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 (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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**Abstract**

**OBJECTIVE:** Clinical studies should be one main aspect underlying dentists' decision-making towards dental materials. Study design, conduct, analysis and reporting impact on the usefulness of studies. We discuss problems with current studies and highlight areas where improvement might be possible.

**METHODS:** Based on systematically and non-systematically collected data, we demonstrate where and why current studies in clinical dentistry deliver less-than-optimus results. Lending from general medicine, we suggest ways forward for clinical dental material science.

**RESULTS:** Randomized controlled (efficacy) trials remain a major pillar in dental material science, as they reduce selection bias and, if well-designed and conducted, have high internal validity. Given their costs and limited external validity, alternatives like practice-based or pragmatic controlled trials or observational studies can complement the evidence-base. Prior to conduct, 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.
Association of sleep bruxism with ceramic restoration failure: A systematic review and meta-analysis. [Review]

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 non-peer-reviewed literature databases, were searched. The risk of bias was assessed by 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.

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Journal Article. Review.

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Marginal adaptation and CAD-CAM technology: A systematic review of restorative material and fabrication techniques. [Review]
Source

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.

MATERIAL AND METHODS: An electronic search of English-language literature published between January 1, 2000, and June 30, 2016, was conducted of the Medline/PubMed database.

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 implant infrastructures 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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OBJECTIVES: Repair instead of complete replacement is recommended to manage partially defective restorations. It is unclear if and why such treatment is taught at dental schools or practiced by dentists. We aimed to identify barriers and facilitators for repairs using a systematic review and meta- and qualitative analysis.

SOURCES: Electronic databases (PubMed, CENTRAL, Embase, PsycINFO) were searched.

STUDY SELECTION: Quantitative studies reporting on the proportion of (1) dentists stating to perform repairs, (2) dental schools teaching repairs, (3) failed restorations having been repaired were included. We also included qualitative studies on barriers/facilitators for repairs. Random-effects meta-analyses, meta-regression and a thematic analysis using the theoretical domains framework were conducted.

DATA: 401 articles were assessed and 29, mainly quantitative, studies included. 7,228 dentists and 276 dental schools had been surveyed, and treatment data of 30,172 restorations evaluated. The mean (95% CI) proportion of dentists stating to perform repairs was 71.5% (49.7-86.4%), 83.3% (73.6-90.0%) of dental schools taught repairs. 31.3% (26.3-36.7%) of failed restorations had been repaired. More recent studies reported significantly more dentists to repair restorations (p=0.004). Employment in public health practices and being the dentist who placed the original restoration were facilitators for repairs. Amalgams were repaired less often, and financial aspects and regulations came as barriers.

CONCLUSIONS: While most dentists state to perform repairs and the vast majority of dental schools teach repairs, the proportion of truly repaired restorations was low. A number of interventions to implement repair in dental practice can be deduced from our findings.

CLINICAL SIGNIFICANCE: Partially defective restorations are common in dental practice. While repairs are taught and dentists are aware of the recommendation towards repairs, the actually performed proportion of repairs seems low.
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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Title
A new classification system for the restoration of root filled teeth. [Review]

Source

Abstract
The aim of this report is to (i) review the current literature on the status of root filled teeth, (ii) analyse the most important factors in decision-making, (iii) discuss the current restorative concepts, and (iv) classify both the evidence and clinical practice in a way that seeks to be clear, understandable and helpful for clinicians. Restoration of root filled teeth represents a challenge for the clinician and remains a controversial subject. The guidelines describe a new classification that is drawn from evidence presented in the literature and also from clinical expertise-based reviews. It describes five categories of teeth.

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Source

Abstract
The aim of this report is to (i) review the current literature on the status of root filled teeth, (ii) analyse the most important factors in decision-making, (iii) discuss the current restorative concepts, and (iv) classify both the evidence and clinical practice in a way that seeks to be clear, understandable and helpful for clinicians. Restoration of root filled teeth represents a challenge for the clinician and remains a controversial subject. The guidelines describe a new classification that is drawn from evidence presented in the literature and also from clinical expertise-based reviews. It describes five categories of teeth.
Optical properties of zirconia ceramics for esthetic dental restorations: A systematic review. [Review]

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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Quality and Survival of Direct Light-Activated Composite Resin Restorations in Posterior Teeth: A 5- to 20-Year Retrospective Longitudinal Study. [Review]

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.
RECENT REVIEWS RELATED TO RESTORATIVE DENTISTRY

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.
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.
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.

Antibacterial glass-ionomer cement restorative materials: A critical review on the current status of extended release formulations.

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RECENT REVIEWS RELATED TO RESTORATIVE DENTISTRY

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.
This systematic review investigated the failure rate of conventional single-unit restorations in root filled posterior permanent teeth. Two reviewers independently applied eligibility criteria, extracted data and assessed the quality of the evidence of each included study according to the Cochrane Collaboration's procedures for randomized control trials (RCTs) and the STROBE criteria for observational studies. The MEDLINE (via Ovid), EMBASE (via Ovid), Cochrane Oral Health Group Trials Register and CENTRAL (via Cochrane Library) databases were searched electronically (January 1993 to week 1, February 2015). This was complemented by an additional hand search of selected journals and the references of relevant studies. Clinical studies published on root filled single-unit restorative treatments with a mean follow-up period of at least 3 years were selected. The outcome measured was clinical or radiological failure. Overall, the four RCTs and the single observational study included were of low and high quality, respectively. Therefore, a meta-analysis was not possible. The pooled mean failure rates were reported according to the type of 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.
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
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," "unsplinted," "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
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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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. 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.

Keywords: Oral anticoagulant therapy, bleeding, dental implant surgery, dental extraction.
RECENT REVIEWS RELATED TO RESTORATIVE DENTISTRY

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Title
Source
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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 a 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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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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Abstract

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.

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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.
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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Abstract

OBJECTIVE: The goal of this manuscript is to provide an overview of biofilm attributes and measurement approaches in the context of studying biofilms on tooth and dental material surfaces to improve oral health.

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 applied. 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.
Evaluating the effect of antioxidant agents on shear bond strength of tooth-colored restorative materials after bleaching: A systematic review. [Review]

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, editorials 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.
**Recent Reviews Related to Restorative Dentistry**

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**Status**
PubMed-not-MEDLINE

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**Title**
Advanced Implant-Prosthetic Rehabilitation: How to Obtain a Correct Restoration of Both Functions and Aesthetics in Patients with Complex Combined Dental and Maxillofacial Trauma: A Case Report and Topical Review of the Literature.

**Source**

**Abstract**
Aim. This study aims to explain the main steps that characterize the implant-prosthetic rehabilitation in complex combined dental and maxillofacial trauma. Material and Methods. A 20-year-old patient reported an extensive facial trauma which also involved the alveolar process of the maxillary bone. The patient reported a maxillofacial fracture and the loss of teeth 1.3, 1.2, 1.1, and 2.1. A "Le Fort" type 2 fracture was also reported, with the malar bone involvement. After reduction and containment of bone fractures, through appropriate mounting plates, appropriate functional and aesthetic rehabilitation of the patient were replaced thanks to a temporary removable prosthesis. After 6 months, the patient performed numerous clinical investigations, aimed at a proper planning of implant-prosthetic rehabilitation of the upper dental arch. Conclusion. With the planning of the case, as well as respecting the surrounding biological structures, the surgery of implants can be carried out with the most appropriate procedure. Lastly, new dental implants with highly bioactive surfaces have been developed, providing an excellent and rapid bone integration.

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**Title**
Bulk-fill resin-based composite restorative materials: a review.

**Source**

**Abstract**
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

PURPOSE: The purpose of this systematic review was to identify the failure rate of conventional single-unit tooth-supported restorations in posterior permanent vital teeth as a function of remaining tooth structure.

MATERIAL AND METHODS: Four databases were searched electronically, and 8 selected journals were searched manually up to February 2015. Clinical studies of tooth-supported single-unit restorative treatments with a mean follow-up period of at least 3 years were selected. The outcome measured was the restorations’ clinical or radiological failure. Following the Preferred Reporting Items for Systematic reviews and Meta-Analyses guidelines, the Cochrane Collaboration procedures for randomized control trials, the Strengthening the Reporting of Observational Studies in Epidemiology criteria for observational studies, 2 reviewers independently applied eligibility criteria, extracted data, and assessed the quality of the evidence of the included studies using the American Association of Critical Care Nurses’ system. The weighted-mean group 5-year failure rates of the restorations were reported according to the type of treatment and remaining tooth structure. A metaregression model was used to assess the correlation between the number of remaining tooth walls and the weighted-mean 5-year failure rates.

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 randomized controlled trials 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 structure and treatment outcomes.

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.


STATEMENT OF PROBLEM: No knowledge synthesis exists concerning when to use a direct restoration versus a complete-coverage indirect restoration in posterior vital teeth.

Failure rate of single-unit restorations on posterior vital teeth: A systematic review. [Review]

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Emeritus Professor, Division of Prosthodontics and Restorative Dentistry, Faculty of Dentistry, McGill University, Montreal, Quebec, Canada.

Keywords: Direct restorations; Failure; Single-unit; Posterior teeth; Systematic review.

Archived by: Faleh Tamimi, PhD, DDS, E-mail: faleh.tamimimarino@mcgill.ca

Title

Failure rate of single-unit restorations on posterior vital teeth: A systematic review. [Review]

Source


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Abstract

STATEMENT OF PROBLEM: No knowledge synthesis exists concerning when to use a direct restoration versus a complete-coverage indirect restoration in posterior vital teeth.

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Keywords: Direct restorations; Failure; Single-unit; Posterior teeth; Systematic review.

Archived by: Faleh Tamimi, PhD, DDS, E-mail: faleh.tamimimarino@mcgill.ca

Title

Failure rate of single-unit restorations on posterior vital teeth: A systematic review. [Review]

Source


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Abstract

STATEMENT OF PROBLEM: No knowledge synthesis exists concerning when to use a direct restoration versus a complete-coverage indirect restoration in posterior vital teeth.

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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.
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).

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Title
No differences in longevity of direct and indirect composite restorations.
Comments
Comment on: J Dent. 2016 Nov;54:1-12; PMID: 27523636
Source
Evidence-Based Dentistry. 18(2):46, 2017 06 23.

Abstract

Data sourcesMedline, Cochrane Library, Web of Science, Scopus, Latin American and Caribbean Health Sciences (LILACS), Brazilian Library of Dentistry (BBO), clinicaltrials.gov and SIGLE databases. Study selectionOnly 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 synthesisTwo reviewers selected studies for inclusion, abstracted data and assessed risk of bias. A fixed effects meta-analysis was conducted. ResultsNine 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.

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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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Title
Should my composite restorations last forever? Why are they failing?. [Review]

Source

Abstract
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.
Clinical trials have identified secondary caries and bulk fracture as the main causes for composite restoration failure. As a measure to avoid frequent reinterventions for restoration replacement, composites with some sort of defense mechanism against biofilm formation and demineralization, as well as materials with lower susceptibility to crack propagation are necessary. Also, the restorative procedure with composites are very time-consuming and technically demanding, particularly concerning the application of the adhesive system. Therefore, together with bulk-fill composites, self-adhesive restorative composites could reduce operator error and chairside time. This literature review describes the current stage of development of remineralizing, antibacterial and self-healing composites. Also, an overview of the research on fiber-reinforced composites and self-adhesive composites, both introduced for clinical use in recent years, is presented.
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RECENT REVIEWS RELATED TO RESTORATIVE DENTISTRY

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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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Title
Clinical performance and failure modes of pulpless teeth restored with posts: a systematic review. [Review]
Source
Pesquisa Odontologica Brasileira = Brazilian Oral Research. 31:e64, 2017 Jul 03.
Abstract
The aim of this systematic review was to compare the clinical performance and failure modes of teeth restored with intra-radicular retainers. A search was performed on PubMed/Medline, Central and ClinicalTrials databases for randomized clinical trials comparing clinical behavior and failures of at least two types of retainers. From 341 detected papers, 16 were selected for full-text analysis, of which 9 met the eligibility criteria. A manual search added 2 more studies, totaling 11 studies that were included in this review. Evaluated retainers were fiber (prefabricated and customized) and metal (prefabricated and cast) posts, and follow-up ranged from 6 months to 10 years. Most studies showed good clinical behavior for evaluated intra-radicular retainers. Reported survival rates varied from 71 to 100% for fiber posts and 50 to 97.1% for metal posts. Studies found no difference in the survival among different metal posts and most studies found no difference between fiber and metal posts. Two studies also showed that remaining dentine height, number of walls and ferrule increased the longevity of the restored teeth. Failures of fiber posts were mainly due to post loss of retention, while metal post failures were mostly related to root fracture, post fracture and crown and/or post loss of retention. In conclusion, metal and fiber posts present similar clinical behavior at short to medium term follow-up.
Remaining dental structure and ferrule increase the survival of restored pulpless teeth. Studies with longer follow-up are needed.
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Reports of uncontrolled clinical trials for directly placed restorations in vital teeth. [Review]

Pesquisa Odontologica Brasileira = Brazilian Oral Research. 31:e48, 2017 Jul 03.

