication techniques, 12 contrasted CAD-CAM technology and copy milling, 4 compared CAD-CAM milling with direct metal laser sintering (DMLS), and 22 investigated the performance of a CAD-CAM system regarding marginal adaptation in restorations/infrastructures produced with different restorative materials.

CONCLUSIONS: Most of the CAD-CAM restorations/infrastructures were within the clinically acceptable marginal discrepancy (MD) range. The performance of a CAD-CAM system relative to marginal adaptation is influenced by the restorative material. Compared with CAD-CAM, most of the heat-pressed lithium disilicate crowns displayed equal or smaller MD values. Slip-casting crowns exhibited similar or better marginal accuracy than those fabricated with CAD-CAM. Cobalt-chromium and titanium implants produced using a CAD-CAM system elicited smaller MD values than zirconia. The majority of cobalt-chromium restorations/infrastructures produced by DMLS displayed better marginal accuracy than those fabricated with the casting technique. Compared with copy milling, the majority of zirconia restorations/infrastructures produced by CAD-CAM milling exhibited better marginal adaptation. No clear conclusions can be drawn about the superiority of CAD-CAM milling over the casting technique and DMLS regarding marginal adaptation.

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Abstract

PURPOSE: To analyze the clinical success of direct light-activated composite resin restorations in posterior teeth. The quality of the margins and occlusal surfaces were evaluated, as well as their survival, according to their extensions and locations. The clinical performance of posterior composite resin restorations with different compositions were compared. All restorations were performed by the first author in his private practice, in a 5- to 20-year period.

MATERIALS AND METHODS: Several types of composite resins, provided by different manufacturers, were placed in posterior teeth, after isolation with rubber dams. To be included in the study, the restorations had to have been in function for at least 5 years and had to have been placed between October 1993 and October 2008 by the first author. The established failure criteria were: tooth and/or restoration fracture, secondary caries, endodontic treatment, or tooth loss. Included patients must have been treated in the first author's office for at least 7 years and still in the practice through 2013; all patients had complete dental arches. Patients with removable dental prostheses or disabilities, who had moved, or who had died were excluded. Of 210 patients who fulfilled the inclusion criteria, 138 randomly selected subjects were clinically examined between November 2013 and April 2014. Of these 138 patients, 61 had received 105 direct-light-activated composite resin restorations in posterior teeth, which met the inclusion criteria. Twenty-nine patients (47.5%) underwent annual maintenance therapy. The patient-based data collected from clinical exams and personal records were recorded on a specially designed form. Age, gender, period of clinical attendance, tooth preparation, location, size, quality and longevity of the restorations, restorative materials, adhesive systems, parafunctional habits, secondary caries, and maintenance therapy were the variables evaluated. Authors were blinded to the clinical assessments. Cohen's Kappa coefficient of the quality analysis of the margins and occlusal surfaces of the restorations ranged from 0.78 to 1. Data processing was performed using Epidat software, v3.1, developed by the Conselleria de Sanidade de la Xunta de Galicia with the support of PAHO-WHO and SPSS software v13.0. If the number of complete values was too small, a Kaplan-Meier curve could not be used. Therefore the Fisher's exact test, Chi-square test, Kruskal-Wallis test, and Mann-Whitney non-parametric test were indicated to analyze significant differences.

RESULTS: At the time of the examinations, 103 (98%) restorations were in function, and 98 (95.1%) were rated as clinically successful. Two restorations failed (2%). The observed mean survival time of restorations that remained functional was 11 years and 7 months.

CONCLUSIONS: In the present report, direct light-activated composite resin restorations in posterior teeth showed a high clinical success rate and long-term mean survival time. These composite resins might be considered the material of choice to restore medium, extended, and in some clinical situations, large preparations in posterior teeth.
BDA LIBRARY MEDLINE SEARCH

RECENT REVIEWS RELATED TO RESTORATIVE DENTISTRY

Pardal-Pelaez B; Montero J.
Authors Full Name
Pardal-Pelaez, Beatriz; Montero, Javier.
Institution
Pardal-Pelaez, Beatriz. DDS, PhD in Dentistry. Postgraduate Student of the Department of Surgery. University of Salamanca. Campus Miguel de Unamuno. Salamanca, Spain.
Montero, Javier. DDS, PhD in Dentistry. Graduate in Odontology. Tenured Lecturer in Prosthodontics of School of Dentistry. University of Salamanca. Campus Miguel de Unamuno. Salamanca, Spain.
Title
Preload loss of abutment screws after dynamic fatigue in single implant-supported restorations. A systematic review. [Review]
Source
Abstract
Background: To carry out a systematic literature review of the causes of preload loss of the abutment screws, of internal and external connection implants, tightened to different torque values and subjected to cyclic loading.

Material and Methods: A systematic search was conducted in PubMed, EMBASE, and Cochrane Library databases with reference to in vitro studies in which internal and external connection implants were subjected to cyclic loads to determine the degree of loosening of the abutment screws after loading.

Results: The reviewed studies tested distinct implant connections (mostly externally hexed, and morse taper) subjected to diverse cycles (from 16667 to 1 million), with loads ranging from 0-400 Nw, using screws of different materials and designs that were tightened into torques between 20-45 Ncm. Accordingly after loading the percentage of torque loss ranges between 16.1% to 39%.

Conclusions: Most of the studies indicate that the internal connection, together with the morse taper, best resists cyclic loading in terms of screw loosening in single-tooth implants. <b>Key words:</b>Dental Implants, Dental Implant-Abutment Design, Torque, In Vitro Techniques, Systematic Review.

Jaccardillo-Ibarguren I; Sanchez-Torres A; Figueiredo R; Valmaseda-Castellon E.
Authors Full Name
Jaccardillo-Ibarguren, Inaki; Sanchez-Torres, Alba; Figueiredo, Rui; Valmaseda-Castellon, Eduard.
Institution
Jaccardillo-Ibarguren, Inaki. DDS, MS, Master of Oral Surgery and Implantology, Professor of the Master of Oral Surgery and Implantology degree program, School of Medicine and Health Sciences, University of Barcelona. Researcher at the IDIBELL institute.
Sanchez-Torres, Alba. DDS, MS, Fellow of the Master of Oral Surgery and Implantology degree program, School of Medicine and Health Sciences, University of Barcelona.
Figueiredo, Rui. DDS, MS, PhD, Master of Oral Surgery and Implantology. Associate professor of Oral Surgery and Professor of the Master of Oral Surgery and Implantology degree program, School of Medicine and Health Sciences, University of Barcelona. Researcher at the IDIBELL institute.
Valmaseda-Castellon, Eduard. DDS, MS, PhD, Master of Oral Surgery and Implantology. Professor of Oral Surgery. Director of the Master of Oral Surgery and Implantology degree program, School of Medicine and Health Sciences, University of Barcelona. Researcher at the IDIBELL institute.
Title
Bimaxillary simultaneous immediate loading of full-arch restorations: A case series. [Review]
Source
Abstract
AIM: To describe a bimaxillary simultaneous immediate loading protocol with full-arch implant-supported fixed prostheses.

MATERIAL AND METHODS: A prospective case series of 8 patients who required full-arch rehabilitation was conducted. The main inclusion criteria were patients with teeth that required extraction. At least 1 molar per arch was temporarily employed to stabilize the surgical template and the provisional prosthesis during intraoral relining.

RESULTS: Two upper implants failed in 1 patient. Structural fracture was registered in 3 patients, around 3 months after loading. All of them had bruxism. Three esthetic complications were registered: midline deviation, canting of the occlusal plane and color mismatch.
CONCLUSIONS: Although this protocol achieves optimal results, some mechanical complications were encountered. The fracture of the provisional prosthesis is a relatively common mechanical complication but does not seem to jeopardize the final treatment result. <b>Key words:</b>Implant-supported full-arch, provisional prosthesis fracture, bimaxillary simultaneous rehabilitation, conical abutments.

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Authors
Duangthip D; Chen KJ; Gao SS; Lo ECM; Chu CH.

Author NameID
Lo, Edward Chin Man; ORCID: https://orcid.org/0000-0002-3618-0619
Chu, Chun Hung; ORCID: https://orcid.org/0000-0002-8167-0430

Authors Full Name
Duangthip, Duangporn; Chen, Kitty Jieyi; Gao, Sherry Shiqian; Lo, Edward Chin Man; Chu, Chun Hung.

Institution
Duangthip, Duangporn. Faculty of Dentistry, The University of Hong Kong, Hong Kong, China. dduang@hku.hk.
Chen, Kitty Jieyi. Faculty of Dentistry, The University of Hong Kong, Hong Kong, China. kjychen@hku.hk.
Gao, Sherry Shiqian. Faculty of Dentistry, The University of Hong Kong, Hong Kong, China. gao1204@hku.hk.
Lo, Edward Chin Man. Faculty of Dentistry, The University of Hong Kong, Hong Kong, China. edward-lo@hku.hk.
Chu, Chun Hung. Faculty of Dentistry, The University of Hong Kong, Hong Kong, China. chchu@hku.hk.

Title
Managing Early Childhood Caries with Atraumatic Restorative Treatment and Topical Silver and Fluoride Agents. [Review]

Source

Abstract
Early childhood caries (ECC) is a significant global health problem affecting millions of preschool children worldwide. In general, preschool children from families with 20% of the lowest family incomes suffered about 80% of the ECC. Most, if not all, surveys indicated that the great majority of ECC was left untreated. Untreated caries progresses into the dental pulp, causing pain and infection. It can spread systemically, affecting a child's growth, development and general health. Fundamental caries management is based on the conventional restorative approach. Because preschool children are too young to cope with lengthy dental treatment, they often receive dental treatment under general anaesthesia from a specialist dentist. However, treatment under general anaesthesia poses a life-threatening risk to young children. Moreover, there are few dentists in rural areas, where ECC is prevalent. Hence, conventional dental care is unaffordable, inaccessible or unavailable in many communities. However, studies showed that the atraumatic restorative treatment had a very good success rate in treating dentine caries in young children. Silver diamine fluoride is considered safe and effective in arresting dentine caries in primary teeth. The aim of this paper is to review and discuss updated evidence of these alternative approaches in order to manage cavitated ECC.

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Authors
Nair P; Hickel R; Ilie N.

Authors Full Name
Nair, Pooja; Hickel, Reinhard; Ilie, Nicoleta.

Institution
Nair, Pooja. Department of Operative Dentistry and Periodontology, Ludwig-Maximilians University, Munich, Germany.
Hickel, Reinhard. Department of Operative Dentistry and Periodontology, Ludwig-Maximilians University, Munich, Germany.
Ilie, Nicoleta. Department of Operative Dentistry and Periodontology, Ludwig-Maximilians University, Munich, Germany.