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]

Primary Dental Journal. 6(2):62-70, 2017 May 01.

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 Emergency Dental Appointment: Restorative Emergencies Part 1 - Tooth Related Problems. [Review]

Primary Dental Journal. 6(2):52-61, 2017 May 01.

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.
Dental emergencies affect a large proportion of the population. While there is ample information in the literature on how to manage medical emergencies in dental practice, there is little information on common dental emergencies and how to manage them. In the UK, the 2009 Adult Dental Health Survey reported 9% of dentate adults reporting pain at their clinical examination. 1 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.

**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.

**References**


Title
Bone Quality and Quantity and Dental Implant Failure: A Systematic Review and Meta-analysis. [Review]
Source
Abstract
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
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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Title
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

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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 Al2O3, and sintered Al2O3. 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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Title
Models of Caries Formation around Dental Composite Restorations. [Review]
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.
since several of these factors were shown to influence the failure of restorations, regardless of the material type. An assessment of patient factors along with other variables should become part of clinical studies to classify patients according to risk and were thoroughly discussed. In view of the information gathered in this review, the factors was performed by applying predefined criteria. The review was organized into two parts, the first describing how patient factors were assessed in the studies (n=45) and the second presenting the statistical significance (n=27) and size of the effect (n=11) of these factors on restoration survival. Patient-related factors mentioned in the studies included age; gender; caries risk; caries activity/severity; decayed, missing, filled teeth; number of restorations; oral hygiene; and bruxism, among others. Sixteen studies included the patient age or age range in the analysis, which was found to be significant in 47% of the studies. Regarding gender, four of 17 reports found a significant effect on survival, showing more failures for men in three studies. The caries profile or related variables were included in the analysis of 15 studies, and a significant effect on survival was reported for high-caries-risk individuals (or related variables) in 67% of these studies. Bruxism was also found to influence restoration survival in three of six studies where this variable was investigated. Some issues were found regarding the reporting of methods used to classify patients according to risk and were thoroughly discussed. In view of the information gathered in this review, the assessment of patient factors along with other variables should become part of clinical studies investigating restoration survival, since several of these factors were shown to influence the failure of restorations, regardless of the material type.
OBJECTIVES: The aim of this systematic review and meta-analysis was to assess the differences in clinical performance in direct and indirect resin composite restorations in permanent posterior teeth.

STUDY SELECTION: We included randomized clinical trials (RCTs) that compared the clinical performance of direct and indirect resin composite restorations in Class I and Class II cavities in permanent teeth, with at least two years of follow-up. The risk of bias tool suggested by Cochrane Collaboration was used for quality assessment.

DATA: After duplicate removal, 912 studies were identified. Twenty fulfilled the inclusion criteria after the abstract screening. Two articles were added after a hand search of the reference list of included studies. After examination, nine RCTs were included in the qualitative analysis and five were considered to have a 'low' risk of bias. The overall risk difference in longevity between direct and indirect resin composite restorations in permanent posterior teeth (p>0.05) at five-year follow-up was 1.494 [0.893-2.500], and regardless of the type of tooth restored, that of molars and premolars was 0.716 [0.177-2.888] at three-year follow-up.

CONCLUSIONS: Based on the findings, there was no difference in longevity of direct and indirect resin composite restorations regardless of the type of material and the restored tooth.

CLINICAL SIGNIFICANCE: Contemporary dentistry is based on minimally invasive restorations. Any indication of a less conservative technique must have unquestionable advantages. In vitro and in vivo studies reveal contradictory evidence of the clinical performance of direct and indirect resin composite restorations in posterior teeth. Thus this study clarified this doubt.

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With the march of time our bodies start to wear out: eyesight fades, skin loses its elasticity, teeth and bones become more brittle and injuries heal more slowly. These universal features of aging can be traced back to our stem cells. Aging has a profound effect on stem cells: DNA mutations naturally accumulate over time and our bodies have evolved highly specialized mechanisms to remove these damaged cells. Whilst obviously beneficial, this repair mechanism also reduces the pool of available stem cells on our rate of healing. Simply put: fewer stem cells means a decline in tissue function and slower healing. Despite this seemingly intractable situation, research over the past decade now demonstrates that some of the effects of aging are reversible. Nobel prize-winning research demonstrates that old cells can become young again, and lessons learned from these experiments in a dish are now being translated into human therapies. Scientists and clinicians around the world are identifying and characterizing methods to activate stem cells to reinvigorate the body's natural regenerative process. If this research in dental regenerative medicine pans out, the end result will be tissue homoeostasis and healing back to the levels we appreciated when we were young.

Abstract

Background: The evidence stemming from trials on restorative materials is shaped not only by trial findings, but also trial design and validity. We aimed to evaluate both aspects in randomized controlled dental restorative trials published from 2005-2015.

Methods: Using systematic review methodology, we retrieved trials comparing restorative or adhesive dental materials. Two authors independently assessed design, risk of bias, registration status, and findings of trials. Descriptive and regression analyses were performed. Results: 114 studies on 15,321 restorations placed mainly in permanent teeth of 5222 patients were included. Per trial, the median number of patients was 37 (25th/75th percentiles: 30/51). Follow-up was 24 (20/48) months. Seventeen percent of trials reported on sample size calculations, 2% had been registered. Most trials (90%) used US Public Health Service (USPHS) criteria, and had a high risk of bias. More recent trials were more likely to have been registered, to have reported on sample size calculations, to be of low risk of bias, and to use other than USPHS criteria. Twenty-three percent of trials yielded significant differences between groups. The likelihood of such differences was significantly increased in older studies, studies with potential reporting bias, published in journals with high impact factor (>2), longer follow-up periods, and not using USPHS-criteria.

Conclusions: The majority of dental restorative trials published from 2005-2015 had limited validity. Risk of bias decreased in more recent trials. Future trials should aim for high validity, be registered, and use defined and appropriate sample sizes, follow-up periods, and outcome measures.
STATEMENT OF PROBLEM: It is clear the contemporary dentist is confronted with a blizzard of information regarding materials and techniques from journal articles, advertisements, newsletters, the internet, and continuing education events. While some of that information is sound and helpful, much of it is misleading at best.

PURPOSE: This review identifies and discusses the most important scientific findings regarding outcomes of dental treatment to assist the practitioner in making evidence-based choices. This review was conducted to assist the busy dentist in keeping abreast of the latest scientific information regarding the clinical practice of dentistry.

MATERIAL AND METHODS: Each of the authors, who are considered experts in their disciplines, was asked to peruse the scientific literature published in 2015 in their discipline and review the articles for important information that may have an impact on treatment decisions. Comments on experimental methodology, statistical evaluation, and overall validity of the conclusions are included in many of the reviews.

RESULTS: 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 wish more detail.

CONCLUSIONS: Analysis of the scientific literature published in 2015 is divided into 7 sections, dental materials, periodontics, prosthodontics, occlusion and temporomandibular disorders, sleep-disordered breathing, cariology, and implant dentistry.
Tooth wear is a process that is usually a result of tooth to tooth and/or tooth and restoration contact. The process of wear essentially becomes accelerated by the introduction of restorations inside the oral cavity, especially in case of opposing ceramic restorations. The newest materials have vastly contributed toward the interest in esthetic dental restorations and have been extensively studied in laboratories. However, despite the recent technological advancements, there has not been a valid in vivo method of evaluation involving clinical wear caused due to ceramics upon restored teeth and natural dentition. The aim of this paper is to review the latest advancements in all-ceramic materials, and their effect on the wear of opposing dentition. The descriptive review has been written after a thorough MEDLINE/PubMed search by the authors. It is imperative that clinicians are aware of recent advancements and that they should always consider the type of ceramic restorative materials used to maintain a stable occlusal relation. The ceramic restorations should be adequately finished and polished after the chair-side adjustment process of occlusal surfaces.

Objectives The aim of this paper is to identify the factors that affect the complexity of implant restoration and to explore the indices that help us to assess it. With this knowledge the growing number of clinicians restoring dental implants will have a better understanding of the available guidance and evidence base, and the differing levels of competence required. Study design A literature review was conducted. The selection of publications reporting on complexity was based on predetermined criteria and was agreed upon by the authors. After title and abstract screening 17 articles were reviewed. The articles that were utilised to form the ITI SAC tool and Cologne Risk Assessment we also included. Assessing complexity Two key guides are available: International Team for Implantology's Straightforward Advanced Complex tool and the Cologne ABC risk score. While these guides help identify treatment complexity they do not provide a strong enough evidence base from which to solely base clinical decisions. The key patient factors are expectation, communication, the oral environment, aesthetic outcome, occlusion, soft tissue profile and the intra-arch distance, whereas the key technical factors are impression taking, type of retention, loading protocol and the need for provisional restorations. Human factors also have a significant effect on complexity, specifically, the experience and training of the clinician, team communication and the work environment. Conclusions There are many interconnecting factors that affect the complexity of dental implant restoration. Furthermore the two widely used indices for the assessment of complexity have been investigated, and although these offer a good guideline as to the level of complexity, there is a lack evidence to support their use. The development of evidence-based treatment and protocols is necessary to develop the current indices further, and these need to be expanded to include other critical areas, such as human factors. A practical guide to aid practitioners in reducing complexity has been proposed.
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RECENT REVIEWS RELATED TO RESTORATIVE DENTISTRY

Authors
Anonymous.

Title
Restorative materials containing antimicrobial agents: is there evidence for their antimicrobial and anticaries effects? A systematic review.

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Abstract
No study has examined if restorative materials that contain antimicrobials, exert an anticaries effect in vivo.

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Title
Zirconia Crown as Single Unit Tooth Restoration: A Literature Review.

Source

Abstract
Ceramics has become increasingly popular as a dental restorative material because of its superior esthetics, as well as its inertness and biocompatibility. Among dental ceramics, zirconia is used as a dental biomaterial and it is the material of choice in contemporary restorative dentistry. Zirconia ceramics has both clinical popularity and success due to its outstanding mechanical properties and ease of machining in the green stage via computer-aided design and computer-aided manufacturing technology.

Zirconia is one of the most promising restorative biomaterial because it has favorable mechanical and chemical properties suitable for medical application. Zirconia ceramics is becoming a prevalent biomaterial in dentistry. Clinical evaluations also indicate a good success rate for zirconia with minimal complications. This article reviews the current literature on dental zirconia with respect to basic properties, biocompatibility, and clinical applications in aesthetic dentistry as single unit crown.

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Title
Evaluation of the marginal fit of single-unit, complete-coverage ceramic restorations fabricated after digital and conventional impressions: A systematic review and meta-analysis. [Review]

Source

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Abstract

STATEMENT OF PROBLEM: In existing published reports, some studies indicate the superiority of digital impression systems in terms of the marginal accuracy of ceramic restorations, whereas others show that the conventional method provides restorations with better marginal fit than fully digital fabrication. Which impression method provides the lowest mean values for marginal adaptation is inconclusive. The findings from those studies cannot be easily generalized, and in vivo studies that could provide valid and meaningful information are limited in the existing publications.

PURPOSE: The purpose of this study was to systematically review existing reports and evaluate the marginal fit of ceramic single-tooth restorations after either digital or conventional impression methods by combining the available evidence in a meta-analysis.

MATERIAL AND METHODS: The search strategy for this systematic review of the publications was based on a Population, Intervention, Comparison, and Outcome (PICO) framework. For the statistical analysis, the mean marginal fit values of each study were extracted and categorized according to the impression method to calculate the mean value, together with the 95% confidence intervals (CI) of each category, and to evaluate the impact of each impression method on the marginal adaptation by comparing digital and conventional techniques separately for in vitro and in vivo studies.