Title
Adverse effects of salivary contamination for adhesives in restorative dentistry. A literature review. [Review]

Source

Abstract
PURPOSE: To review and critically analyze the literature concerning the influence of salivary contamination on the bond quality of adhesives used in restorative materials by comparing and contrasting the different adhesive materials.
METHODS: A detailed search on PUBMED, Cochrane Library, Google Scholar and Web of Science was carried out to identify publications on salivary contamination and dental adhesive materials, from 1990-2017 (March) which resulted in a total of 6,202 web-identified publications. After screening titles/abstracts and de-duplicating, 54 publications were selected that matched the requirements for this review. The condition for selection was English literature concerning the effect of salivary contamination on the adhesives used in restorative dentistry. The obtained articles were systematically evaluated.

RESULTS: Salivary contamination of adhesives during restorative procedures statistically (64.6%) showed an adverse effect on adhesives, occurring either at one or many stages of restoration. Methodological dissimilarities impeded the direct comparison of the selected studies. Nevertheless, the 2-step etch and rinse adhesives were relatively less vulnerable to salivary contamination than the others. 65% of the evaluated studies for decontamination achieved improved bonding when the contaminated surface was subjected to some kind of decontamination procedure. However, the duration and other specificities were not standard in all the evaluations and need further research to assess the course of action. It is necessary to do long term studies to evaluate the effectiveness of contaminated adhesive over time.

CLINICAL SIGNIFICANCE: Salivary contamination is a potential cause for poor bond quality of adhesive systems during restorative procedures and to provide a successful treatment, proper care must be taken to ensure the operating area is free from contamination. Understanding the properties of the materials and its constituents as well as considering measures to manage the potential vulnerabilities due to salivary contamination in the area of bonding might help a clinician to produce better results.

METHODS: The literature regarding adhesive restoration failures was reviewed with particular emphasis on the chemistry of adhesives and oral biofilm in terms of their potential relevance to the failures of adhesive restorations in the oral environment.

RESULTS: Salivary contamination of adhesives during restorative procedures statistically (64.6%) showed an adverse effect on adhesives, occurring either at one or many stages of restoration. Methodological dissimilarities impeded the direct comparison of the selected studies. Nevertheless, the 2-step etch and rinse adhesives were relatively less vulnerable to salivary contamination than the others. 65% of the evaluated studies for decontamination achieved improved bonding when the contaminated surface was subjected to some kind of decontamination procedure. However, the duration and other specificities were not standard in all the evaluations and need further research to assess the course of action. It is necessary to do long term studies to evaluate the effectiveness of contaminated adhesive over time.

CLINICAL SIGNIFICANCE: Salivary contamination is a potential cause for poor bond quality of adhesive systems during restorative procedures and to provide a successful treatment, proper care must be taken to ensure the operating area is free from contamination. Understanding the properties of the materials and its constituents as well as considering measures to manage the potential vulnerabilities due to salivary contamination in the area of bonding might help a clinician to produce better results.
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Authors
Manso AP; Carvalho RM.

Institution
Manso, Adriana P. Department of Oral Biological and Medical Sciences, Division of Biomaterials, Faculty of Dentistry, The University of British Columbia, 368-2199 Wesbrook Mall, Vancouver, British Columbia V6T 1Z3, Canada.
Carvalho, Ricardo M. Department of Oral Biological and Medical Sciences, Division of Biomaterials, Faculty of Dentistry, The University of British Columbia, 368-2199 Wesbrook Mall, Vancouver, British Columbia V6T 1Z3, Canada. Electronic address: rickmc@dentistry.ubc.ca.

Title
Dental Cements for Luting and Bonding Restorations: Self-Adhesive Resin Cements. [Review]

Source

Abstract
Self-adhesive resin cements combine easy application of conventional luting materials with improved mechanical properties and bonding capability of resin cements. The presence of functional acidic monomers, dual cure setting mechanism, and fillers capable of neutralizing the initial low pH of the cement are essential elements of the material and should be understood when selecting the ideal luting material for each clinical situation. This article addresses the most relevant aspects of self-adhesive resin cements and their potential impact on clinical performance. Although few clinical studies are available to establish solid clinical evidence, the information presented provides clinical guidance in the dynamic environment of material development.

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Authors
Zhang Y; Kelly JR.

Institution
Zhang, Yu. Department of Biomaterials and Biomimetics, NYU College of Dentistry, 433 First Avenue, Room 810, New York, NY 10010, USA. Electronic address: yz21@nyu.edu.
Kelly, J Robert. Department of Biomedical Engineering, University of Connecticut Health Center, Mailstop 1615, 263 Farmington Avenue, Farmington, CT 06030-1615, USA.

Title
Dental Ceramics for Restoration and Metal Veneering. [Review]

Source

Abstract
A survey of the development of dental ceramics is presented to provide a better understanding of the rationale behind the development and clinical indications of each class of ceramic material. Knowledge of the composition, microstructure, and properties of a material is critical for selecting the right material for specific applications. The key to successful ceramic restorations rests on material selection, manufacturing technique, and restoration design, including the balancing of several factors such as residual stresses, tooth contact conditions, tooth size and shape, elastic modulus of the adhesives and tooth structure, and surface state.

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RECENT REVIEWS RELATED TO RESTORATIVE DENTISTRY

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Authors
Suksaphar W; Banomyong D; Jirathanyanatt T; Ngoenwiwatkul Y.
Author NameID
Banomyong, Danuchit; ORCID: https://orcid.org/0000-0003-3612-3830
Authors Full Name
Suksaphar, Warattama; Banomyong, Danuchit; Jirathanyanatt, Titalee; Ngoenwiwatkul, Yaowaluk.
Institution
Suksaphar, Warattama. Department of Operative Dentistry and Endodontics, Mahidol University Faculty of Dentistry, Bangkok, Thailand.
Banomyong, Danuchit. Department of Operative Dentistry and Endodontics, Mahidol University Faculty of Dentistry, Bangkok, Thailand.
Jirathanyanatt, Titalee. Department of Operative Dentistry and Endodontics, Mahidol University Faculty of Dentistry, Bangkok, Thailand.
Ngoenwiwatkul, Yaowaluk. Department of Community Dentistry, Mahidol University Faculty of Dentistry, Bangkok, Thailand.
Title
Survival rates against fracture of endodontically treated posterior teeth restored with full-coverage crowns or resin composite restorations: a systematic review. [Review]
Source
Abstract
This systematic review aims to summarize the current clinical studies that investigated survival rates against fracture of endodontically treated posterior teeth restored with crowns or resin composite restorations. Literature search were performed using keywords. Publications from 1980 to 2016 were searched in PubMed, ScienceDirect, Web of Science, MEDLINE, and SCOPUS. Included studies were selected based on inclusion and exclusion criteria. Three clinical studies were included: 1 randomized controlled trial and 1 prospective and 1 retrospective cohort studies. Pooled survival rates ranged from 94%-100% and 91.9%-100% for crowns and resin composite, respectively. The majority of teeth had no more than 3 surface loss of tooth structure. The studies included were heterogeneous, and were not appropriate for further meta-analysis. Current evidence suggested that the survival rates against the fracture of endodontically treated posterior teeth restored with crowns or resin composites were not significantly different in the teeth with minimum to moderate loss of tooth structure.
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Authors
Hafshejani TM; Zamanian A; Venugopal JR; Rezvani Z; Sefat F; Saeb MR; Vahabi H; Zarrintaj P; Mozafari M.
Authors Full Name
Hafshejani, Tahereh Mohammadi; Zamanian, Ali; Venugopal, Jayarama Reddy; Rezvani, Zahra; Sefat, Farshid; Saeb, Mohammad Reza; Vahabi, Henri; Zarrintaj, Payam; Mozafari, Masoud.
Institution
Hafshejani, Tahereh Mohammadi. Bioengineering Research Group, Nanotechnology and Advanced Materials Department, Materials and Energy Research Center (MERC), P.O. Box 14155-4777, Tehran, Iran.
Zamanian, Ali. Bioengineering Research Group, Nanotechnology and Advanced Materials Department, Materials and Energy Research Center (MERC), P.O. Box 14155-4777, Tehran, Iran.
Venugopal, Jayarama Reddy. Center for Nanofibers and Nanotechnology and Department of Mechanical Engineering, National University of Singapore, Singapore 117576, Singapore.
Rezvani, Zahra. Bioengineering Research Group, Nanotechnology and Advanced Materials Department, Materials and Energy Research Center (MERC), P.O. Box 14155-4777, Tehran, Iran.
Sefat, Farshid. School of Engineering, Design and Technology-Medical Engineering, University of Bradford, Bradford, West Yorkshire, UK.
Saeb, Mohammad Reza. Department of Resin and Additives, Institute for Color Science and Technology, P.O. Box 16765-654, Tehran, Iran.
Zarrintaj, Payam. School of Chemical Engineering, College of Engineering, University of Tehran, Tehran, Iran.
Mozafari, Masoud. Bioengineering Research Group, Nanotechnology and Advanced Materials Department, Materials and Energy Research Center (MERC), P.O. Box 14155-4777, Tehran, Iran. Electronic address: mozafari.masoud@gmail.com.
Title
Antibacterial glass-ionomer cement restorative materials: A critical review on the current status of extended release formulations. [Review]
Source
Abstract
Glass-ionomer cements (GICs) have been widely used for over forty years, because of their desirable properties in dentistry. The most important advantages of the GICs are associated with their ability to release long-term antimicrobial agents. However, GICs used as restorative materials have still lots of challenges due to their secondary caries and low mechanical properties. Recent studies showed that the fluoride-releasing activity of conventional GICs is inadequate for effectual antibacterial conservation in many cases. Therefore, many efforts have been proposed to modify the antibacterial features of GICs in order to prevent the secondary caries. Particularly, for achieving this goal GICs were incorporated into various biomaterials possessing antibacterial activities. The scope of this review is to assess systematically the extant researches addressing the antibacterial modifications in GICs in order to provide with an authoritative, at the same time in-depth understanding of controlled antibacterial release in this class of biomaterials. It also gives a whole perspective on the future developments of GICs and challenges related to antibacterial GICs.

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Authors
Zhang N; Ma Y; Weir MD; Xu HHK; Bai Y; Melo MAS.

Zhang, Ning; Ma, Yansong; Weir, Michael D; Xu, Hockin H K; Bai, Yuxing; Melo, Mary Anne S.

Institution
Zhang, Ning. Department of Orthodontics, School of Stomatology, Capital Medical University, Beijing 100050, China. dentistzhang112@163.com.
Zhang, Ning. Biomaterials & Tissue Engineering Division, Department of Endodontics, Prosthodontics and Operative Dentistry, University of Maryland School of Dentistry, Baltimore, MD 21201, USA. dentistzhang112@163.com.
Ma, Yansong. Department of Orthodontics, School of Stomatology, Capital Medical University, Beijing 100050, China. mayansong0911@126.com.
Weir, Michael D. Biomaterials & Tissue Engineering Division, Department of Endodontics, Prosthodontics and Operative Dentistry, University of Maryland School of Dentistry, Baltimore, MD 21201, USA. byuxing@263.net.
Xu, Hockin H K. Biomaterials & Tissue Engineering Division, Department of Endodontics, Prosthodontics and Operative Dentistry, University of Maryland School of Dentistry, Baltimore, MD 21201, USA. MWeir@umaryland.edu.
Xu, Hockin H K. Center for Stem Cell Biology & Regenerative Medicine, University of Maryland School of Medicine, Baltimore, MD 21201, USA. MWeir@umaryland.edu.
Xu, Hockin H K. Marlene and Stewart Greenebaum Cancer Center, University of Maryland School of Medicine, Baltimore, MD 21201, USA. MWeir@umaryland.edu.
Xu, Hockin H K. Department of Mechanical Engineering, University of Maryland, Baltimore, Baltimore, MD 21250, USA. MWeir@umaryland.edu.
Bai, Yuxing. Department of Orthodontics, School of Stomatology, Capital Medical University, Beijing 100050, China. hxl@umaryland.edu.

Title

Source
Materials. 10(5), 2017 May 06.

Abstract
Dental polymeric composites have become the first choice for cavity restorations due to their esthetics and capacity to be bonded to the tooth. However, the oral cavity is considered to be harsh environment for a polymeric material. Oral biofilms can degrade the polymeric components, thus compromising the marginal integrity and leading to the recurrence of caries. Recurrent caries around restorations has been reported as the main reason for restoration failure. The degradation of materials greatly compromises the clinical longevity. This review focuses on the degradation process of resin composites by oral biofilms, the mechanisms of degradation and its consequences. In addition, potential future developments in the area of resin-based dental biomaterials with an emphasis on anti-biofilm strategies are also reviewed.

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Authors
Ntovas P; Doukoudakis S; Tzoutzas J; Lagouvardos P.
Authors Full Name
Ntovas, Panagiotis; Doukoudakis, Spyridon; Tzoutzas, John; Lagouvardos, Panagiotis.

Institution
Ntovas, Panagiotis. Department of Operative Dentistry, Dental School, University of Athens, Athens, Greece.
Doukoudakis, Spyridon. Department of Operative Dentistry, Dental School, University of Athens, Athens, Greece.
Tzoutzas, John. Department of Operative Dentistry, Dental School, University of Athens, Athens, Greece.
Lagouvardos, Panagiotis. Department of Operative Dentistry, Dental School, University of Athens, Athens, Greece.

Title
Evidence provided for the use of oscillating instruments in restorative dentistry: A systematic review. [Review]

Source

Abstract
Oscillating diamond instruments are considered gentle sources for the removal of demineralized tooth hard tissues and the preparation of cavity angles and margins needed in minimally invasive dentistry. However, there is a question if literature provides enough evidence for their efficacy in restorative dentistry procedures. A literature search until May 2016 was conducted, using PubMed, Scopus, and The Cochrane Central Register of Controlled Trials databases. The quality of the studies was assessed using the recommendation of the Oxford Centre for Evidence-based Medicine. Fifty-five studies were finally included in the study. Of which, 78.2% of them were laboratory studies and only 21.8% were clinical studies. The strength of recommendation was 5 for most of them and D their grade of evidence. Bond strength of adhesives on surfaces prepared with these instruments, effective caries removal and cutting characteristics of the oscillating instruments were the main targets of the studies. Conventional diamond, steel, and chemical vapor deposition diamond tips and systems based on abrasive slurry were the oscillating tips, used in different studies. The strength of recommendation and grade of evidence of the studies were low. Although these devices seem to be useful for many clinical situations, there is a need for more well-structured evidence-based studies with more widely accepted procedures and common devices, to have more meaningful results and conclusions of higher strength.

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Authors
Donovan TE; Marzola R; Murphy KR; Cagna DR; Eichmiller F; McKee JR; Metz JE; Albouy JP; Troeltzsch M.

Authors Full Name
Donovan, Terence E; Marzola, Riccardo; Murphy, Kevin R; Cagna, David R; Eichmiller, Frederick; McKee, James R; Metz, James E; Albouy, Jean-Pierre; Troeltzsch, Mathias.

Institution
Donovan, Terence E. Chair, Committee on Scientific Investigation, and Professor and Chair, Biomaterials, Department of Operative Dentistry, University of North Carolina School of Dentistry at Chapel Hill, NC. Electronic address: terry_donovan@dentistry.unc.edu.
Marzola, Riccardo. Private practice, Ferrara, Italy.
Murphy, Kevin R. Private practice, Baltimore, Md.
Cagna, David R. Associate Dean, Professor and Director, Advanced Prosthodontics, University of Tennessee Health Sciences Center, Memphis, Tenn.
Eichmiller, Frederick. Delta Dental, Stevens Point, Wis.
McKee, James R. Private practice, Downers Grove, Ill.
Metz, James E. Private practice, Columbus, Ohio.
Albouy, Jean-Pierre. Private practice, Montpellier, France.
Troeltzsch, Mathias. Private practice, Ansbach, Bavaria, Germany.

Title
Annual review of selected scientific literature: Report of the committee on scientific investigation of the American Academy of Restorative Dentistry. [Review]

Source

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Abstract
This review was conducted to assist the busy dentist in keeping abreast of the latest scientific information regarding the clinical practice of dentistry. Each of the authors, who are considered experts in their disciplines, was asked to peruse the scientific literature in their discipline published in 2016 and review the articles for important information that may affect treatment decisions. Comments on experimental methodology, statistical evaluation, and the overall validity of conclusions are included with many of the reviews. The reviews are not meant to stand alone but are intended to inform the interested reader about what has been discovered in the past year. The readers are then invited to go to the source, if they want more detail.

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Abstract

Esthetic considerations are a significant contributing factor in the management of prosthodontic cases and an interdisciplinary approach is often necessary to achieve an optimal result. The visible soft-tissue architecture plays a key role in developing an esthetic smile. Furthermore, an understanding of the relationship between the restorative margin and the gingiva is important for long-term stability of the result. The gingival architecture and gingival health are important for ensuring optimal esthetics following prosthodontic work and close attention to both soft and hard tissues around the teeth, before, during and after restorative procedures, will greatly improve the likelihood of a successful outcome. Moreover, knowing the options available in periodontal plastic surgery is important in esthetic dentistry today. The relevant literature related to restorative and surgical procedures when performing esthetic dentistry are reviewed in this article, and different approaches are illustrated with appropriate cases to explain the treatment approach that was utilized to improve the esthetic appearance of the case.
Clinician assessments and patient perspectives of single-tooth implant restorations in the esthetic zone of the maxilla: A systematic review. [Review]

STATEMENT OF PROBLEM: Esthetic outcomes associated with implant dentistry are important to both clinicians and patients. However, esthetic satisfaction may vary between the 2 groups. In order to evaluate the current publications relating to this topic, the following focused question was developed, "what are the quantitative and qualitative differences between clinician evaluations and patient perspectives in the assessment of single-tooth implant outcomes in the esthetic zone?"

PURPOSE: The purpose of this systematic review was to identify differences in esthetic satisfaction between clinicians and patients when evaluating single-tooth implant-supported restorations.

MATERIAL AND METHODS: An electronic search of the Medline database and Cochrane Central Register of Controlled Trials (2000 to 2014) was performed. The search was supplemented by a manual search of specific journals. A quality assessment of full-text articles was performed according to Cochrane Collaboration's tool and Newcastle-Ottawa scale for risk of bias assessment. Information regarding outcomes was collected and compared.

RESULTS: The search term combinations identified 555 titles. Subsequent to further review, 11 publications, including 2 randomized controlled trials, were selected for inclusion. Because of the heterogeneity of the study designs, study interventions, and esthetic assessment methods, no meta-analysis was performed. The clinicians identified a satisfactory outcome in 51% to 100% for peri-implant soft tissue and 62% to 90% for implant restorations. Patients showed a mean range score of 43% to 93% for peri-implant soft tissue and 81% to 96% for implant restorations. The visual analog scale score of the dentists was always lower than that of the patients. The review identified correlations between subjective and objective assessments for the Pink Esthetic Score (PES), the Papilla Index (PI), the Implant Crown Aesthetic Index (ICAI), and the modified (mod-ICAI) indices.

CONCLUSIONS: Clinicians are more critical of esthetic outcomes than patients. The PES and the PI correlated with the patients' responses concerning the peri-implant soft tissue. The ICAI and the mod-ICAI showed a correlation of both the peri-implant mucosa and implant-supported crown satisfaction. Thus, a comprehensive and practical index should be developed to assess the esthetic outcomes for single-tooth implant restorations in the esthetic zone.
Resin-based composite (RBC) materials are increasingly being used for the restoration of posterior teeth. The increasing demand for aesthetic, tooth-coloured restorations coupled with the patient’s concerns regarding the use of mercury containing restorations, has driven a surge in the use of RBC materials. With the Minamata Convention in 2013 calling for the phase-out of dental amalgam and dental schools increasingly teaching techniques for RBC restorations in posterior teeth, it is likely that the dental profession’s reliance upon RBC for the restoration of posterior teeth will only increase. In order to simplify and speed-up the placement of large posterior RBCs, manufacturers have produced a range of materials which can be placed in single or deeper increments, known as bulk-fill RBCs. Over a relatively short period of time many bulk-fill RBCs have been marketed quoting increment depths between 4-10 mm. The placement of these larger increments of RBC may reduce the time needed when placing posterior restorations and thereby reduce technique sensitivity. This article aims to review the properties and handling characteristics of the bulk-fill RBC materials currently available, while advising the optimal techniques of placement.