RESULTS: Twelve studies were included in the meta-analysis from the 63 identified records after database searching. For the in vitro studies, where ceramic restorations were fabricated after conventional impressions, the mean value of the marginal fit was 58.9 mum (95% CI: 41.1-76.7 mum), whereas after digital impressions, it was 63.3 mum (95% CI: 50.5-76.0 mum). In the in vivo studies, the mean marginal discrepancy of the restorations after digital impressions was 56.1 mum (95% CI: 46.3-65.8 mum), whereas after conventional impressions, it was 79.2 mum (95% CI: 59.6-98.9 mum).

CONCLUSION: No significant difference was observed regarding the marginal discrepancy of single-unit ceramic restorations fabricated after digital or conventional impressions.
High-viscosity glass-ionomer cements for direct posterior tooth restorations in permanent teeth: The evidence in brief.

METHODS: The evidence sources: laboratory trials, uncontrolled clinical trials, controlled clinical trials with HVGIC restorations placed after conventional cavity preparation by drill and controlled clinical trials with HVGIC restorations placed following the atraumatic restorative treatment (ART) approach, were assessed based on systematic reviews and meta-analyses, as well as methodological studies.

RESULTS: The precision and validity of evidence from laboratory trials, uncontrolled clinical trials and non-ART controlled clinical trials are insufficient for clinical guidance. Clinical evidence for HVGIC restorations placed using ART, comprises of 38 controlled clinical trials including over 10 000 tooth restorations. Systematic review results of these trials indicate no statistically significant differences (p>0.05) in the failure rates between HVGIC and amalgam restorations in single- and multiple surface tooth cavities after up to six years. Although, many of these trials suffered from too low sample sizes, their results could be pooled in three meta-analyses. The bias risk in all trials was judged to be high.

CONCLUSION: Controlled clinical trials with HVGIC restorations placed using ART provide the bulk of the available evidence that suggest that the failure rate of direct posterior HVGIC restorations in permanent teeth are comparable to that of dental amalgam restorations.
BACKGROUND: Pre-restorative crown lengthening surgery (CLS) is a common periodontal procedure, for which systematic reviews are lacking. This systematic review aimed to assess outcomes of CLS performed for restorative reasons.

METHODS: Databases (MEDLINE, Scopus, OpenGrey) were searched up to January 2016 for clinical/animal trials on CLS for restorative reasons with >=6-month follow-up. Primary outcomes investigated were: free gingival margin position, probing depth, clinical attachment level, and plaque/inflammation indices.

RESULTS: Four non-randomized and one randomized controlled clinical trial and one controlled animal trial were included. Heterogeneity and high risk of bias were identified. CLS resulted in increased crown length (6-month average: 1.4-3.3 mm). Between immediate postsurgery and follow-up, gingival margin may rebound, largely during the first three postoperative months. Technical (flap positioning, osseous resection, root preparation) and anatomical (periodontal biotype) factors influence outcomes. The literature lacks studies on tooth mobility, crown-root ratio, patient- and referring dentist-reported outcomes, surgical technique comparisons, and restorative treatment timing.

CONCLUSIONS: Within the available data limitations, it is concluded that CLS results in increased crown length and possible gingival margin rebound. Technical aspects (primarily) and anatomical factors (secondarily) influence outcomes. Future research is needed to fill significant voids in our knowledge on several procedural aspects.
OBJECTIVE: To evaluate the long-term clinical performance of direct versus indirect composite inlays/onlays in posterior teeth. A systematic review and meta-analysis. [Review]

DATA: Screening for inclusion eligibility, quality assessment of studies and data extraction was performed independently by two authors.

SOURCES: The electronic databases MEDLINE, EMBASE, Cochrane Oral Health Group's Trials Register and CENTRAL were searched (14.12.2015), with no restriction to publication date or language. We included only randomised controlled trials (RCTs) and evaluated them according to Cochrane risk of bias tool. The main outcome assessed was the restoration failure, determined by several clinical parameters.

STUDY SELECTION: Two studies concerning direct and indirect inlays (82 patients with 248 restorations) and one study for onlays (157 patients with 176 restorations) satisfied the inclusion criteria. Two trials, one of unclear and one of high risk of bias, could be mathematically combined. The meta-analysis indicated no statistically significant difference in the risk failure between direct and indirect inlays, after 5 years (RR: 1.54; 95% CI: 0.42, 5.58; p=0.52) or 11 years of function (RR: 0.95; 95% CI: 0.34, 2.63; p=0.92). Only one parameter, the marginal discoloration, slightly favored direct inlays after 11 years (RR: 0.41; 95% CI: 0.17, 0.96; p=0.04). Only one study dealt with onlays; an overall 5-year survival of 87% (95% CI: 81-93%) was reported.

CONCLUSION: The difference of the two techniques did not reach statistical significance in order to recommend one technique over the other. The scarcity of primary studies support the need for further well-designed long-term studies in order to reach firm conclusions about both techniques.

CLINICAL SIGNIFICANCE: Resin composite materials, placed directly or indirectly, exhibit a promising long-term clinical performance when rehabilitation of posterior teeth is needed. Although many years in clinical practice, the selection of the best treatment protocol still remains subjective. The available studies, and their synthesis, cannot provide reliable evidence in this field.
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RECENT REVIEWS RELATED TO RESTORATIVE DENTISTRY

Alhareky M; Tavares M.
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Title
Amalgam vs Composite Restoration, Survival, and Secondary Caries.
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Abstract

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TYPE OF STUDY/DESIGN: Systematic review with meta-analysis of data.

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Title
Endocrown restorations: A systematic review and meta-analysis. [Review]
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Abstract
OBJECTIVES: A systematic review was conducted to evaluate clinical (survival) and in vitro (fracture strength) studies of endocrown restorations compared to conventional treatments (intraradicular posts, direct composite resin, inlay/onlay).
DATA: This report followed the PRISMA Statement. A total of 8 studies were included in this review.

SOURCES: Two reviewers performed a literature search up to February 2016 in seven databases: PubMed, Web of Science, Scopus, BBO, Scielo, Lilacs and Ibeics.

STUDY SELECTION: Only clinical trials and in vitro studies that evaluated endocrowns were included. Case reports, case series, pilot studies, reviews and in vitro studies that evaluated properties other than fracture strength of endocrowns were excluded. From the 103 eligible articles, 8 remained in the qualitative analysis (3 clinical trials and 5 in vitro studies), and the meta-analysis was performed for the 5 in vitro studies. A global comparison was performed with random-effects models at a significance level of p<0.05.

RESULTS: Clinical trials showed a success rate of endocrowns varying from 94 to 100%. The global analysis in posterior and anterior teeth demonstrated that endocrowns had higher fracture strength than conventional treatments (p=0.03). However, when comparing endocrowns to conventional treatments only in posterior teeth (subgroup analyses), no statistically significant differences were found between treatments (p=0.07; I(2)=62%).

CONCLUSION: The literature suggests that endocrowns may perform similarly or better than the conventional treatments using intraradicular posts, direct composite resin or inlay/onlay restorations.

CLINICAL SIGNIFICANCE: Although further studies are still necessary to confirm the present findings, endocrowns show potential application for the rehabilitation of severely compromised, endodontically treated teeth.
Survival of Composite Resin Restorations of severely Decayed Primary Anterior Teeth retained by Glass Fiber Posts or Reversed-orientated Metal Posts. [Review]

Source

Abstract
AIM: The aim of this study was to compare the survival of composite resin restorations retained by glass fiber posts or reversed-orientated (upside-down) metal posts in severely decayed primary anterior teeth after 6, 12, and 18 months.

MATERIALS AND METHODS: A total of forty-four 3- to 5-year-old children with bilateral severely decayed primary maxillary canines were included. Patients were treated under general anesthesia. After pulpectomy, an intracanal post was seated in the primary maxillary canine on each side: either a glass fiber post or a metallic post in reversed orientation and teeth restored with light-cured composite. Survival rate of each technique was evaluated at predetermined follow-ups and data were analyzed with McNemar's test (alpha = 0.05).

RESULTS: The difference in survival of restorations retained by two types of posts was not statistically significant in clinical and radiographical evaluations after 6, 12, and 18 months. The survival rate of reversed-orientated metal and glass fiber posts after 18 months was 61.1 and 67.6% respectively (p = 0.14).

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Title
Sleep bruxism: challenges and restorative solutions. [Review]

Source
Clinical Cosmetic & Investigational Dentistry. 8:71-7, 2016.

Abstract
Bruxism is a parafunctional activity related to clenching or grinding the teeth and tooth wear can be a consequence of sleep bruxism (SB). Management of severe tooth wear due to SB is a challenging situation because of the common reduced amount of remaining dental structure and loss of vertical dimension of occlusion. Rationale for the planning of oral rehabilitation of patients with SB presenting severe tooth wear should rely on evidence-based approaches; however, few studies have discussed properties of dental materials for SB rehabilitation and how to cosmetically manage severe tooth wear. This review aimed to provide an overview into bruxism cosmetic rehabilitation and how this can be implemented with good outcomes for the patient.

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Title
No Clear Evidence of the Effect of Cantilevered Implant Supported Fixed Restorations on the Marginal Bone or the Prosthetic Complications.

Source

Abstract

SOURCE OF FUNDING: Not reported

STUDY DESIGN: Systematic review and meta-analysis.

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Eyelid fat grafting: Indications, operative technique and complications; a systematic review.

INTRODUCTION: Many recent studies concerning autologous fat grafting in the eyelids have been published, mostly consisting of case reports and retrospective case series. However, no study on the overall complication or satisfaction rate associated with the various grafting techniques exists. We performed a comprehensive literature review to determine the outcomes and complications of eyelid fat grafting, as well as patient satisfaction.

METHODS: A systematic review of the literature using the PRISMA criteria was conducted. This protocol was registered at the Prospective Register of Systematic Reviews at the National Institute for Health Research.

RESULTS: Sixteen studies, representing 1,159 patients and published between June 2004 and December 2014, were included. Satisfactory results, judged by clinical examination, were observed in all studies. Few postoperative complications were reported.

CONCLUSIONS: We demonstrated that the procedures were easy to perform, and achieved satisfactory and sustainable results with few complications in both reconstructive and cosmetic surgery. However, a wide disparity exists in the various fat harvesting, fat purification, and reinjection techniques. Further studies are required to assess the long-term outcomes. Our conclusions should be accepted cautiously due to the small number of articles and the lack of evidence in published studies.

Title
Eyelid fat grafting: Indications, operative technique and complications; a systematic review.

Source

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Abstract
INTRODUCTION: Many recent studies concerning autologous fat grafting in the eyelids have been published, mostly consisting of case reports and retrospective case series. However, no study on the overall complication or satisfaction rate associated with the various grafting techniques exists. We performed a comprehensive literature review to determine the outcomes and complications of eyelid fat grafting, as well as patient satisfaction.

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STATEMENT OF PROBLEM: With a number of zirconia ceramic materials currently available for clinical use, an overview of the scientific literature on the adhesion methods and their potential influence is indicated.

PURPOSE: The purpose of this systematic review was to classify and analyze the existing methods and materials proposed to improve adhesion to zirconia surfaces.

MATERIAL AND METHODS: The current literature of in vitro studies examining the bond strength on zirconia ceramics, including clinical studies from 1998 until 2014, was analyzed. A search of the English language literature was undertaken using MEDLINE and PubMed, and a hand search was made for any relevant research paper from the library of a dental school. Papers evaluating only alumina restoration bond or ceramic-zirconia bond were excluded.

RESULTS: A total of 134 publications were identified for analysis. Different adhesive techniques with different testing methods were reviewed. Results were difficult to compare in that the parameters varied in each research protocol.

CONCLUSIONS: Airborne-particle abrasion and tribochemical silica coating are reference pretreatment methods. Adhesive monomers are necessary for chemical bonding. Surface contamination and aging have negative effects on adhesion to zirconia. Many factors influence each combination of zirconia material, such as surface treatment, adhesive medium, and aging conditions. Laboratory studies should be confirmed by clinical trials.

Copyright © 2016 Editorial Council for the Journal of Prosthetic Dentistry. Published by Elsevier Inc. All rights reserved.
### Title
Caries lesion prevention and arrestment in approximal surfaces in contact with glass ionomer cement restorations - A systematic review and meta-analysis.

### Source

### Abstract
**BACKGROUND:** Studies have suggested that in the presence of approximal cavities, the approximal surface in contact with this one shows a higher risk in the development of caries lesions.

**AIM:** To evaluate the ability of dental materials to prevent and to arrest caries lesion in approximal surfaces in contact with occlusoproximal restorations.

**DESIGN:** Two independent reviewers performed a literature search in PubMed through November 2014. The inclusion criteria were: (1) subject related to the scope of this systematic review, (2) study with follow-up, (3) not performed in specific groups, (4) to have a comparison group. After selection by title and abstract, potentially eligible articles were read in full. Meta-analysis was carried out considering the outcome as caries lesion progression or arrestment.