Abstract

Background and Objective: Minor dental surgery is invasive and hemorrhagic. Thus, in patients treated with anticoagulants, the bleeding risk related to these invasive procedures is concerning. The aim of this meta-analysis is to evaluate this risk by comparing the post-operative bleeding rates of oral anticoagulation treatment (OAT) patients (without interrupted or altered anticoagulant intake) with non-OAT patients. Methods: PubMed, Embase and the Cochrane Library were searched for eligible studies that compared the post-operative (following minor dental surgery) bleeding rates of OAT patients without interrupted or altered therapy with those of non-OAT patients. Relative risk (RR) and 95% confidence interval (CI) were calculated. Subgroup analyses were used to identify the association between the bleeding rate and different dental surgeries or anticoagulants. Results: Thirty two full text articles were assessed for eligibility and 20 studies were excluded according to the selection criteria. Finally, 12 studies and a total of 2102 OAT patients and 2271 non-OAT patients were included. A pooled analysis indicated that the post-operative bleeding risk in OAT patients is higher than that of non-OAT patients (RR: 2.794, 95% CI: 1.722-4.532, P = 0.000). The pooled RRs in the dental implant surgery and dental extraction subgroups were 2.136 (95% CI: 0.825-5.531, P = 0.118) and 2.003 (95% CI: 0.987-4.063, P = 0.054), respectively. As for the different oral anticoagulants, the pooled RR in the subgroup of new oral anticoagulants (NOACs) was 1.603 (95% CI: 0.430-5.980, P = 0.482), while the pooled RR in the vitamin K antagonists subgroup was 3.067 (95% CI: 1.838-5.118, P = 0.000). Conclusion: Under current evidence, OAT patients were under a higher post-operative bleeding risk than the non-OAT patients following minor dental surgery. For the dental implant surgeries and dental extractions, our study failed to demonstrate a higher risk of bleeding in the OAT patients compared with the non-OAT patients. Besides, The NOACs might be safer than the vitamin K antagonists in dental implant surgery. However, more well-designed studies are required for future research.
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RECENT REVIEWS RELATED TO RESTORATIVE DENTISTRY

Institution
Priest, George. Board Certified Prosthodontist, 23 Main Street, Suite 303, Hilton Head Island, SC, 29926, USA.
Title
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Abstract
OBJECTIVE: There is a trend toward increased use of screw-retained single-implant restorations. A comprehensive literature review was undertaken to examine the data related to screw- and cement-retention and to objectively evaluate the innovations in implant dentistry that have led to this resurgence.
OVERVIEW: When comparing the two options, survival and complication rates are similar, bone and soft-tissue levels are comparable, and zirconia offers esthetic advantages for both selections. Zirconia abutments with bonded titanium inserts provide esthetic alternatives to titanium abutments for both choices. Bone- and soft-tissue responses are similar, but residual cement of cement-retained restorations is associated with significant soft- and hard-tissue complications. The potential weakness of ceramic discontinuity of screw-access openings can be lessened by the incorporation of stronger ceramic materials such as zirconia and lithium disilicate. The overriding remaining indication for cement-retained restorations is to compensate for angled implants.
CONCLUSIONS: Screw-retained single-implant crowns should be reconsidered for many clinical situations for the following reasons: Predictable retention and retrievability No potential for the biologic consequences associated with residual cement As with cement-retained restorations, the choice between metal ceramics or all ceramics Only one margin, at the implant/abutment interface A single abutment/crown ceramic margin that can extend gingivally to the implant interface Nearly imperceptible blend of a composite resin in ceramic abutment access openings One component instead of two, which may simplify the restorative process CLINICAL SIGNIFICANCE: Innovations in implant and ceramic technology now give screw-retained prostheses the potential for esthetic, functional, and biologic outcomes that are comparable to those for cement-retained prostheses, while providing the advantages of predictable retrievability and avoidance of residual cement. Angled implants, however, remain a major indication for cement-retained single-implant prostheses. (J Esthet Restor Dent 29:161-171, 2017).
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Title
Longevity of direct and indirect resin composite restorations in permanent posterior teeth: a systematic review and meta-analysis.
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Abstract
No difference in longevity between direct and indirect resin composite restorations.
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Authors
Al Amri MD; Kellesarian SV.
Authors Full Name
Al Amri, Mohammad D; Kellesarian, Sergio Varela.
Institution
Al Amri, Mohammad D. Department of Prosthetic Dental Sciences, College of Dentistry, King Saud University, Riyadh, Saudi Arabia.
Kellesarian, Sergio Varela. Department of General Dentistry, Eastman Institute for Oral Health, University of Rochester, NY.
Title
Longevity of direct and indirect resin composite restorations in permanent posterior teeth: a systematic review and meta-analysis.
Crestal Bone Loss Around Adjacent Dental Implants Restored with Splinted and Nonsplinted Fixed Restorations: A Systematic Literature Review. [Review]

Source

Abstract
PURPOSE: The aim of this systematic review was to compare the crestal bone loss around splinted and nonsplinted adjacent implants.

MATERIALS AND METHODS: To address the focused question, "Is crestal bone loss around adjacent implants different with splinted from that with nonsplinted restorations?" indexed databases were searched from 1965 up to and including May 2016 using various combinations of the following keywords: "implant," "splinted," "nonsplinted," "unsplit," "connected," "unconnected," "nonconnected," and "bone loss." Letters to the editor, commentaries, historic reviews, case reports, case series, animal studies, and studies on full-arch rehabilitation were excluded.

RESULTS: Six studies were included with titanium implants ranging from 114 to 1187 implants. All studies had nonsplinted and splinted restorations that ranged from 20 to 234 restorations and from 60 to 970 restorations, respectively. In all the studies, the follow-up period after the restoration placement ranged between 1 and 22 years, with a mean follow-up ranging between 3 and 10.18 +/- 3.18 years. In all studies, the mean crestal bone loss for implants restored with nonsplinted restorations ranged between 0.30 +/- 0.65 and 1.3 +/- 0.2 mm, whereas the mean crestal bone loss for implants restored with splinted restorations ranged between 0.50 +/- 0.8 and 1.22 +/- 0.95 mm.

CONCLUSION: Within the limitations of this review it is concluded that adjacent implants restored with splinted and nonsplinted fixed restorations did not exhibit a difference in crestal bone loss. The evidence from this systematic review suggests further investigation.

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Title
Failure of single-unit restorations on root filled posterior teeth: a systematic review. [Review]

Source
treatment and remaining coronal tooth structure. The current evidence suggested that the failure rates of the treatments may depend on the amount of remaining tooth structure and type of treatment. Post-retained crowns were associated with the most favourable outcome in teeth with one to two remaining coronal tooth wall(s), whereas post-free crowns were superior when greater tooth structure was available. Restorations in teeth without ferrules had such a high rate of failure that other treatment options should be considered.

RESULTS: Five randomized controlled trials and 9 observational studies were included and their quality ranged from low to moderate. These studies included a total of 358 crowns, 4804 composite resins, and 303582 amalgams. Data obtained from the studies showed that, regardless of the amount of remaining tooth structure, amalgams presented better outcomes than composite resins. Furthermore, in teeth with fewer than 2 remaining walls, high-quality observational studies demonstrated that crowns were better than amalgams. A clear inverse correlation was found between the amount of remaining tooth walls and the weighted-mean 5-year failure rates.

CONCLUSIONS: Insufficient high-quality data are available to support one restorative treatment or material over another for the restoration of vital posterior teeth. However, the current evidence suggests that the failure rates of treatments may depend on the amount of remaining tooth structure and types of treatment.
OBJECTIVE: Nowadays bioactive glasses are finding increasing applications in medical practice due to their ability to stimulate re-mineralisation. However, they are intrinsically brittle materials and the study of new compositions will open up new scenarios enhancing their mechanical properties and maintaining the high bioactivity for a broader range of applications. This systematic review aims to identify the relationship between the composition of bioactive glasses used in medical applications and their influence on the mechanical and biological properties.

METHODS: Various electronic databases (PubMed, Science Direct) were used for collecting articles on this subject. This research includes papers from January 2011 to March 2016. PRISMA guidelines for systematic review and meta-analysis have been used. 109 abstracts were collected and screened, 68 articles were read as relevant articles and a total of 22 papers were finally selected for this study.

RESULTS: Most of the studies obtained enhanced mechanical properties and the conservation of bioactivity behaviours; although a lack of homogeneity in the characterization methods makes it difficult to compare data.

SIGNIFICANCE: New compositions of bioactive glasses incorporating specific ions and the addition in polymers will be the most important direction for future researches in developing new materials for medical applications and especially for dentistry.

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METHODS: A historical perspective and terminology are presented, followed by a general description of the complexity of oral biofilms. Then, an approach to grouping measurable biofilm properties is presented and considered in relation to biofilm-material interactions and material design strategies to alter biofilms. Finally, the need for measurement assurance in biofilm and biofilm-materials research is discussed.

RESULTS: Biofilms are highly heterogeneous communities that are challenging to quantify. Their characteristics can be broadly categorized into constituents (identity), quantity, structure, and function. These attributes can be measured over time and in response to substrates and external stimuli. Selecting the biofilm attribute(s) of interest and appropriate measurement methods will depend on the application and, in the case of antimicrobial therapies, the strategic approach and expected mechanism of action. To provide measurement assurance, community accepted protocols and guidelines for minimum data and metadata should be established and broadly approved. Consensus standards may help to streamline testing and demonstration of product claims.

SIGNIFICANCE: Understanding oral biofilms and their interactions with tooth and dental material surfaces holds great promise for enabling improvements in oral and overall human health. Both substrate and biofilm properties should be considered to develop a more thorough understanding of the system.
RECENT REVIEWS RELATED TO RESTORATIVE DENTISTRY

SIGNIFICANCE: This study did not identify clear advantages of using the first generation of ormocer-based fillings rather than conventional composites. Given the recent development of new, dimethacrylate-diluent-free ormocer matrices, potentially more stable and resistant, new randomized clinical trials should be developed comparing this new family of pure ormocers with current composites.

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Authors
Heintze SD; Ilie N; Hickel R; Reis A; Loguercio A; Rousson V.

Authors Full Name
Heintze, Siegward D; Ilie, Nicoleta; Hickel, Reinhard; Reis, Alessandra; Loguercio, Alessandro; Rousson, Valentin.

Institution
Heintze, Siegward D. R&D, Ivoclar Vivadent AG, Preclinical Research, Schaan, Liechtenstein. Electronic address: siegward.heintze@ivoclarvivadent.com.

Ilie, Nicoleta. Department of Operative Dentistry and Periodontology, University Hospital, Ludwig-Maximilian-University, Munich, Germany.

Hickel, Reinhard. Department of Operative Dentistry and Periodontology, University Hospital, Ludwig-Maximilian-University, Munich, Germany.

Reis, Alessandra. Department of Restorative Dentistry, State University of Ponta Grossa, Brazil.

Loguercio, Alessandro. Department of Restorative Dentistry, State University of Ponta Grossa, Brazil.

Rousson, Valentin. Division of Biostatistics, Institute for Social and Preventive Medicine, University Hospital Lausanne, Switzerland.

Title
Laboratory mechanical parameters of composite resins and their relation to fractures and wear in clinical trials-A systematic review. [Review]

Source

Abstract
OBJECTIVE: To evaluate a range of mechanical parameters of composite resins and compare the data to the frequency of fractures and wear in clinical studies.

METHODS: Based on a search of PubMed and SCOPUS, clinical studies on posterior composite restorations were investigated with regard to bias by two independent reviewers using Cochrane Collaboration's tool for assessing risk of bias in randomized trials. The target variables were chipping and/or fracture, loss of anatomical form (wear) and a combination of both (summary clinical index). These outcomes were modelled by time and material in a linear mixed effect model including random study and experiment effects. The laboratory data from one test institute were used: flexural strength, flexural modulus, compressive strength, and fracture toughness (all after 24-h storage in distilled water). For some materials flexural strength data after aging in water/saliva/ethanol were available. Besides calculating correlations between clinical and laboratory outcomes, we explored whether a model including a laboratory predictor dichotomized at a cut-off value better predicted a clinical outcome than a linear model.

RESULTS: A total of 74 clinical experiments from 45 studies were included involving 31 materials for which laboratory data were also available. A weak positive correlation between fracture toughness and clinical fractures was found (Spearman rho=0.34, p=0.11) in addition to a moderate and statistically significant correlation between flexural strength and clinical wear (Spearman rho=0.46, p=0.01). When excluding those studies with "high" risk of bias (n=18), the correlations were generally weaker with no statistically significant correlation. For aging in ethanol, a very strong correlation was found between flexural strength decrease and clinical index, but this finding was based on only 7 materials (Spearman rho=0.96, p=0.0001). Prediction was not consistently improved with cutoff values.

SIGNIFICANCE: Correlations between clinical and laboratory outcomes were moderately positive with few significant results, fracture toughness being correlated with clinical fractures and flexural strength with clinical wear. Whether artificial aging enhances the prognostic value needs further investigations.

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Comparison between published clinical success of direct resin composite restorations in vital posterior teeth in 1995-2005 and 2006-2016 periods. [Review]


Abstract
Composites are increasing in popularity as restorative materials. This growing role indicates the necessity of studies on their clinical outcome. In this study, clinical studies published on the performance of posterior composite restorations were included except those of less than a 24-month assessment period. Results of non-vital, anterior or primary teeth and cervical single-surface restorations were also excluded. Records about composite type, number of final recall restorations, failure/survival rate, assessment period and failure reasons were analysed for each decade. Overall survival/failure rates for studies in 1995-2005 were 89.41%/10.59% and for 2006-2016 were 86.87%/13.13%, respectively. In 1995-2005, the reasons for failure were secondary caries (29.47%) and composite fracture (28.84%) with low tooth fracture (3.45%) compared with reasons of failure in 2006-2016, which were secondary caries (25.68%), composite fracture (39.07%), and tooth fracture (23.76%). An increase in incidence of composite fracture, tooth fracture and need for endodontic treatment as failure reasons was noted in the latter decade in addition to a decrease in secondary caries, postoperative sensitivity, unsatisfactory marginal adaptation and wear. The overall rates of failure showed little difference, but the causes showed a notable change. This is believed to be a reflection of increased use of composites for larger restorations and possibly changes of material characteristics.

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Metal-free materials for fixed prosthodontic restorations. [Review]


Abstract
BACKGROUND: Fixed prosthodontic treatment (crowns, fixed dental prostheses (FDPs), complete arch prostheses) involves the use of several different materials to replace missing tooth structure. Traditionally full metal or metal frameworks veneered with ceramic (metal-ceramic (MC)) have been used. In recent years several different metal-free systems have become available to clinicians and patients. In general, metal-free restorations should allow practitioners to better reproduce natural tooth colour, avoiding shortcomings of MC restorations. The comparative in service clinical performance of fixed prosthodontic treatments of different materials is unclear.

OBJECTIVES: To assess the effects of metal-free materials for prosthodontic restorations compared to metal-ceramic or other conventional all-metal materials.

SEARCH METHODS: Cochrane Oral Health's Information Specialist searched the following databases: Cochrane Oral Health's Trials Register (searched 3 May 2017), Cochrane Central Register of Controlled Trials (CENTRAL; 2017, Issue 4) in the Cochrane Library (searched 3 May 2017), MEDLINE Ovid (1946 to 3 May 2017), and Embase Ovid (1980 to 3 May 2017). The US National Institutes of Health Trials Registry (ClinicalTrials.gov) and the World Health Organization International Clinical Trials Registry Platform were searched for ongoing trials (searched 3 May 2017). No restrictions were placed on the language or date of publication when searching the electronic databases.
Atraumatic Restorative Treatment (ART) was developed, mainly for treating caries in children living in underdeveloped areas of the world where resources and facilities such as electricity and trained manpower are limited. ART is a minimally invasive approach which involves removal of decayed tissue using hand instruments alone, usually without use of anaesthesia and electrically driven techniques (pressed versus layered) in 40 participants. There was insufficient evidence of a difference for failures (i.e. no failures in either treatment group), bridge complications, or patients' aesthetic evaluation at any time of assessment up to three years. One trial compared metal-free implant-supported screw retained single crowns (zirconia veneered with feldspathic ceramic) to metal-ceramic implant-supported screw-retained single crowns in 20 participants. There was insufficient evidence of a difference in bridge failures (i.e. no failures in either treatment group), bridge complications or patients' aesthetic evaluation at any time of assessment up to three years. One trial compared metal-free implant-supported screw retained single crowns (zirconia veneered with feldspathic ceramic) to metal-ceramic implant-retained single crowns in 18 participants. There was insufficient evidence of a difference at one year. One trial compared metal-free implant-retained single crowns (zirconia veneered with feldspathic ceramic) to metal-ceramic abutment-retained single crowns in 37 participants. There was insufficient evidence of a difference for any primary outcome: bridge failures (i.e. no failures in either treatment group), bridge complications or patients' aesthetic evaluation at any time of assessment up to three years. One trial compared metal-free implant-retained single crowns (zirconia veneered with feldspathic ceramic) to metal-ceramic abutment-retained single crowns in 18 participants. There was insufficient evidence of a difference in bridge failures (i.e. no failures in either treatment group), bridge complications or patients' aesthetic evaluation at any time of assessment up to three years. One trial compared metal-free implant-supported metal-ceramic FDPs in 21 participants. There was insufficient evidence of a difference for any primary outcome: bridge failures (i.e. no failures in either treatment group), bridge complications or patients' aesthetic evaluation at any time of assessment up to three years. One trial compared metal-free implant-supported screw retained single crowns (zirconia veneered with feldspathic ceramic) to metal-ceramic implant-supported screw-retained single crowns in 20 participants. There was insufficient evidence of a difference in bridge failures (i.e. no failures in either treatment group), bridge complications or patients' aesthetic evaluation at any time of assessment up to three years. Two trials compared metal-free implant abutments (zirconia) to metal implant abutments both supporting single crowns in 50 participants. There was insufficient evidence of a difference in abutment failure at one year. One trial compared metal-free implant-supported FDPs made of two different types of zirconia ceramic in 18 participants. There was insufficient evidence of a difference in failures at any time of assessment up to 10 years (i.e. no failures in either treatment group). There was some evidence of a benefit for the zirconia-toughened alumina group in terms of complications (chipping). One trial compared metal-free tooth-supported FDPs made with two different veneering techniques (pressed versus layered) in 40 participants. There was insufficient evidence of a difference for failures (i.e. no failures in either treatment group) or complications at any time of assessment up to three years.

AUTHORS' CONCLUSIONS: There is insufficient evidence to support or refute the effectiveness of metal-free materials for fixed prosthodontic treatment over metal-ceramic or other type of standard restorations. The overall quality of existing evidence was very low, therefore great caution should be exercised when generalising the results of the included trials. Until more evidence becomes available clinicians should continue to base decisions on which material to use for fixed prosthodontic treatment on their own clinical experience, whilst taking into consideration the individual circumstances and preferences of their patients. There is urgent need of properly designed RCTs.

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MEDLINE

Authors: Dorri M; Martinez-Zapata MJ; Walsh T; Marinho VC; Sheiham Deceased A; Zaror C.

Authors Full Name: Dorri, Mojtaba; Zapata, Maria Jose; Walsh, Tanya; Marinho, Valeria Cc; Sheiham Deceased, Aubrey; Zaror, Carlos.

Institution: Dorri, Mojtaba. Department of Restorative Dentistry, Bristol Oral and Dental School, Lower Maudlin Street, Bristol, UK, BS1 2LY.

Title: Atraumatic restorative treatment versus conventional restorative treatment for managing dental caries. [Review]


Abstract: BACKGROUND: Dental caries is a sugar-dependent disease that damages tooth structure and, due to loss of mineral components, may eventually lead to cavitation. Dental caries is the most prevalent disease worldwide and is considered the most important burden of oral health. Conventional treatment methods (drill and fill) involve the use of rotary burs under local anaesthesia. The need for an electricity supply, expensive handpieces and highly trained dental health personnel may limit access to dental treatment, especially in underdeveloped regions. To overcome the limitations of conventional restorative treatment, the Atraumatic Restorative Treatment (ART) was developed, mainly for treating caries in children living in under-served areas of the world where resources and facilities such as electricity and trained manpower are limited. ART is a minimally invasive approach which involves removal of decayed tissue using hand instruments alone, usually without use of anaesthesia and electrically driven techniques (pressed versus layered) in 40 participants. There was insufficient evidence of a difference for failures (i.e. no failures in either treatment group), bridge complications or patients' aesthetic evaluation at any time of assessment up to three years. One trial compared metal-free implant-supported screw retained single crowns (zirconia veneered with feldspathic ceramic) to metal-ceramic implant-supported screw-retained single crowns in 20 participants. There was insufficient evidence of a difference in bridge failures (i.e. no failures in either treatment group), bridge complications or patients' aesthetic evaluation at any time of assessment up to three years. One trial compared metal-free implant-supported screw retained single crowns (zirconia veneered with feldspathic ceramic) to metal-ceramic implant-supported screw-retained single crowns in 20 participants. There was insufficient evidence of a difference in bridge failures (i.e. no failures in either treatment group), bridge complications or patients' aesthetic evaluation at any time of assessment up to three years.
OBJECTIVES: To assess the effects of Atraumatic Restorative Treatment (ART) compared with conventional treatment for managing dental caries lesions in the primary and permanent teeth of children and adults.