**RESULTS:** The search strategy identified 772 potentially relevant studies, and 10 of them were included in the review (six laboratory studies and four longitudinal trials). For the longitudinal clinical trials, no difference was verified among the materials (OR = 0.680, 95%CI:0.233-1.983). When a meta-analysis was performed for laboratory studies, GIC was significantly associated with better ability to arrest caries lesions (OR = 0.153, 95%CI:0.060-0.391).

**CONCLUSIONS:** In laboratory studies, GIC shows better ability to arrest caries lesion in approximal adjacent surfaces, but this ability was not confirmed in longitudinal clinical trials.

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### Title
Key Parameters of Hybrid Materials for CAD/CAM-Based Restorative Dentistry. [Review]

### Source
Abstract
Hybrid materials are a recent addition to the dental armamentarium for computer-assisted design/ computer-assisted manufacturing (CAD/CAM)-based restorative dentistry. They are intended to provide dentists with the capability of restoring single teeth in one appointment with a material that emulates the structure and physical properties of natural teeth. This article aims to provide an overview of currently available hybrid materials and offer the reader further understanding of their key clinical parameters and possible limitations.

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Title
Effects and Effectiveness of Cavity Disinfectants in Operative Dentistry: A Literature Review. [Review]

Source

Abstract
The degree of success in the elimination of bacteria during cavity preparation and prior to the insertion of a restoration may increase the longevity of the restoration and therefore the success of the restorative procedure. The complete eradication of bacteria in a caries-affected tooth, during cavity preparation, is considered a difficult clinical task. In addition to weakening the tooth structure, attempts to excavate extensive carious tissue completely, by only mechanical procedures, may affect the vitality of the pulp. Therefore, disinfection of the cavity preparation after caries excavation can aid in the elimination of bacterial remnants that can be responsible for recurrent caries, postoperative sensitivity, and failure of the restoration. However, the effects of disinfectants on the restorative treatment have been a major concern for dental clinicians and researchers. This review aims to explore existing literature and provide information about different materials and techniques that have been used for disinfecting cavity preparations and their effects and effectiveness in operative dentistry and, therefore, helps dental practitioners with clinical decision to use cavity disinfectants during restorative procedures. Antimicrobial effectiveness and effects on the pulp and dental restorations, in addition to possible side effects, were all reviewed in this paper.

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Title
Policy on Early Childhood Caries (ECC): Unique Challenges and Treatment Options. [Review]

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Title
Policy on Interim Therapeutic Restorations (ITR). [Review]
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Abstract
OBJECTIVES: The aim of this review was to evaluate the clinical success and survival rates of zirconia ceramic implants after at least 1 year of function and to assess if there is sufficient evidence to justify using them as alternatives to titanium implants.

MATERIALS AND METHODS: An electronic search in MEDLINE, EMBASE, and the Cochrane Central Register of Controlled Clinical Trials (CENTRAL) databases was performed in April 2015 by two independent examiners to retrieve clinical studies focusing on the survival rate of zirconia implants after at least 1 year of function. Implant survival was estimated using the overall proportion reported in the studies with a Clopper-Pearson 95% confidence interval (random effect model with a Der-Simonian Laird estimate).

RESULTS: Fourteen articles were selected out of the 1519 titles initially screened. The overall survival rate of zirconia one- and two-piece implants was calculated at 92% (95% CI 87-95) after 1 year of function. The survival of implants at 1 year for the selected studies revealed considerable heterogeneity.

CONCLUSIONS: In spite of the unavailability of sufficient long-term evidence to justify using zirconia oral implants, zirconia ceramics could potentially be the alternative to titanium for a non-metallic implant solution. However, further clinical studies are required to establish long-term results, and to determine the risk of technical and biological complications. Additional randomized controlled clinical trials examining two-piece zirconia implant systems are also required to assess their survival and success rates in comparison with titanium as well as one-piece zirconia implants.

CLINICAL RELEVANCE: Zirconia implants provide a potential alternative to titanium ones. However, clinicians must be aware of the lack of knowledge regarding long-term outcomes and specific reasons for failure.
**Recent Reviews Related to Restorative Dentistry**

### Turned versus anodised dental implants: a meta-analysis. [Review]

**Source**

**Abstract**
The aim of this meta-analysis was to test the null hypothesis of no difference in the implant failure rates, marginal bone loss (MBL) and post-operative infection for patients being rehabilitated by turned versus anodised-surface implants, against the alternative hypothesis of a difference. An electronic search without time or language restrictions was undertaken in November 2015. Eligibility criteria included clinical human studies, either randomised or not. Thirty-eight publications were included. The results suggest a risk ratio of 2.82 (95% CI 1.95-4.06, P < 0.00001) for failure of turned implants, when compared to anodised-surface implants. Sensitivity analyses showed similar results when only the studies inserting implants in maxillae or mandibles were pooled. There were no statistically significant effects of turned implants on the MBL (mean difference-MD 0.02, 95%CI -0.16-0.20; P = 0.82) in comparison to anodised implants. The results of a meta-regression considering the follow-up period as a covariate suggested an increase of the MD with the increase in the follow-up time (MD increase 0.012 mm year($^{-1}$)), however, without a statistical significance ($P = 0.813$). Due to lack of satisfactory information, meta-analysis for the outcome 'post-operative infection' was not performed. The results have to be interpreted with caution due to the presence of several confounding factors in the included studies.

### Loading protocols and implant supported restorations proposed for the rehabilitation of partially and fully edentulous jaws.

**Source**

**Abstract**
Loading protocols and implant supported restorations proposed for the rehabilitation of partially and fully edentulous jaws. Camlog Foundation Consensus Report.
OBJECTIVES: The aim of this consensus meeting was to assess whether immediate loading protocols achieve comparable clinical outcomes when compared to conventional loading protocols depending on the type of prosthetic restoration. In addition post-loading implant loss for implant supported prostheses in edentulous jaws was analyzed regarding a potential impact of implant location (maxilla vs. mandible), implant number per patient, type of prosthesis (removable vs. fixed), and type of attachment system (screw-retained, ball vs. bar vs. telescopic crown).

MATERIAL AND METHODS: Two comprehensive systematic reviews were prepared in advance of the meeting. Consensus statements, practical recommendations, and implications for future research were based on within group as well as plenary scrutinization and discussions of these systematic reviews.

RESULTS: The survival rates are high for immediate loaded and conventional loaded implants, but immediate loading may impose a greater risk for implant failure. The estimated implant loss rate is influenced by the implant location, type of restoration, and implant number.

CONCLUSIONS: Consistent reporting of clinical studies is necessary and high-quality studies are needed to confirm the present results.

Abstract

OBJECTIVES: To investigate the effect of treated periodontitis on implant outcomes in partially edentulous individuals compared with periodontally healthy patients.

MATERIAL AND METHODS: Longitudinal studies reporting on implant survival, success, incidence of peri-implantitis, bone loss and periodontal status, and on partially dentate patients with a history of treated periodontitis were included.

RESULTS: The search yielded 14,917 citations. Twenty-seven publications met the inclusion criteria for qualitative data synthesis. Implant success and survival were higher in periodontally healthy patients, whilst bone loss and incidence of peri-implantitis was increased in patients with history of treated periodontitis. There was a higher tendency for implant loss and biological complications in patients previously presenting with severe forms of periodontitis. The strength of the evidence was limited by the heterogeneity of the included studies in terms of study design, population, therapy, unit of analysis, inconsistent definition of baselines and outcomes, as well as by the inadequate reporting of statistical analysis and accounting for confounding factors; thus, meta-analysis could not be performed.

CONCLUSIONS: Implants placed in patients treated for periodontal disease are associated with higher incidence of biological complications and lower success and survival rates than those placed in periodontally healthy patients. Severe forms of periodontal disease are associated with higher rates of implant loss. However, it is critical to develop well-designed, long-term prospective studies to provide further substantive evidence on the association of these outcomes.

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Objective: Wide-diameter implants are frequently placed in molar sites to obtain appropriate restoration profiles, to rescue implants that lack stability, and to engage bone in extraction sites. However, studies of wide-diameter implant placement have provided conflicting evidence regarding clinical outcomes. This systematic review aims to analyze survival rates of wide-diameter implants (platform diameter >=5 mm) and assess clinical variables potentially affecting failure rates.

Material and Methods: Electronic search was conducted using MEDLINE (PubMed), Cochrane Central Register of Controlled Trials (CENTRAL) and EMBASE from January 1980 to October 2014. Publication screening, data extraction, and quality assessment were performed. Failure rate per implant-year was analyzed using mix-effects Poisson regression model to obtain summary estimates of the 5-year survival rate. Relative risk (RR) was calculated to evaluate the association of different clinical variables with estimated failure rates.

Results: Eleven retrospective studies and eight prospective studies having at least 1-year follow-up period were included in the analysis. The estimated 5-year survival rate was 92.67% (95% confidence interval: [79.60, 97.50]) in the retrospective studies and 97.76% (Confidence interval: [93.25, 99.27]) in the prospective studies. Implant surface and implant diameter were significantly associated with the failure events in the retrospective studies.

Conclusions: Placement of wide-diameter implants demonstrated a promising survival rate during 5-year follow-up. Further controlled trials with the control group and longer follow-up period are needed to provide the direct evidence comparing survival rates of wide implants with survival rates of narrower implants.

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Immediate dental implant placement into infected vs. non-infected sockets: a meta-analysis.

OBJECTIVE: This meta-analysis was aimed at assessing whether immediate dental implant placement into infected vs. non-infected sites produced different effects on implant failure risk and marginal bone loss.

MATERIAL AND METHODS: Relevant studies were identified by searching articles in PubMed, Web of Knowledge, and the Cochrane Library through February 2015 and by reviewing the reference lists of the retrieved articles. When an intervention led to dichotomous outcomes, the outcomes were expressed as risk ratios, whereas continuous outcomes were expressed as mean differences in millimeters; each had a 95% confidence interval. Study-specific estimates were combined using fixed-effects models.

RESULTS: A total of 1743 articles were identified following the search process. Seven studies were finally included in the meta-analysis, which comprised a total of 1586 implants and 25 failures. Compared to the immediate insertion of a dental implant into a non-infected site, the insertion of an implant into an infected site showed 116% increase in the risk of implant failure, which had borderline statistical significance (risk ratio = 2.16, 95% confidence interval: 0.97, 4.80, P = 0.058; heterogeneity: I<sup>2</sup> = 0.0%, P<sub>heterogeneity</sub> = 0.997). With regard to marginal bone loss, we observed no statistically significant difference between insertions into infected vs. non-infected sites (mean difference = -0.04, 95% confidence interval: -0.09, 0.02, P = 0.173, heterogeneity: I<sup>2</sup> = 0.0%, P<sub>heterogeneity</sub> = 0.765).

CONCLUSION: This meta-analysis suggests that immediately placing a dental implant into an infected site may increase the risk of implant failure. Given the presence of uncontrolled confounders in the studies that were assessed, the results should be interpreted with caution.

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Title
- Gummy Smile and Short Tooth Syndrome - Part 2: Periodontal Surgical Approaches in Interdisciplinary Treatment. [Review]
Abstract

One of the most frequent causes of gummy smile is an altered eruption, i.e., the gingival margins are located at a more coronal position than normal. These cases can be successfully treated with a periodontal surgical approach. Several techniques may be used, depending on the different anatomic variations. The surgery must be carefully planned so as to avoid discrepancies between the soft tissues and the teeth. Clinical examination and radiographic evaluation will allow clinicians to determine the position of the gingival margin, bone crest, and cemento-enamel junction and thus elicit a correct diagnosis of the subtype of altered eruption. The periodontist will need to consider these factors in order to obtain a satisfactory outcome, especially in multidisciplinary cases.

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Title

Clinical Decisions: Determining When to Save or Remove an Ailing Implant. [Review]

Source

Compendium of Continuing Education in Dentistry. 37(4):233-243; quiz244, 2016 Apr.

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Abstract

The basis for the decision to either save or remove an ailing implant is multifactorial, and, as such, it has become one of the more controversial topics in the field of dental implantology. While bone lost to peri-implant disease can now be augmented with increasing predictability, the degree of success still varies depending on the size and configuration of the osseous defect. Concurrently, with the development of improved high-reverse torque instrumentation, minimally invasive techniques can be used to easily remove an implant that is malpositioned, causing an esthetic problem, or showing advanced bone loss. Any eventual decision regarding the retention or removal of an ailing implant must also be balanced with the desires of the patient, who typically will have already invested significant time and money to have the implant initially placed and restored. This article will present the variables involved in the decision-making process for when to save or remove an ailing implant. Clinical examples illustrating the management for these factors will be offered, providing clinicians a variety of alternatives available for managing different clinical circumstances that may be encountered.