SEARCH METHODS: Cochrane Oral Health's Information Specialist searched the following databases: Cochrane Oral Health's Trials Register (to 22 February 2017), the Cochrane Central Register of Controlled Trials (CENTRAL) (the Cochrane Library, 2017, Issue 1), MEDLINE Ovid (1946 to 22 February 2017), Embase Ovid (1980 to 22 February 2017), LILACS BIREME Virtual Health Library (Latin American and Caribbean Health Science Information database; 1982 to 22 February 2017) and BBO BIREME Virtual Health Library (Bibliografia Brasileira de Odontologia; 1986 to 22 February 2017). The US National Institutes of Health Trials Registry (ClinicalTrials.gov) and the World Health Organization International Clinical Trials Registry Platform were searched for ongoing trials. No restrictions were placed on the language or date of publication when searching the electronic databases.

SELECTION CRITERIA: We included randomised controlled trials (RCTs) with at least six months' follow-up that compared the effects of ART with a conventional restorative approach using the same or different restorative dental materials to treat caries lesions.

DATA COLLECTION AND ANALYSIS: Two review authors independently screened search results, extracted data from included studies and assessed the risk of bias in those studies. We used standard methodological procedures expected by Cochrane to evaluate risk of bias and synthesise data. Where pooling was appropriate we conducted meta-analyses using the random-effects model. We assessed the quality of the evidence using GRADE criteria.

MAIN RESULTS: We included a total of 15 eligible studies randomising 3760 participants in this review. The age of participants across the studies ranged from 3 to 101 years, with a mean of 25.42 years. 48% of participants were male. All included studies were published between 2002 and 2016. Two of the 15 studies declared that the financial support was from companies that manufacture restorative material. Five studies were individually randomised parallel-group studies; six were cluster-randomised parallel-group studies; and four were randomised studies that used a split-mouth design. Eleven studies evaluated the effects of ART on primary teeth only, and four on permanent teeth. The follow-up period of the included studies ranged from 6 months to 36 months. We judged all studies to be at high risk of bias. For the main comparison of ART compared to conventional treatment using the same material: all but two studies used high-viscosity glass ionomer (H-GIC) as the restorative material; one study used a composite material; and one study used resin-modified glass ionomer cement (RM-GIC). Compared to conventional treatment using H-GIC, ART may increase the risk of restoration failure in the primary dentition, over a follow-up period from 12 to 24 months (OR 1.60, 95% CI 1.13 to 2.27, five studies; 643 participants analysed; low-quality evidence). Our confidence in this effect estimate is limited due to serious concerns over risk of performance and attrition bias. For this comparison, ART may reduce pain during procedure compared with conventional treatment (MD -0.65, 95% CI -1.38 to 0.07; 40 participants analysed; low-quality evidence). Comparisons of ART to conventional treatment using composite or RM-GIC were downgraded to very low quality due to indirectness, imprecision and high risk of performance and attrition bias. Given the very low quality of the evidence from single group studies, we are uncertain about the restoration failure of ART compared with conventional treatment using composite over a 24-month follow-up period (OR 1.11, 95% CI 0.54 to 2.29; one study; 57 participants) and ART using RM-GIC in the permanent teeth of older adults with root caries lesions over a six-month follow-up period (OR 2.71, 95% CI 0.94 to 7.81; one study; 64 participants). No studies reported on adverse events or costs.

AUTHORS' CONCLUSIONS: Low-quality evidence suggests that ART using H-GIC may have a higher risk of restoration failure than conventional treatment for caries lesions in primary teeth. The effects of ART using composite and RM-GIC are uncertain due to the very low quality of the evidence and we cannot rely on the findings. Most studies evaluated the effects of ART on the primary dentition. Well-designed RCTs are required that report on restoration failure at clinically meaningful time points, as well as participant-reported outcomes such as pain and discomfort. Due to the potential confounding effects from the use of different dental materials, a robust body of evidence on the effects of ART compared with conventional treatment using the same restoration material is necessary. We identified four ongoing trials that could provide further insights into this area.

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Authors
Shah R; M G T; Thomas R; Mehta DS.
Authors Full Name
Shah, Rucha; M G, Triveni; Thomas, Raison; Mehta, Dhoom Singh.
Institution
Title
An Update on the Protocols and Biologic Actions of Platelet Rich Fibrin in Dentistry. [Review]
Source
Local Messages
Abstract
Platelet rich fibrin (PRF) is a surgical biologic additive that is prepared by manipulation of autologous blood. It has now evolved to become one of the most widely used platelet concentrate in dentistry. It has almost replaced Platelet rich plasma (PRP) for usage owing to its advantages such as being 100% autogenous, easy technique, time and cost effectiveness, superior & prolonged growth factor release. It finds varied applications in dentistry including management of gingival recession, for guided bone regeneration in periodontal, peri-implant and endodontic bone defects. Since its inception in 2001 by Choukroun & co-workers, there has been in-depth research regarding its clinical applications, biologic actions, various technique modifications and optimizations. Several modifications of the conventional protocol like the advanced PRF, injectable PRF, PRF lysate and Titanium-prepared PRF. Hence, the aim of this article to review the biological properties of platelet rich fibrin and the advancement in the PRF technology since its inception.

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Authors
Nobre CM; de Barros Pascoal AL; Albuquerque Souza E; Machion Shadloox L; Dos Santos Calderon P; de Aquino Martins AR; de Vasconcelos Gurgel BC.

Authors Full Name
Nobre, Cintia Mirela Guimaraes; de Barros Pascoal, Ana Luisa; Albuquerque Souza, Emmanuel; Machion Shadloox, Luciana; Dos Santos Calderon, Patricia; de Aquino Martins, Ana Rafaela Luz; de Vasconcelos Gurgel, Bruno Cesar.

Institution

Title
A systematic review and meta-analysis on the effects of crown lengthening on adjacent and non-adjacent sites. [Review]

Source

Local Messages
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Abstract
OBJECTIVES: The objective of the study was to assess the impact of periodontal crown lengthening surgery on clinical parameters at adjacent and non-adjacent sites compared to treated sites.

MATERIAL AND METHODS: An electronic search was carried out on MEDLINE-PubMed, The Cochrane Library, and ISI Web of Science databases between 1978 and 2015. Methodological quality assessment was based on Cochrane recommendations. Meta-analyses were assessed with RevMan 5.0 and heterogeneity between studies by the Higgin test (I^2). Clinical attachment level (CAL) and probing depth (PD) were the primary outcome variables. Four case series studies were included and three in the meta-analysis. All studies showed high risk of bias.

RESULTS: The surgery promoted significant changes in treated, adjacent, and non-adjacent sites. There were greater changes in PD (mean difference -0.14, 95 % CI -0.18 to -0.10, p < 0.00001) and CAL (mean difference 0.16, 95 % CI 0.13 to 0.20, p < 0.00001) in treated sites when compared to adjacent and non-adjacent sites for PD (mean difference -0.09, 95 % CI -0.12 to -0.05, p < 0.00001) and CAL (mean difference 0.91, 95 % CI 0.87 to 0.94, p < 0.00001).

CONCLUSION: Crown lengthening surgery results in changes of clinical parameters in treated, adjacent, and non-adjacent sites.

CLINICAL RELEVANCE: Clinical and esthetic alterations on the adjacent/non-adjacent teeth can lead to clinical and esthetic alterations, which must be considered in surgical planning.

Publication Type

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2017
The aim of this systematic review was to evaluate implant loss in younger and older patients. An electronic search of four databases (MEDLINE, EMBASE, SCOPUS, and the Cochrane Library) was undertaken until May 2016 without time restriction and was supplemented by manual searching. Prospective cohorts were included if they met the following criteria: (i) presence of an exposed group (older subjects) with a minimum age of 60 years; (ii) presence of a control group (younger subjects) with a maximum age of 59 years; and (iii) outcome data considering implant survival or loss. Meta-analyses were performed to evaluate the impact of ageing on implant failure. Of 4152 potentially eligible articles, four were included in the qualitative analysis and quantitative synthesis. The pooled estimates suggest that the risk of implant loss in older patients is not significantly higher (RR = 1.54; 95% CI: 0.42, 5.58; p = 0.52) in one study and, in another was 0.95 (95% CI: 0.34, 2.63; p = 0.92) over 11 years. For onlays there was also no statistically-significant difference in survival, though overall five-year survival was 87% (95% CI: 81-93%).

Conclusions: There is insufficient evidence to favour the direct or indirect technique for the restoration of posterior teeth with inlays and onlays.
0.92; 95% CI 0.43-1.96, P = 0.83) when compared to younger subjects. This systematic review suggests that age is not a limiting factor for dental implant therapy.

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Publication Type Journal Article. Meta-Analysis. Review.
Year of Publication 2017

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Status MEDLINE
Authors Kielbassa AM; Glockner G; Wolgin M; Glockner K.
Authors Full Name Kielbassa, Andrej M; Glockner, Georg; Wolgin, Michael; Glockner, Karl.
Title Systematic review on highly viscous glass-ionomer cement/resin coating restorations (Part II): Do they merge Minamata Convention and minimum intervention dentistry?. [Review]

Abstract BACKGROUND: With the Minamata Convention the use of mercury will be phased down, and this undoubtedly will have an effect on dental treatment regimens and economic resources. Composite resin restorations are considered viable alternatives to amalgam fillings; however, these will not be covered completely by health insurance systems in many countries. Recently, a high-viscosity glass-ionomer cement (hvGIC) processed with a resinous coating (RC) has been introduced, and has been marketed as a restorative material in load-bearing Class I cavities (and in Class II cavities with limited size), thus serving as a possible alternative to amalgam fillings.

OBJECTIVE: To discuss the outcome based on the evaluation presented in Part I of this paper, and to critically appraise the methodologies of the various studies.

RESULTS: Two of the included studies were industry-funded, and status of the other clinical trials remained unclear. Quality of study reporting was considered perfectible. The use of a light-cured nanofilled resin coating material would seem advantageous, at least when regarding short- and medium term outcomes.

CONCLUSION: Within the respective indications and cavity geometries, the hvGIC/RC approach would seem promising, could merge the phase-down of mercury and the objectives of minimally invasive treatment to some extent, and might be a restorative alternative for patients suffering from allergies or not willing to afford other sophisticated or expensive techniques. These recommendations are based on studies evaluating EQUIA Fil (GC), but are not transferable to clinical perspectives of the glass hybrid successor product (EQUIA Forte; GC).