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Guideline on Restorative Dentistry.

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Publication Type

Assessment of treatment failure in endodontic therapy. [Review]


Abstract

There is a paucity of guidelines for the dental profession to assess failure of endodontic therapy. While a successful treatment can be well defined by the absence of apical periodontitis and clinical symptoms after a period of observation, failed treatment has escaped a distinct standing over the years. This article highlights aspects of significance and concludes that research ought to better explore the general health properties of persistent apical periodontitis on root-filled teeth and finally confirm the extent there is an association between apical periodontitis and adverse systemic health effects. Clearing this condition will determine whether clinicians should take a serious or relaxed attitude to persistent apical periodontitis subsequent to endodontic treatment.

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Common Prosthetic Implant Complications in Fixed Restorations. [Review]

Compendium of Continuing Education in Dentistry. 37(7):431-4;quiz439, 2016 Jul.

Abstract

Many clinicians consider implants to be one of the most important innovations in dental care. Even so, over the past 40 years of implant dentistry, complications have been a constant struggle for restorative dentists, surgeons, and patients alike. Implant-related problems can be particularly challenging and frustrating, especially given that an implant is thought to be a "lifetime" solution expected to yield minimal difficulties. This, however, is not necessarily the case with prosthetic restorations. With innovations in implant technology continuing to rapidly advance, maintaining knowledge of all the latest developments can be challenging for clinicians. The purpose of this article is to provide a basic understanding of the treatment, management, and prevention of common prosthetic and technical implant complications seen in the office of a restorative dentist.
The restoration of proximal surface cavities, originating from Class II carious lesions, to "normal" anatomical specifications is a fundamental objective for the dental practitioner. Cognitive interpretation of tooth morphology attained from evidence-based resources, together with the necessary psychomotor skills for correct design and completion, are considered essential strategies for restoration success. Also, the visualization of the original tooth structure, if present, should substantially benefit the dentist in the creation of a clinically satisfactory restoration. The purpose of this evidence-based review is to define the cause and effect of decisions based on optimum treatment standards of care for the patient. The concepts of form and function, as related to the oral environment, and the consequences of unsatisfactory dental restorative care will be scrutinized. This article will identify and explain the different challenges and solutions for restoration of dental proximal lesions and provide an overview of past, present, and future procedures.
Lithium Disilicate Restorations Fatigue Testing Parameters: A Systematic Review. [Review]

METHODS: An electronic search was performed in PubMed, Scopus, and Ovid to identify in vitro studies that investigated fatigue resistance of LD crowns and FDPs. The search included all studies published in English in peer-reviewed journals in the period from 1998 to June 2014. The search followed a specific strategy that included combination of the following keywords: lithium disilicate, e.max, empress, all-ceramic, all ceramic, glass ceramic, fatigue, cyclic loading, dynamic loading, chewing simulator, fracture resistance, thermocycling, laboratory simulation, aging, crown, FDPs, FPDs, fixed partial denture, fixed dental prosthesis, and bridge. Studies were selected if mechanical and thermal loading parameters were clearly identified. Search results with abstracts were transferred into Endnote reference system, and duplicates were deleted. The remaining studies were then reviewed at three levels (title, abstract, full text) to further refine the articles.

RESULTS: The initial search retrieved 1044 eligible studies. After deduplication, 864 records were examined by titles and then abstracts; 826 were excluded, and 38 were assessed by full-text reading. In total, 19 articles met inclusion criteria and were included in this study.

CONCLUSION: The studies reviewed showed a level of heterogeneity, as testing parameters were considered through different setups. The current study demonstrated that various setting of the testing parameters and having a lack of testing standardization has likely led to inconsistency in the reported results. The obvious heterogeneity in the setting of testing variables—especially the magnitude of load and number of cycles applied—made it impractical to run direct comparisons between the reviewed studies. Therefore, specific international standardization of fatigue testing of dental restorations is urgently needed to ensure the delivery of consistent, indicative, and comparable data.
CONCLUSION: This systematic review showed that all-ceramic restorations fabricated using the correct clinical protocol have an adequate clinical survival for at least 5 years of clinical service with very low complication rates. Minor ceramic chipping and debonding did not affect the longevity of the restorations.

CLINICAL RELEVANCE: Long-term clinical performance of all-ceramic restorations manufactured using various ceramic systems provides clinical evidence of complications and long-term management of these restorations. Available evidence indicates the effectiveness of various ceramic systems for numerous clinical applications. Correct planning and a rigorous technical execution protocol increase clinical success. Studies of ceramic prostheses indicate more problems with ceramic failure and debonding.

Purpose

This document serves as a baseline with the expectation of future modifications when additional evidence becomes available.

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Abstract

PURPOSE: To provide guidelines for patient recall regimen, professional maintenance regimen, and at-home maintenance regimen for patients with tooth-borne and implant-borne removable and fixed restorations.

MATERIALS AND METHODS: The American College of Prosthodontists (ACP) convened a scientific panel of experts appointed by the ACP, American Dental Association (ADA), Academy of General Dentistry (AGD), and American Dental Hygienists Association (ADHA) who critically evaluated and debated recently published findings from two systematic reviews on this topic. The major outcomes and consequences considered during formulation of the clinical practice guidelines (CPGs) were risk for failure of tooth- and implant-borne restorations. The panel conducted a round table discussion of the proposed guidelines, which were debated in detail. Feedback was used to supplement and refine the proposed guidelines, and consensus was attained.

RESULTS: A set of CPGs was developed for tooth-borne restorations and implant-borne restorations. Each CPG comprised (1) patient recall, (2) professional maintenance, and (3) at-home maintenance. For tooth-borne restorations, the professional maintenance and at-home maintenance CPGs were subdivided for removable and fixed restorations. For implant-borne restorations, the professional maintenance CPGs were subdivided for removable and fixed restorations and further divided into biological maintenance and mechanical maintenance for each type of restoration. The at-home maintenance CPGs were subdivided for removable and fixed restorations.

CONCLUSIONS: The clinical practice guidelines presented in this document were initially developed using the two systematic reviews. Additional guidelines were developed using expert opinion and consensus, which included discussion of the best clinical practices, clinical feasibility, and risk-benefit ratio to the patient. To the authors’ knowledge, these are the first CPGs addressing patient recall regimen, professional maintenance regimen, and at-home maintenance regimen for patients with tooth-borne and implant-borne restorations. This document serves as a baseline with the expectation of future modifications when additional evidence becomes available.

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20151229
A Systematic Review of Recall Regimen and Maintenance Regimen of Patients with Dental Restorations. Part 1: Tooth-Borne Restorations. [Review]

Purpose: To evaluate the current scientific evidence on patient recall and maintenance of dental restorations on natural teeth, standardized patient care regimens, and improve maintenance of oral health. An additional purpose was to examine areas of deficiency in the current scientific literature and provide recommendations for future studies.

Materials and Methods: An electronic search for articles in the English language literature from the past 15 years was performed independently by multiple investigators using a systematic search process. After application of predetermined inclusion and exclusion criteria, the final list of articles was reviewed in depth to meet the objectives of this review.

Results: The initial electronic search resulted in 2161 titles. The systematic application of inclusion and exclusion criteria resulted in 12 articles that met the objectives of the study. An additional 4 articles were added through a supplemental search process for a total of 16 studies. Out of these, 9 were randomized controlled clinical trials and 7 were observational studies. The majority of the studies (14 out of 16) were conducted in the past 5 years, and most of the studies were conducted in Europe (10). Results from the qualitative data, on a combined 3569 patients, indicated that outcome improvements in recall and maintenance regimen were related to (1) patient/treatment characteristics (adherence to recall appointments, type of restoration and type of restorative material); (2) agent (chlorhexidine, fluoride, triclosan); and (3) professional intervention (repeated oral hygiene instruction, regular oral hygiene intervention).

Conclusions: There is minimal evidence related to recall regimens in patients with removable and fixed tooth-borne restorations; however, there is considerable evidence indicating that patients with tooth-borne removable and fixed restorations require lifelong professional maintenance to provide repeated oral hygiene instruction and regular oral hygiene intervention customized to each patient's treatment. Current evidence also indicates that use of specific oral topical agents like chlorhexidine, fluoride, and triclosan can aid in reducing risk for gingival inflammation, dental caries, and candidiasis. Therefore, these agents may aid in improvement of professional and at-home maintenance of various tooth-borne dental restorations. Furthermore, due to the heterogeneity of patient populations, restorations, and treatment needs, the evidence compels forethought of creating clinical practice guidelines for recall and maintenance of patients with tooth-borne dental restorations.

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A Systematic Review of Recall Regimen and Maintenance Regimen of Patients with Dental Restorations. Part 2: Implant-Borne Restorations. [Review]

**Source**

**Abstract**

**PURPOSE:** To evaluate the current scientific evidence on patient recall and maintenance of implant-supported restorations, to standardize patient care regimens and improve maintenance of oral health. An additional purpose was to examine areas of deficiency in the current scientific literature and provide recommendations for future studies.

**MATERIALS AND METHODS:** An electronic search for articles in the English language literature from the past 10 years was performed independently by multiple investigators using a systematic search process. After application of predetermined inclusion and exclusion criteria, the final list of articles was reviewed to meet the objectives of this review.

**RESULTS:** The initial electronic search resulted in 2816 titles. The systematic application of inclusion and exclusion criteria resulted in 14 articles that satisfied the study objectives. An additional 6 articles were added through a supplemental search process for a total of 20 studies. Of these, 11 were randomized controlled clinical trials, and 9 were observational studies. The majority of the studies (15 out of 20) were conducted in the past 5 years and most studies were conducted in Europe (15), followed by Asia (2), South America (1), the United States (1), and the Middle East (1). Results from the qualitative data on a combined 1088 patients indicated that outcome improvements in recall and maintenance regimen were related to (1) patient/treatment characteristic (type of prosthesis, type of prosthetic components, and type of restorative materials); (2) specific oral topical agents or oral hygiene aids (electric toothbrush, interdental brush, chlorhexidine, triclosan, water flossers) and (3) professional intervention (oral hygiene maintenance, and maintenance of the prosthesis).

**CONCLUSIONS:** There is minimal evidence related to recall regimens in patients with implant-borne removable and fixed restorations; however, a considerable body of evidence indicates that patients with implant-borne removable and fixed restorations require lifelong professional recall regimens to provide biological and mechanical maintenance, customized for each patient. Current evidence also demonstrates that the use of specific oral topical agents and oral hygiene aids can improve professional and at-home maintenance of implant-borne restorations. There is evidence to demonstrate differences in mechanical and biological maintenance needs due to differences in prosthetic materials and designs. Deficiencies in existing evidence compel the forththought of creating clinical practice guidelines for recall and maintenance of patients with implant-borne dental restorations.

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**Title**
The marginal fit of E.max Press and E.max CAD lithium disilicate restorations: A critical review. [Review]

**Source**

**Abstract**
This critical review aimed to assess the vertical marginal gap that was present when E.max lithium disilicate-based restoration (Press and CAD) are fabricated in-vitro. Published articles reporting vertical marginal gap measurements of in-vitro restorations that had been fabricated from E.Max lithium disilicate were sought with an electronic search of MEDLINE (PubMed) and hand search of selected dental journals. The outcomes were reviewed qualitatively. The majority of studies that compared the marginal fit of E.max press and E.max CAD restorations, found that the E.max lithium disilicate restorations fabricated with the press technique had significantly smaller marginal gaps than those fabricated with CAD technique. This research indicates that E.max lithium disilicate restorations fabricated with the press technique have measurably smaller marginal gaps when compared with those fabricated with CAD techniques within in-vitro environments. The marginal gaps achieved by the restorations across all groups were within a clinically acceptable range.

**Title**
Systematic review on highly viscous glass-ionomer cement/resin coating restorations (Part I): Do they merge Minamata Convention and minimum intervention dentistry?. [Review]

**Source**

**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 evaluate the literature on this treatment approach, and to focus particularly on the clinical performance of the hvGIC/RC combination.

SEARCH STRATEGY: The Cochrane Library as well as Ebsco, Embase, PubMed, and Scopus databases were screened. Moreover, relevant abstracts published with dental meetings were reviewed.

SELECTION CRITERIA: All available randomized clinical trials focusing on the hvGIC/RC approach (published either as full-texts or abstracts until June 2016) were selected. Moreover, single-group studies using hvGIC/RC were included.

DATA COLLECTION AND ANALYSIS: Screening of titles and abstracts, data extraction, and quality assessments of full-texts according to Oxford scoring were performed.

RESULTS: Regarding failure rates, minor differences between hvGIC/RC and GIC or composite resins as comparators could be observed in seven clinical studies. The hvGIC/RC combination showed high survival rates (with only few catastrophic failures) of up to 6 years.

CONCLUSION: Class I retention rates of hvGIC/RC seem promising, but further high-quality clinical studies are clearly warranted.
OBJECTIVE: This systematic review aimed to compare immediate protocols with conventional protocols of single-tooth implants in terms of changes in the surrounding hard and soft tissue in the esthetic area.

MATERIALS AND METHODS: Electronic and manual searches were performed in PubMed, EMBASE, Cochrane, and other data systems for research articles published between January 2001 and December 2014. Only randomized controlled trials (RCTs) reporting on hard and or soft tissue characteristics following a single-tooth implant were included. Based on the protocol used in each study, the included studies were categorized into three groups to assess the relationships between the factors and related esthetic indexes. Variables such as marginal bone level changes (mesial, distal, and mean bone level), peri-implant soft tissue changes (papilla level, midbuccal mucosa, and probing depth), and other esthetic indices were taken into consideration. The data were analyzed using RevMan version 5.3, Stata 12, and GRADEpro 3.6.1 software.

RESULTS: A total of 13 RCTs met the inclusion criteria. Four studies examined immediate implant placement, five studies examined immediate implant restoration, and four studies examined immediate loading. Comparing the bone level changes following immediate and conventional restoration, no significant differences were found in the bone level of the mesial site (standard mean difference [SMD] = -0.04 mm; 95% confidence interval [CI]: -0.25 to 0.17 mm), the distal site (SMD = -0.15 mm; 95% CI: -0.38 to 0.09 mm), and the mean bone level changes (SMD = 0.05 mm; 95% CI: -0.18 to 0.27 mm). The difference in the marginal bone level changes between immediate and conventional loading was also not statistically significant (SMD = -0.05 mm; 95% CI: -0.15 to 0.06 mm for the mesial site and SMD = -0.02 mm; 95% CI: -0.09 to 0.06 mm for the distal site). Soft tissue changes following immediate and conventional restoration reported no significant differences in the papilla level of the mesial site (SMD = 0.18 mm; 95% CI: 0.00 to 0.37 mm), the papilla level of the distal site (SMD = -0.12 mm; 95% CI: -0.34 to 0.09 mm), and the midbuccal mucosa (SMD = -0.22 mm; 95% CI: -1.29 to 0.85 mm).

CONCLUSION: Within the limitations, it can be concluded that immediately placed, restored, or loaded single-tooth implants in the esthetic zone result in similar hard and soft tissue changes compared with conventional protocols.

OBJECTIVE: To test the null hypothesis of no difference in the implant failure rates, marginal bone loss, and postoperative infection for patients receiving or not receiving bisphosphonates, against the alternative hypothesis of a difference.

METHOD AND MATERIALS: An electronic search was undertaken in October 2015 in PubMed/Medline, Web of Science, and Embase, plus hand-searching and databases of clinical trials. Eligibility criteria included clinical human studies, either randomized or not.
RESULTS: A total of 18 publications were included in the review. Concerning implant failure, the meta-analysis found a risk ratio of 1.73 (95% confidence interval [CI] 1.21-2.48, P = .003) for patients taking bisphosphonates, when compared to patients not taking the medicament. The probability of an implant failure in patients taking bisphosphonates was estimated to be 1.5% (0.015, 95% CI 0.006-0.023, standard error [SE] 0.004, P < .001). It cannot be suggested that bisphosphonates may affect the marginal bone loss of dental implants, due to a limited number of studies reporting this outcome. Due to a lack of sufficient information, meta-analysis for the outcome "postoperative infection" was not performed.

CONCLUSION: The results of the present study cannot suggest that the insertion of dental implants in patients taking BPs affects the implant failure rates, due to a limited number of published studies, all characterized by a low level of specificity, and most of them dealing with a limited number of cases without a proper control group. Therefore, the real effect of BPs on the osseointegration and survival of dental implants is still not well established.

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Title
Immediate dentin sealing for indirect bonded restorations. [Review]
Source
Abstract
PURPOSE: The aim of this article is to review available literature on the clinical procedure of immediate dentine sealing for indirect bonded restorations.

STUDY SELECTION: More than 40 articles reporting the technique, studies, outcomes, etc. were reviewed after PUBMED/MEDLINE search, most of them addressing the specific situation of dentin bonding for indirect restorations.

RESULTS: It is known that tooth preparation for indirect bonded restorations can result in significant dentin exposures. Immediate application and polymerization of the dentin bonding agent to the freshly cut dentin, prior to impression making is therefore recommended by some authors. Literature indicates that this procedure, immediate dentine sealing (IDS), appears to achieve improved bond strength, fewer gap formations, decreased bacterial leakage, and reduces post-cementation sensitivity. This rational approach to adhesion is also reported to have a positive influence on tooth structure preservation, patient comfort, and long term survival of indirect bonded restorations.

CONCLUSION: In the extensive literature regarding advantages of using IDS technique significant differences have been shown when compared to Delayed Dentine Sealing. Although more research is required in this field, presently there are NO scientific reasons not to recommend IDS in routine practice.

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Options for Middle Vault and Dorsum Restoration after Hump Removal in Primary Rhinoplasty. [Review]

Prevention of unfavorable sequelae following humpectomy in reduction rhinoplasty by restoration of the middle nasal vault complex today has become imperative in the majority of patients with perhaps the exception of small humps. In general, the techniques used for preservation and reconstruction of these important anatomical structures can be divided into two main categories: spreader graft and spreader flap techniques. Oversimplified spreader graft techniques require donor cartilage, whereas spreader flap techniques use the excess height of the medial portion of the upper lateral cartilages in patients with a cartilaginous hump. In principle, both donor cartilage and preserved upper lateral cartilages usually are positioned along both sides of the dorsal septum to provide natural and harmonious contours as well as to avoid functional impairment (valve collapse). However, the considerable number of publications on this topic attests to existing downsides of both surgical principles. To overcome these shortcomings, we illustrate additional modifications in the application of spreader grafts as well as spreader flaps. However, the main goal of this article is to provide an algorithm helping to decide which technique is best suited to meet the requirements of each individual patient.

Evaluation of the efficacy of flowable composite as lining material on microleakage of composite resin restorations: A systematic review and meta-analysis. [Review]

OBJECTIVE: The efficacy of flowable composite in improving marginal adaptation or reducing microleakage is not fully understood. The purpose of this study was to systematically evaluate existing evidence to verify whether an application of flowable composite as a liner provided less microleakage in Class 2 composite restorations.

METHOD AND MATERIALS: PubMed, ISI (Web of Science), and Scopus databases were searched according to the selected keywords, up to 15 Feb 2015, without any restriction on date or language. Full texts of published articles that seemed to meet primary criteria for inclusion in this research were obtained. Data of studies were extracted if they were assessed as high or moderate level of evidence. Due to the variation of methods used in different studies, they were divided into five groups: groups 1 and 2, studies that evaluated the effect of flowable composite as a liner on dentinal or enamel margins and applied flowable composite on all of the cavity wall margins; groups 3 and 4, studies that evaluated the effect of flowable composite as a liner on dentinal and enamel margins and applied flowable composite only on gingival margin; and group 5, clinical studies.

RESULTS: The initial search yielded 1,370 publications. After hand searching, six extra studies were included in the review. The abstracts of all were read independently by AB and SG. After methodologic assessment and evaluation of the level of evidence, 18 studies were selected for this study. The results of this study indicate that flowable composite liners have no significant effect on microleakage of composite restorations in all of five groups.

CONCLUSION: Application of flowable composite as a liner in composite restorations cannot reduce microleakage or improve clinical performance.
A systematic review and meta-analysis of removable and fixed implant-supported prostheses in edentulous jaws: post-loading implant loss. [Review]

Source

Abstract
OBJECTIVES: The aim of this systematic review was to analyze post-loading implant loss for implant-supported prostheses in edentulous jaws, regarding a potential impact of implant location (maxilla vs. mandible), implant number per patient, type of prosthesis (removable vs. fixed), and type of attachment system (screw-retained, ball vs. bar vs. telescopic crown).

MATERIAL AND METHODS: A systematic literature search for randomized-controlled trials (RCTs) or prospective studies was conducted within PubMed, Cochrane Library, and Embase. Quality assessment of the included studies was carried out, and the review was structured according to PRISMA. Implant loss and corresponding 3- and 5-year survival rates were estimated by means of a Poisson regression model with total exposure time as offset.

RESULTS: After title, abstract, and full-text screening, 54 studies were included for qualitative analyses. Estimated 5-year survival rates of implants were 97.9% [95% CI 97.4; 98.4] in the maxilla and 98.9% [95% CI 98.7; 99.1] in the mandible. Corresponding implant loss rates per 100 implant years were significantly higher in the maxilla (0.42 [95% CI 0.33; 0.53] vs. 0.22 [95% CI 0.17; 0.27]; P = 0.0001). Implant loss rates for fixed restorations were significantly lower compared to removable restorations (0.23 [95% CI 0.18; 0.29] vs. 0.35 [95% CI 0.28; 0.44]; P = 0.0148). Four implants and a fixed restoration in the mandible resulted in significantly higher implant loss rates compared to five or more implants with a fixed restoration. The analysis of one implant and a mandibular overdenture also revealed higher implant loss rates than an overdenture on two implants. The same (lower implant number = higher implant loss rate) applied when comparing 2 vs. 4 implants and a mandibular overdenture. Implant loss rates for maxillary overdentures on <4 implants were significantly higher than for four implants (7.22 [95% CI 5.41; 9.64] vs. 2.31 [1.56; 3.42]; P < 0.0001).

CONCLUSIONS: Implant location, type of restoration, and implant number do have an influence on the estimated implant loss rate. Consistent reporting of clinical studies is necessary and high-quality studies are needed to confirm the present results.

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AIM: To determine the survival trend of dental implants after functional loading for >=1 year in diabetic patients and to conduct independently by 2 reviewers. Life-table analysis and Kaplan-Meier survival curves were used to evaluate implant survival and to plot the cumulative survival rate and cumulative hazard ratio.

MATERIAL AND METHODS: An electronic search of the Cochrane Oral Health Group’s Trials Register, Medline and Embase, plus a manual search up to December 2015 was performed. Studies assessing the survival rate of dental implants in patients with a diagnosis of diabetes mellitus were considered eligible. Screening of studies, quality assessment, and data extraction were conducted independently by 2 reviewers. Life-table analysis and Kaplan-Meier survival curves were used to evaluate implant survival and to plot the cumulative survival rate and cumulative hazard ratio.
RESULTS: Seven studies, including 1142 implants were identified. The cumulative survival rate was 0.96 +/- 0.10 before loading, 0.93 +/- 0.10 and 0.91 +/- 0.10 at 1 year, and at the end of the follow-up period, respectively. The hazard ratio was 4% during the period of osseointegration, 3% during the first year of loading, and remained constant over the 6-year follow-up.

CONCLUSIONS: Patients with diabetes mellitus showed an increasing trend of implant failure during the period of osseointegration and the first year of loading.

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Title
Clinical Practice Guidelines for Recall and Maintenance of Patients with Tooth-Borne and Implant-Borne Dental Restorations.
Source

METHODS: The American College of Prosthodontists (ACP) convened a scientific panel of experts appointed by the ACP, American Dental Association (ADA), Academy of General Dentistry (AGD), and American Dental Hygienists Association (ADHA) who critically evaluated and debated recently published findings from 2 systematic reviews on this topic. The major outcomes and consequences considered during formulation of the clinical practice guidelines (CPGs) were risk for failure of tooth- and implant-borne restorations. The panel conducted a round table discussion of the proposed guidelines, which were debated in detail. Feedback was used to supplement and refine the proposed guidelines, and consensus was attained.

RESULTS: A set of CPGs was developed for tooth-borne restorations and implant-borne restorations. Each CPG comprised of 1) patient recall; 2) professional maintenance, and 3) at-home maintenance regimen for patients with tooth- and implant-borne removable and fixed restorations.