Feiz A; Mosleh H; Nazeri R.
Authors Full Name Feiz, Atiyeh; Mosleh, Hamid; Nazeri, Rahman.
Institution Feiz, Atiyeh. Department of Restorative Dentistry, Torabinejad Dental Material Research Center, Dental School, Isfahan University of Medical Sciences, Isfahan, Iran.
Mosleh, Hamid. Department of Pediatric Dentistry and Research Committee, School of Dentistry, Isfahan University of Medical Sciences, Isfahan, Iran.
Nazeri, Rahman. General Dentist, Isfahan University of Medical Sciences, Isfahan, Iran. Electronic address: rahman.nazeri@gmail.com.
Title Evaluating the effect of antioxidant agents on shear bond strength of tooth-colored restorative materials after bleaching: A systematic review. [Review]
Abstract
PURPOSE: The main objective of the present study was to make a systematic review of how antioxidant agents affect shear bond strength of tooth-colored restorative materials after bleaching.

DATA SOURCES: Electronic search was used to extract the related articles on the targeted key words such as “antioxidant”, “dental bleaching” and “shear bond strength” (SBS) from MeSH, PubMed, Medline, and Cochrane electronic data bases. These articles were all published before 2016.

STUDY SELECTION: Inclusion criteria were restricted to English journal articles concerning humans, clinical trials, cohorts and case-control studies. Therefore, systematic reviews, case reports, letters to editors, editorialials and congress abstracts were excluded from the analysis.

CONCLUSIONS: Most studies conducted on the issue have produced experimental data which are rather controversial, and there is no general agreement about the reported outcomes. As an illustration, most studies have not considered the relationship between the type of antioxidant materials and the shear bond strength. In point of fact, some researchers (e.g, Kimyai et al.) have concluded that antioxidants like gel and solution leave similar effects on SBS. Alternatively, certain studies (e.g., Kunt et al.) have produced inconclusive data regarding the impact of one week postponement of the restorative process on SBS after the bleaching process. The results of the studies evaluating the role of various adhesive systems used after bleaching have demonstrated that regardless of the type of adhesive system used, applying antioxidants before restorative procedures can adversely affect the bleaching agents utilized for SBS. It has also been suggested that the type of the adhesive system used might be correlated with the magnitude of SBS. The results obtained from the systematic review of the articles under investigation reflected that the use of antioxidant agents, regardless of their type, form, concentration and duration of application, can improve SBS after bleaching.


Abstract
The aim of this study was to use electronic health care records (EHRs) to examine retrospectively the incidence of and attributes associated with dental implant failures necessitating implant removal in a large cohort of patients treated in the student clinics of a U.S. dental school over three and a half years. EHRs were searched for all patients who received dental implants between July 1, 2011, and December 31, 2014. Characteristics of patients and implants that were actively removed due to irrevocable failure of any etiology (“failure cohort”) during this period were compared to those of all other patients who received dental implants during the same time frame (“reference cohort”). Differences in the frequency distribution of various characteristics between the failure and reference cohorts were compared. Of a total 6,129 implants placed in 2,127 patients during the study period, 179 implants (2.9%) in 120 patients (5.6%) were removed. In the multivariate analysis, presence of a removable (OR=2.86) or fixed temporary prosthesis (OR=3.71) was statistically significantly associated with increased risk for implant failure. In contrast, antibiotic coverage (pre- and post-surgery OR=0.16; post-surgery only OR=0.38) and implants of certain manufacturers were associated with lower risk of implant failure. In this sizeable cohort of patients receiving care in dental student clinics, the review of EHRs facilitated identification of multiple variables associated with implant failure resulting in removal; however, these findings do not suggest causative relationships. The adopted analytical approach can enhance quality assurance measures and may contribute to the identification of true risk factors for dental implant failure.

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Journal Article.

Year of Publication
2017
Composites resins have become the first choice for direct anterior and posterior restorations. The great popularity is related to their esthetic appearance and reduced need of sound tissue removal as compared with former treatments. Several studies have demonstrated that composite restorations may last long in clinical service. In this review we discuss the factors playing a role on the long-term longevity. Composite restorations have demonstrated a good clinical performance with annual failure rates varying from 1% to 3% in posterior teeth and 1% to 5% in anterior teeth. Factors related to the patients such as caries risk and occlusal stress risk, in addition to socioeconomic factors, may affect the survival significantly. Characteristics of the clinical operators, particularly their decision making when it comes to observing or approaching an existing restoration, are decisive for longevity. Cavity features such as the number of restored walls, composite volume, and presence of endodontic treatment are of major importance and may dictate the service time of the restorative approach. The choice of restorative composite seems to have a minor effect on longevity provided that appropriate technical procedures are used. The main reasons for failure in posterior teeth are secondary caries and fracture (restoration or tooth/restoration), while in anterior teeth esthetic concerns are the main reasons leading to restoration failures. Composite resin restorations can be considered a reliable treatment as long as both the professional and the patient are aware of the factors involved in restoration failures.
Restorative composites have evolved significantly since they were first introduced in the early 1960s, with most of the development concentrating on the filler technology. This has led to improved mechanical properties, notably wear resistance, and has expanded the use of composites to larger posterior restorations. On the organic matrix side, concerns over the polymerization stress and the potential damage to the bonded interface have dominated research in the past 20 y, with many "low-shrinkage" composites being launched commercially. The lack of clinical correlation between the use of these materials and improved restoration outcomes has shifted the focus more recently to improving materials' resistance to degradation in the oral environment, caused by aqueous solvents and salivary enzymes, as well as biofilm development. Antimicrobial and ester-free monomers have been developed in the recent past, and evidence is mounting for their potential benefit. This article reviews literature on the newest materials currently on the market and provides an outlook for the future developments needed to improve restoration longevity past the average 10 y.

Publication Type
Journal Article. Review.
Year of Publication
2017
Reports of uncontrolled clinical trials for directly placed restorations in vital teeth. [Review]

Abstract
Uncontrolled trials are criticized as unreliable. This study aimed to establish how the number of published reports from uncontrolled clinical trials compares to that of controlled trials for directly placed restorations in vital teeth and whether their annual number is increasing, stable or decreasing. PubMed was searched and suitable citations of uncontrolled and controlled trial reports published between 1990-2016 were included. Reference check and hand searching were conducted. The median annual report number with 25 and 75% percentile was calculated for both types of trials. 695 reports were found. The median number of reports per year was 4 (3-7) and 22 (15-26) from uncontrolled and controlled trials, respectively. A statistically significant decreasing ratio of uncontrolled to controlled trial reports was observed (p = 0.01) by linear regression analysis. The number of reports of uncontrolled clinical trials listed in PubMed over the last 27 years appears at least five times smaller than that of controlled clinical trials and its number in relation to that of controlled trials seems to decrease over time.

The Emergency Dental Appointment: Restorative Emergencies Part 2 - Dental Implant Related Problems. [Review]

Abstract
This is the second paper in a two-part series discussing the management of common restorative dental emergencies. The first paper focussed upon problems relating to conventional fixed and removable restorations, and this paper discusses the management of common dental implant related emergencies. With dental implant treatment becoming an increasingly popular method of replacing missing teeth, it is very likely that dentists working in general practice will routinely come across patients who have previously undergone this form of treatment, even if they themselves are not directly involved in placing or restoring dental implants. This paper is aimed at general dental practitioners (GDPs) who have some experience in managing dental implants, and those who want to gain further insight into how such situations may be managed.
The prevalence of non-pain related restorative dental emergencies is estimated to be higher, and will be a common presenting situation in the dental clinic. Often these unplanned events cause difficulties for dental practitioners, who are already constrained by time, to fit in these patients and manage them. Over and above this, the increasing life spans, retention of teeth into later life and finite life of dental restorations all add to the challenges encountered by the dental practitioner. Prompt and effective management of these conditions often leads to optimising patient experience, but also offers better outcomes. This two-part series provides an overview of the more common dental emergencies encountered by the dental practitioner and their management. Paper 1 focuses on the management of common tooth-related emergencies and includes non-odontogenic and odontogenic pain. Paper 2 focuses on the management of osseointegrated dental implant related emergencies.

**Publication Type**
- Journal Article. Review.
- Year of Publication 2017

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**Abstract**

Data sources Medline, Cochrane Library, Web of Science, Scopus, Latin American and Caribbean Health Sciences (LILACS), Brazilian Library of Dentistry (BBO), clinicaltrials.gov and SIGLE databases. Study selection Only randomised clinical trials were considered that compared direct vs indirect composite restorations, with or without cusp involvement, having a follow-up period of two years or greater. Data extraction and synthesis Two reviewers selected studies for inclusion, abstracted data and assessed risk of bias. A fixed effects meta-analysis was conducted. Results Nine studies met the inclusion criteria with six contributing to the meta-analysis. There was no statistically significant difference in clinical longevity for direct and indirect resin composite restorations; relative risk (RR) = 1.494 (95% CI; 0.893-2.500, p = 0.126). Comparing molars and premolars restored with DRC and IRC at three years there was no significant difference; RR = 0.716 (95% CI; 0.177-2.888, p = 0.638). Conclusions The results of the review indicate that there is no statistically significant difference in failure rate of direct resin composites vs indirect resin composites. Longitudinal studies on today's improved materials should, however, be considered for further review.

**Publication Type**
- Journal Article. Comment.
- Year of Publication 2017

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**Abstract**

A review of risk factors and management of acid erosion. Particular emphasis is placed on the use of direct composite as a reversible and relatively straightforward restorative option.

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- Year of Publication 2017
VI 1
Status
MEDLINE
Authors
Milosevic A.
Authors Full Name
Milosevic, Alex.
Title
Abrasion: A Common Dental Problem Revisited. [Review]
Source
Local Messages
THIS JOURNAL IS AVAILABLE IN THE BDA LIBRARY, TO REQUEST THIS ARTICLE FROM THE LIBRARY GO TO:
Abstract
Dental abrasion is most commonly seen at the cervical necks of teeth, but can occur in any area, even inter-dentally from vigorous and incorrect use of dental floss. Acid erosion has been implicated in the initiation and progress of the cervical lesion, while tooth-brush abrasion has long been held as the prime cause of cervical abrasion. Identification of the risk factors is clearly important in order to modify any habits and provide appropriate advice.
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Authors
Jobim Jardim J; Henz S; Barbachan E Silva B.
Authors Full Name
Jobim Jardim, Juliana; Henz, Sandra; Barbachan E Silva, Berenice.
Title
Restorative Treatment Decisions in Posterior Teeth: A Systematic Review. [Review]
Source
Abstract
PURPOSE: To determine the stage of caries in posterior permanent teeth at which dentists decide to intervene invasively.
MATERIALS AND METHODS: A search of the literature from January 1980 to November 2015 available in MEDLINE-PubMed, EMBASE, and the Cochrane Library was conducted. The main search terms used were decision-making, restorative treatment, dental caries lesion, occlusal surface, and approximal surface. The inclusion criterion was studies including dentists only. Three reviewers independently screened titles and abstracts to determine the eligibility of studies. Subsequently, the full texts of the papers deemed eligible were perused and included in the data extraction process.
RESULTS: The review encompassed 11 studies and the methodological quality was considered moderate. Most dentists would restore lesions confined to enamel and reaching the outer half of the dentin, irrespective of the surface involved. With regard to the occlusal surface, the percentage of dentists who restored enamel lesions ranged from 4.6% to 17.8%. Regarding dentin lesions (outer half), 50.2%-70.2% of the dentists opted for invasive treatment. For the approximal surface, the choice for invasive treatment of enamel lesions ranged from 5%-88%. In dentin lesions, 4.4%-94% of dentists restored lesions in the outer half of the dentin.
CONCLUSION: Despite the progress achieved in the understanding of the development and management of caries, dentists still recommend restorative treatment in its early stages.
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Authors
Chrcanovic BR; Albrektsson T; Wennerberg A.
Authors Full Name
Chrcanovic, Bruno Ramos; Albrektsson, Tomas; Wennerberg, Ann.
Title
Bone Quality and Quantity and Dental Implant Failure: A Systematic Review and Meta-analysis. [Review]
Source
PURPOSE: The aim of this study was to test the null hypothesis that there is no difference in implant failure rates, marginal bone loss, and postoperative infection for implants inserted in bone with different qualities and quantities according to the classification of Lekholm and Zarb.