CONCLUSION: The clinical practice guidelines presented in this document were initially developed using the 2 systematic reviews. Additional guidelines were developed using expert opinion and consensus, which included discussion of the best clinical practices, clinical feasibility and risk-benefit ratio to the patient. To the authors' knowledge, these are the first CPGs addressing patient recall regimen, professional maintenance regimen, and at-home maintenance regimen for patients with tooth-borne and implant-borne restorations. This document serves as a baseline with the expectation of future modifications when additional evidence becomes available.
The displaced implants were removed using the Caldwell-Luc approach or a transoral or transnasal endoscopic approach. Presentation, but resulted in a low incidence of complications, such as maxillary sinusitis.

RESULTS: Twenty-two journal articles were selected; these discussed 49 displaced implants. Most of the implants were displaced into the maxillary sinus during implantation, but resulted in a low incidence of complications, such as maxillary sinusitis. The displaced implants were removed using the Caldwell-Luc approach or a transoral or transnasal endoscopic approach.

CONCLUSION: Implants displaced into the maxillary sinus have various causes according to when they are displaced. As displaced implants can cause several complications, transnasal endoscopy is recommended to remove them; however, the implants should be examined thoroughly before selecting the removal method.
Survival Rate of Resin and Ceramic Inlays, Onlays, and Overlays: A Systematic Review and Meta-analysis. [Review]

Abstract

This systematic review and meta-analysis aimed to evaluate the survival rate of ceramic and resin inlays, onlays, and overlays and to identify the complication types associated with the main clinical outcomes. Two reviewers searched PubMed, EMBASE, and the Cochrane Central Register of Controlled Trials for articles published between 1983 through April 2015, conforming to Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines for systematic reviews. Clinical studies meeting the following criteria were included: 1) studies related to resin and ceramic inlays, onlays, and overlays; 2) prospective, retrospective, or randomized controlled trials conducted in humans; 3) studies with a dropout rate of less than 30%; and 4) studies with a follow-up longer than 5 y. Of 1,389 articles, 14 met the inclusion criteria. The meta-regression indicated that the type of ceramic material (feldspathic porcelain vs. glass-ceramic), study design (retrospective vs. prospective), follow-up time (5 vs. 10 y), and study setting (university vs. private clinic) did not affect the survival rate. Estimated survival rates for glass-ceramics and feldspathic porcelain were between 92% and 95% at 5 y (n = 5,811 restorations) and were 91% at 10 y (n = 2,154 restorations). Failures were related to fractures/chipping (4%), followed by endodontic complications (3%), secondary caries (1%), debonding (1%), and severe marginal staining (0%). Odds ratios (95% confidence intervals) were 0.19 (0.04 to 0.96) and 0.54 (0.17 to 1.69) for pulp vitality and type of tooth involved (premolars vs. molars), respectively. Ceramic inlays, onlays, and overlays showed high survival rates at 5 y and 10 y, and fractures were the most frequent cause of failure.
OBJECTIVES: This paper investigates the structure and some properties of resin infiltrated ceramic network structure materials suitable for CAD/CAM dental restorative applications.

METHODS: Initially the basis of interpenetrating network materials is defined along with placing them into a materials science perspective. This involves identifying potential advantages of such structures beyond that of the individual materials or simple mixing of the components.

RESULTS: Observations from a number of recently published papers on this class of materials are summarized. These include the strength, fracture toughness, hardness and damage tolerance, namely to pointed and blunt (spherical) indentation as well as to burr adjustment. In addition a summary of recent results of crowns subjected to simulated clinical conditions using a chewing simulator are presented. These results are rationalized on the basis of existing theoretical considerations.

SIGNIFICANCE: The currently available ceramic-resin IPN material for clinical application is softer, exhibits comparable strength and fracture toughness but with substantial R-curve behavior, has lower E modulus and is more damage tolerant than existing glass-ceramic materials. Chewing simulation observations with crowns of this material indicate that it appears to be more resistant to sliding/impact induced cracking although its overall contact induced breakage load is modest.
Clinical performance of anterior resin-bonded fixed dental prostheses with different framework designs: A systematic review and meta-analysis. [Review]

Source

Abstract
OBJECTIVES: To systematically review the failure rate and complications of different framework designs of resin-bonded fixed dental prostheses (RBFPDs) in the anterior region.

METHODS: A systematic search for clinical studies on RBFPDs published prior to December 2014 in Medline/PubMed, EMBASE, and Cochrane Library databases was conducted and complemented by a manual search. Randomized controlled trials (RCTs) as well as prospective and retrospective cohort studies that compared at least two RBFPD framework designs with a minimum of 2 years follow up were included in this review. The quality of the included studies were assessed using the Newcastle-Ottawa scale for cohort studies and Cochrane Handbook for RCT. Prostheses-based data on reported failure rate/survival rate, debonding, and fractures were analyzed by meta-analysis.

RESULTS: Of 1010 screened articles, one RCT and 4 cohort studies fit the inclusion criteria and were included in the meta-analysis. All included articles have a high risk of bias. Failure rates of single-retainer cantilever RBFPDs were lower than two-retainer fixed-fixed RBFPDs (OR 0.42, 95% CI 0.19-0.94, P=0.04). Metal-ceramic RBFPDs showed no difference of failure rates between cantilever RBFPDs and two-retainer fixed-fixed RBFPDs (OR 0.93, 95% CI 0.33-2.63, P=0.89). Debonding was not significantly different between cantilever RBFPDs and two-retainer fixed-fixed RBFPDs (OR 0.61, 95% CI 0.23-1.60, P=0.32). Metal-ceramic RBFPDs showed no difference of debonding between cantilever RBFPDs and two-retainer fixed-fixed RBFPDs (OR 0.81, 95% CI 0.28-2.34, P=0.70).

CONCLUSIONS: Within the limitations of the present study, cantilever RBFPDs demonstrate lower clinical failure than two-retainer RBFPDs in the anterior region. The failure of metal-ceramic RBFPDs is independent of the framework design, while the failure of all-ceramic RBFPDs with different designs has not been clear yet.

CLINICAL SIGNIFICANCE: Based on the principle of minimally invasive treatment, less number of retainers is recommended for RBFPDs.
OBJECTIVE: The aim of this review was to update the literature with regard to the digital methods available by CEREC Chairside System to Register and Design the Occlusion in Restorative Dentistry: A Systematic Literature Review.

PURPOSE: To perform a systematic review of the clinical performance of a low polymerization shrinkage, silorane-based composite (SBC) compared with a methacrylate-based composite (MBC) in posterior restorations.

MATERIALS AND METHODS: Electronic databases were searched: PubMed, Scopus, Bireme, Science Direct, Web of Science, ClinicalTrials.gov and OpenGrey. The search strategy included MeSH terms, synonyms and keywords with no language or date restrictions. Reference lists of eligible studies were cross checked in an attempt to identify additional studies. Based on the PICOS strategy, only randomized clinical trials (RCTs) were included. The risk of bias in the included studies was assessed and classified through the Cochrane Collaboration common scheme for bias. Two meta-analyses were performed using RevMan software, one with all 11 studies and another that included only studies with over 24 months of follow-up, for the main parameters analyzed.

RESULTS: A total of 544 studies were identified. After removing duplicates and examining titles and abstracts, 17 texts were selected and read in full. Six of them were excluded, so the final sample of this systematic review included 11 studies. Six of the 11 studies were classified as having a “low risk of bias” and five were “unclear”. The heterogeneity (I²) in all parameters was not significant. The exclusion of studies with less than 24 months of follow-up did not change the final result of the meta-analysis: both SBC and MBC have satisfactory and statistically similar clinical performances.

CONCLUSION: Low polymerization shrinkage is not the principal factor that determines the superiority of a resin.

Studies.

Abstract

OBJECTIVE: The aim of this review was to update the literature with regard to the digital methods available by CEREC Chairside system to register and design the occlusion, to report their efficacy and technical innovations in the field of Restorative Dentistry. A search strategy was performed using the key-words: “virtual articulator,” or “CAD-CAM and occlusal recording,” or “CAD-CAM and occlusion register,” or “CAD-CAM and occlusal contacts,” or “CAD-CAM and prosthesis.”
MATERIAL AND METHODS: Inclusion criteria comprised studies evaluating the use of digital methods available by CEREC System for occlusal registration and design during prostodontics treatment. PubMed and Cochrane library and reference lists were searched up to January 2016.

RESULTS: The search resulted in 280 articles after removing duplicates. Subsequently, 233 records were excluded and 49 studies were selected for reading in full. Eleven articles were considered eligible for the systematic review (4 in vitro and 7 clinical studies).

CONCLUSION: Scientific evidence suggests that digital methods were accurate to register and design the occlusion of dental prostheses. Nevertheless, further clinical studies are required to establish a conclusion with regard to its accuracy in prostodontics treatment.

CLINICAL SIGNIFICANCE: Digital technologies allow the design of occlusal surfaces of CAD-CAM fabricated prostheses using innovative approaches. This systematic review aimed to update the literature to help dentists determine the most appropriate digital method to register and design the occlusal surface of CAD-CAM crowns. (J Esthet Restor Dent 28:208-220, 2016).
BACKGROUND: Fluoride released from glass ionomer cements (GICs) is capable of preventing caries lesions. However, the preventive effect in margins of occlusal and occlusoproximal restorations have not been proved. The aim of this study was to evaluate the ability of GIC to prevent caries lesions in margins of occlusal and occlusoproximal restorations in primary teeth compared with that of other restorative materials.

TYPES OF STUDIES REVIEWED: The authors conducted a literature search in PubMed and MEDLINE to verify the clinical trials available on the outcome of caries lesions. The inclusion criteria were that the subject related to the scope of this systematic review, the study had a follow-up, and the study was not performed in specific groups. The authors performed all meta-analyses by considering the secondary caries rates for the restorations in clinical trials.

RESULTS: The search strategy identified 450 potentially relevant studies, and the authors included 8 of them in the review. The main reasons for exclusion were that the studies were not related to the scope of this systematic review or were not longitudinal trials. The secondary caries rate of the occlusal restorations was not different among the restorative materials (odds ratio, 1.2; 95% confidence interval, 0.5-3.1). For occlusoproximal analysis, GIC was associated significantly with better ability to prevent caries lesions (odds ratio, 1.7; 95% confidence interval, 1.2-2.5).

CONCLUSIONS AND PRACTICAL IMPLICATIONS: Because new caries lesions in the margins of restorations are the main reason for failure and replacement of restorations in primary teeth, it is important to know whether there is a benefit in using GICs in both occlusal and occlusoproximal cavities.
Practical application of composite resin techniques in the posterior dentition. [Review]


Abstract

Posterior direct resin restorations are the combination of appreciation of anatomy, form and art. We require an understanding of the ideal form and metrics to control occlusal forces whilst layering our composite resin in the most amenable fashion to enable a predictable and asymptomatic restoration which looks and functions much like that of the natural dentition. In this article, and his associated presentation at the British Dental Conference and Exhibition 2016, Dr Chandrapal will discuss the methodology and practical based tips required to form clinical success within the environment of limited time, thus avoiding unnecessary complexities.

Removal techniques for failed implants. [Review]


Abstract

The use of dental implants is an accepted and predictable way of replacing missing or lost teeth. However, implants can and will fail and there are a variety of reasons why this occurs, which the practitioner should understand. In some instances failed implants may require removal and, therefore, practitioners should be aware of techniques that can be used to remove failed implants to potentially enable future rehabilitation of an edentulous region.
This article describes the clinical technique for restoring Class II cavities using a sectional matrix.

Abstract

Purpose: To provide guidelines for patient recall regimen, professional maintenance regimen, and at-home maintenance regimen for patients with tooth-borne and implant-borne removable and fixed restorations.

Materials and Methods: The American College of Prosthodontists (ACP) convened a scientific panel of experts appointed by the ACP, American Dental Association (ADA), Academy of General Dentistry (AGD), and American Dental Hygienists Association (ADHA) who critically evaluated and debated recently published findings from two systematic reviews on this topic. The major outcomes and consequences considered during formulation of the clinical practice guidelines (CPGs) were risk for failure of tooth- and implant-borne restorations. The panel conducted a round table discussion of the proposed guidelines, which were debated in detail. Feedback was used to supplement and refine the proposed guidelines, and consensus was attained.