MATERIALS AND METHODS: An electronic search was undertaken in January 2015 for randomized and nonrandomized human clinical studies.

RESULTS: A total of 94 publications were included. When bone sites of different qualities were considered, the results suggested the following comparative implant failure rates: 1 > 2, 1 > 3, 3 > 2, 4 > 1, 4 > 2, and 4 > 3. Sensitivity analyses suggested that when implants inserted in bone qualities 1 and 2 and 1 and 3 were compared, oxidized and sandblasted/acid-etched surfaces showed a decrease in significant difference in failures compared with turned implants. The same is not true for failure of implants inserted in bone quality 4 compared to failure of implants in all other bone qualities. When bone sites of different quantities were considered, the following comparative implant failure rates were observed: A > B, A > C, A < D, B < C, B < D, C < D, E > A, E > B, E > C, E > D. Due to insufficient information, meta-analyses for the outcomes postoperative infection and marginal bone loss were not performed.

CONCLUSION: Sites with poorer bone quality and lack of bone volume may statistically affect implant failure rates. Implant surfaces may play a role in failure of implants in different bone qualities.

Abstract
The main reason cited for the replacement of dental composite restorations is the recurrence of caries. Numerous models—both in vitro, with acid gels or bacterial biofilms, and in situ, with dental appliances—have been used to study caries formation around dental composites. The literature shows that many factors may affect caries formation, including marginal gap formation, gap size, the local chemical environment, the durability of the bonded interface, the extent of bacterial penetration, and the presence of mechanical loading. Studies have also shown that what have been called wall lesions may form independent of surface lesions, though not likely due to microleakage through very small gap spaces in the clinical situation. Gap size and mechanical loading have been shown to be related to lesion severity within in vitro models, but these results do not correspond exactly with those obtained from in situ studies using restorations in dental appliances. Though not conclusive, some in vitro models have shown that certain materials possessing antimicrobial characteristics may reduce the severity of lesion formation, suggesting possible pathways for developing new composite and adhesive materials for restorations with potentially enhanced longevity.

Publication Type

Year of Publication
2017
Recent Reviews Related to Restorative Dentistry

Success and Survival of Various Types of All-Ceramic Single Crowns: A Critical Review and Analysis of Studies with a Mean Follow-Up of 5 Years or Longer. [Review]

Source

Abstract
Purpose: The aim of this critical review was to assess the survival and success rates of all-ceramic single crowns manufactured using different ceramic materials with a mean follow-up time of 5 years or longer.

Materials and Methods: An electronic search of studies published between 1980 and 2014 complemented by manual searching was conducted in Medline and Scopus. The terms ceramic, crown, survival, success, longevity, and complications were selected as keywords. Predetermined inclusion and exclusion criteria guided the search. Data were extracted and assessed by two independent reviewers. The results were statistically analyzed according to the type of material, and survival/success rate was calculated by assuming a Poisson-distributed number of events.

Results: The initial search yielded 972 articles. After subsequent filtering, 14 studies were selected. The inter-reviewer agreement was rated as good (kappa = 0.65) and very high agreement (kappa = 0.93) during the identification and screening phases, respectively. No studies on densely sintered zirconia or feldspathic crowns satisfied the minimum follow-up time. Only one study of each of the following materials satisfied the inclusion criteria: lithium disilicate, leucite reinforced, pressed AI2O3, and sintered AI2O3. Meta-analysis of the included studies on other materials resulted in the following estimated survival and success rates: for densely sintered alumina crowns, 93.8% and 92.75%, respectively; for fluoromica reinforced, 87.7% and 87.7%, respectively; and for glass-infiltrated alumina core, 94.4% and 92%, respectively. Crown fracture was considered the most frequent complication.

Conclusion: Based on the present critical review, there was no evidence to support the superior application of a single ceramic system or material. Further long-term prospective studies are required.

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Authors
Innes NPT; Schwendicke F.

Institution
Innes, N P T. 1 Paediatric Dentistry, Dundee Dental Hospital and School, University of Dundee, Dundee, UK.
Schwendicke, F. 2 Department of Operative and Preventive Dentistry, Charite-Universitatsmedizin Berlin, Berlin, Germany.

Title
Restorative Thresholds for Carious Lesions: Systematic Review and Meta-analysis. [Review]

Source

Abstract
Current evidence supports noninvasive/nonrestorative treatment of "early" carious lesions; those confined to enamel or reaching the enamel-dentin junction. The extent that dentists' thresholds for intervening restoratively have changed with this evidence is unknown. This systematic review aimed to determine dentists' and therapists' current lesion threshold for carrying our restorative interventions in adults/children and primary/permanent teeth. Embase, Medline via PubMed, and Web of Science were searched for observational studies, without language, time, or quality restrictions. Screening and data extraction were independent and in duplicate. Random-effects meta-analyses with subgroup and meta-regression analysis were performed. Thirty studies, mainly involving dentists, met the inclusion criteria. There was heterogeneity in sampling frames, methods, and scales used to investigate thresholds. The studies spanned 30 y (1983-2014), and sample representativeness and response bias issues were likely to have affected the results. Studies measured what dentists said they would do rather than actually did. Studies represented 17 countries, focusing mainly on adults (n = 17) and permanent teeth (n = 24). For proximal carious lesions confined to enamel (not reaching the enamel-dentin junction), 21% (95% confidence interval [CI], 15%-28%) of dentists/therapists would intervene invasively. The likelihood of a restorative intervention almost doubled (risk ratio, 1.98; 95% CI, 1.68-2.33) in high caries risk patients. For proximal lesions extending up to the enamel-dentin junction, 48% (95% CI, 40%-56%) of dentists/therapists would intervene restoratively. For occlusal lesions with enamel discoloration/cavitation but no clinical/radiographic dentin involvement, 12% (95% CI, 6%-22%) of dentists/therapists stated they would intervene, increasing to 74% (95% CI, 56%-86%) with dentin involvement. There was variance between countries but no significant temporal trend. A significant proportion of dentists/therapists said they would intervene invasively (restoratively) on carious lesions where evidence and clinical recommendations indicate less invasive therapies should be used. There is great need to understand decisions to intervene restoratively and to find implementation interventions that translate research evidence into clinical practice.

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**RECENT REVIEWS RELATED TO RESTORATIVE DENTISTRY**

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**Authors**
Fu FH.

**Authors Full Name**
Fu, Freddie H.

**Institution**
Fu, Freddie H. University of Pittsburgh Medical Center, 3471 5th Avenue, Suite 1011 Kaufmann Building, Pittsburgh, PA, 15213, USA. ffu@upmc.edu.

**Title**
CORR Insights: No Clinically Important Difference in Knee Scores or Instability Between Transtibial and Inlay Techniques for PCL Reconstruction: A Systematic Review.

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**Authors**
Solow RA.

**Authors Full Name**
Solow, Roger A.

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Direct composite resin onlays: rationale and clinical application. [Review]

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**Authors**
Takahashi T; Gonda T; Mizuno Y; Fujinami Y; Maeda Y.

**Authors Full Name**
Takahashi, T; Gonda, T; Mizuno, Y; Fujinami, Y; Maeda, Y.

**Institution**
Takahashi, T. Department of Prosthodontics, Gerodontology and Oral Rehabilitation, Osaka University Graduate School of Dentistry, Suita, Japan.

Gonda, T. Department of Prosthodontics, Gerodontology and Oral Rehabilitation, Osaka University Graduate School of Dentistry, Suita, Japan.

Mizuno, Y. Department of Prosthodontics, Gerodontology and Oral Rehabilitation, Osaka University Graduate School of Dentistry, Suita, Japan.

Fujinami, Y. Department of Prosthodontics, Gerodontology and Oral Rehabilitation, Osaka University Graduate School of Dentistry, Suita, Japan.

Maeda, Y. Department of Prosthodontics, Gerodontology and Oral Rehabilitation, Osaka University Graduate School of Dentistry, Suita, Japan.

**Title**
Reinforcement in removable prosthetics: a literature review. [Review]

**Source**
Abstract

Removable prosthodontics are often associated with mechanical troubles in daily use, such as fracture or deformation. These troubles render prostheses unusable and reduce wearers' QOL. Various reinforcements are used to prevent such problems, but consensus on reinforcement has not been reached. This review aimed to summarise the effects of reinforcement and to propose favourable reinforcement based on material, design and position in the prostheses. Initially, 139 articles were selected by electronic and manual searches. After exclusion of 99 articles based on the exclusion criteria, 40 articles were finally included in the review. Electronic searches were performed for articles published from 2005 to 2015 in PubMed, EMBASE, MEDLINE and Cochrane Library, and manual searches were performed in 10 journals relevant to the topic of removable prosthodontics. For in vitro studies, certain dental alloys and fibres were mainly used. Their forms were different, including complicated forms in dental alloys and various forms in fibres. The materials were examined for mechanical properties like fracture strength, flexural strength and elastic modulus and compared with one another or without reinforcement. There were a few clinical studies and one longitudinal study. Cast metal reinforcement seemed to be most favourable in terms of fracture toughness and stiffness. The most favourable forms differed depending on the prostheses, but placement around thin and deformable areas was effective. However, randomised or longitudinal clinical reports and comparative clinical studies on the use of reinforcement were still lacking and such studies are necessary in the future.