Results: A set of CPGs was developed for tooth-borne restorations and implant-borne restorations. Each CPG comprised (1) patient recall, (2) professional maintenance, and (3) at-home maintenance. For tooth-borne restorations, the professional maintenance and at-home maintenance CPGs were subdivided for removable and fixed restorations. For implant-borne restorations, the professional maintenance CPGs were subdivided for removable and fixed restorations and further divided into biological maintenance and mechanical maintenance for each type of restoration. The at-home maintenance CPGs were subdivided for removable and fixed restorations.

Conclusions: The clinical practice guidelines presented in this document were initially developed using the two systematic reviews. Additional guidelines were developed using expert opinion and consensus, which included discussion of the best clinical practices, clinical feasibility, and risk-benefit ratio to the patient. To the authors' knowledge, these are the first CPGs addressing patient recall regimen, professional maintenance regimen, and at-home maintenance regimen for patients with tooth-borne and implant-borne restorations. This document serves as a baseline with the expectation of future modifications when additional evidence becomes available.

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Title
Source
Abstract
This is the official guideline endorsed by the specialty associations involved in the care of head and neck cancer patients in the UK and provides recommendations on the pre-treatment oral and dental assessment, during and after treatment and oral rehabilitation. Restorative dentists are core members of the multidisciplinary team treating head and neck cancer patients, involved from the treatment planning phase through to long-term rehabilitation. Recommendations * Preventative oral care must be delivered to patients whose cancer treatment will affect the oral cavity, jaws, salivary glands and oral accessibility. (G) * Close working and communication between the surgeons, oncologists and restorative dental specialists is important in ensuring optimal oral health outcomes. (G) * Intensity-modulated radiotherapy has been shown to reduce long-term xerostomia and should be offered to all appropriate patients. (R) * If patients are deemed at risk of trismus they should be warned and its progressive and potentially irreversible nature explained. (G) * Where it is known that adjuvant radiotherapy will be given, extractions should take place at primary surgery to maximise the time for healing and minimise the number of surgical events for patients. (G) * Osseointegrated implants should be considered for all patients having resection for head and neck cancer. (G).
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Title
WITHDRAWN: Root canal posts for the restoration of root filled teeth. [Review][Update of Cochrane Database Syst Rev. 2007 Jan 24;(1):CD004623 Note: ; PMID: 17253516]
Source
Cochrane Database of Systematic Reviews. 11:CD004623, 2016 11 28.
Abstract
BACKGROUND: The foundation for the reconstruction of endodontically-treated teeth can be provided by a metal or a non-metal post and core system but no guidelines exist for choosing one or the other in particular clinical cases.
OBJECTIVES: To assess the effectiveness of different post and core systems for the restoration of endodontically-treated teeth. The primary objective of this review was to compare the clinical failure rates of the different types of posts.
SEARCH METHODS: We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (The Cochrane Library 2005, Issue 3), MEDLINE (from 1966 to September 2005), Scopus (from January 1985 to December 2004) and EMBASE (until December 2004). We looked through reference lists of articles and dental conference proceedings. We contacted researchers in the field and manufacturers.
SELECTION CRITERIA: Randomised or quasi-randomised clinical trials (RCTs) comparing failures on endodontically-treated permanent teeth with different types of post. The outcomes were loss of retention, post fracture and root fracture.
DATA COLLECTION AND ANALYSIS: Two review authors independently assessed the quality of trials and extracted data. Study authors were contacted for additional information.
MAIN RESULTS: Two trials involving 317 participants were included but only one of them, involving 200 participants, compared metal to non-metal posts. The other answered to the secondary objective. The risk of failure was greater with metal-cast posts
(9/98) compared to carbon fibre posts (0/97) (risk ratio (RR) = 0.05 (95% confidence interval (CI) 0.00 to 0.90)) but the study was at high risk of bias. Thus fewer failures occurred when using non-metal posts but the evidence is unreliable.

AUTHORS’ CONCLUSIONS: Our systematic review could not specify which type of post and core system should be used when two or three dentine walls remain. More RCTs are needed to confirm whether fibre-reinforced post and core systems are superior and to clarify the influence of the remaining tooth structure on the treatment outcome of the different post and core systems available. Well-defined inclusion criteria focusing on the number of dentine walls (two or three) should be used.

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Title
Dental implants in irradiated versus nonirradiated patients: A meta-analysis. [Review]
Source
Local Messages
*SOME ISSUES AVAILABLE IN BDA LIBRARY - PLEASE ASK, TO REQUEST THIS ARTICLE FROM THE LIBRARY GO TO:
Abstract
The purpose of the present meta-analysis was to test the null hypothesis of no difference in dental implant failure rates, postoperative infection, and marginal bone loss for patients being rehabilitated by dental implants and being previously irradiated in the head and neck region versus nonirradiated patients against the alternative hypothesis of a difference. The study suggests that irradiation negatively affects the survival of implants, as well as the difference in implant location (maxilla vs mandible), but there is no statistically significant difference in survival when implants are inserted before or after 12 months after radiotherapy. The study failed to support the effectiveness of hyperbaric oxygen therapy in irradiated patients. It was observed that there was a tendency of lower survival rates of implants inserted in the patients submitted to higher irradiation doses. The results should be interpreted with caution because of the presence of uncontrolled confounding factors in the included studies.

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Title
The all-on-four concept may be a viable treatment option for edentulous rehabilitation.
Comments
Comment on: Clin Implant Dent Relat Res. 2014 Dec;16(6):836-55 Note: ; PMID: 23560986
Source
Evidence-Based Dentistry. 17(2):56-7, 2016 06.
Abstract
Data sourcesMedline, the Cochrane Library, Google and hand-searches of systematic reviews and bibliographies from related journals in English and German up to August 2012. Study selectionThree reviewers independently searched for clinical trials that assessed the success rates of placing two anterior and two posterior tilted dental implants in humans either in the maxilla or mandible according to the all-on-four treatment concept. Inclusion limited studies with a minimum follow-up period of one
year. Data extraction and synthesis: The primary outcome measure was the failure rate of implants. The secondary outcomes were prosthesis failure and marginal bone loss/bone level changes assessed through radiological examination. Failure rate was used to calculate standard deviations (SDs) of implants, whereas the mean success rate was used for dental implants and prostheses. Evaluation and quality assessment of articles and data extraction were performed by three independent reviewers. These reviewers estimated risk of bias by assessing the trial quality using a criteria form focused on the trial design, specification of inclusion/exclusion criteria, performance of surgery, outcome measure provided, radiographic examination of marginal bone level change as well as its evaluation and completeness of follow-up. Outcome measures were based on weighted means using a variance components analysis. Results: Thirteen studies, including 4,804 dental implants (2,000 maxilla and 2,804 mandible) placed in 1,201 jaws met the inclusion criteria. Nine were prospective trials, three retrospective studies and one longitudinal trial. All studies except one were considered to be at high risk of bias. Seventy-four (37 axially, 37 tilted) dental implants failed, with most failures (74%) within the first 12 months. Fifty-seven out of 1,231 prostheses failed but were repairable. The major prosthetic complication was the fracture of the all-acrylic prostheses. At 36 months the mean cumulative survival rates for implants and prostheses were 99.0 +/- 1.0% (SD) and 99.9 +/- 0.3% (SD), respectively with an average bone loss of 1.3 +/- 0.4 mm (SD). There were no statistically significant differences in the clinical outcomes between maxillary versus mandibular arches and axially versus tilted placed implants. Conclusions: The available evidence shows a promising short-term prognosis for the all-on-four treatment concept. However, the evidence is limited by the quality of the available studies and the paucity of clinical trials of greater than five years.

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Authors: Schenkel AB; Peltz I; Veitz-Keeinan A.
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Title: Dental cavity liners for Class I and Class II resin-based composite restorations. [Review]
Source: Cochrane Database of Systematic Reviews. 10:CD010526, 2016 Oct 25.
Abstract: BACKGROUND: Resin-based composite (RBC) is currently accepted as a viable material for the restoration of caries for posterior permanent teeth requiring surgical treatment. Despite the fact that the thermal conductivity of the RBC restorative material closely approximates that of natural tooth structure, postoperative hypersensitivity is sometimes still an issue. Dental cavity liners have historically been used to protect the pulp from the toxic effects of some dental restorative materials and to prevent the pain of thermal conductivity by placing an insulating layer between restorative material and the remaining tooth structure.

OBJECTIVES: The objective of this review was to assess the effects of using dental cavity liners in the placement of Class I and Class II resin-based composite posterior restorations in permanent teeth in children and adults.

SEARCH METHODS: Cochrane Oral Health's Information Specialist searched the following databases: Cochrane Oral Health's Trials Register (to 25 May 2016), the Cochrane Central Register of Controlled Trials (CENTRAL; 2016, Issue 4) in the Cochrane Library (searched 25 May 2016), MEDLINE Ovid (1946 to 25 May 2016), Embase Ovid (1980 to 25 May 2016) and LILACS BIREME Virtual Health Library (Latin American and Caribbean Health Science Information database; 1982 to 25 May 2016). We searched ClinicalTrials.gov and the World Health Organization International Clinical Trials Registry Platform for ongoing trials. No restrictions were placed on the language or date of publication when searching the electronic databases.

SELECTION CRITERIA: We included randomized controlled trials assessing the effects of the use of liners under Class I and Class II posterior resin-based composite restorations in permanent teeth (in both adults and children). We included both parallel and split-mouth designs.

DATA COLLECTION AND ANALYSIS: We utilized standard methodological procedures prescribed by Cochrane for data collection and analysis. Two review authors screened the search results and assessed the eligibility of studies for inclusion against the review inclusion criteria. We conducted risk of bias assessments and data extraction independently and in duplicate. Where information was unclear we contacted study authors for clarification.

MAIN RESULTS: Eight studies, recruiting over 700 participants, compared the use of dental cavity liners to no liners for Class I and Class II resin-based composite restorations. Seven studies evaluated postoperative hypersensitivity measured by various methods. All studies were at unclear or high risk of bias. There was inconsistent evidence regarding postoperative hypersensitivity (either measured using cold response or patient-reported), with a benefit shown at some, but not all, time points (low-quality evidence). Four trials measured restoration longevity. Two of the studies were judged to be at high risk and two at unclear risk of bias. No difference in restoration failure rates were shown at one year follow-up, with no failures reported in either group for three of the four studies; the fourth study had a risk ratio (RR) 1.00 (95% confidence interval (CI) 0.07 to 15.00) (low-quality evidence).
Three studies evaluated restoration longevity at two years follow-up and, again, no failures were shown in either group. No adverse events were reported in any of the included studies.

AUTHORS’ CONCLUSIONS: There is inconsistent, low-quality evidence regarding the difference in postoperative hypersensitivity subsequent to placing a dental cavity liner under Class I and Class II posterior resin-based composite restorations in permanent posterior teeth in adults or children 15 years or older. Furthermore, no evidence was found to demonstrate a difference in the longevity of restorations placed with or without dental cavity liners.

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Title
Restorative approaches to treat dentin caries in preschool children: systematic review. [Review]
Source

MATERIALS AND METHODS:

DESIGN: A systematic search of the main electronic databases (Pubmed, Cochrane Collaboration, EMBASE) was conducted to identify peer reviewed papers published in English in the years 1947-2014. Search keywords and MeSH headings were “dental caries”, “primary dentition” and “dental restoration”. The inclusion criteria were clinical studies conducted in children under 6 years old, and reported findings on the longevity or failure of restorations in primary teeth. Retrieved papers were read by two reviewers independently to assess suitability for inclusion, and the final decision was made by consensus. The quality of the included studies was assessed and data were extracted for analysis.

RESULTS: The search identified 348 papers for screening. Among these, 218 papers did not satisfy the study inclusion criteria. Consequently, 130 full papers were retrieved and reviewed. Finally, 9 papers were included. Most of the trials were assessed as having high risk of bias. Five included studies that compared the success rates of restorations with different filling materials and liner materials. Two studies showed clinical advantages of using minimally invasive approaches in caries removal and cavity preparation. The other two trials showed low success rates of interim GI restorations done in a field setting, compared to the high caries arrest rates of silver diammine fluoride application.

CONCLUSION: Within the limitation of this systematic review, there is insufficient evidence to make recommendations regarding which material and technique is the most appropriate for restorative treatment in young children. Minimally invasive approaches are advantageous in operative caries management in primary teeth in preschool children. More well-designed randomised controlled trials are required to confirm these findings.

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Journal Article. Review.

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2016

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Authors
Agnihotry A; Fedorowicz Z; Nasser M.
BACKGROUND: Dental caries (tooth decay) is one of the commonest diseases which afflicts mankind, and has been estimated to affect up to 80% of people in high-income countries. Caries adversely affects and progressively destroys the tissues of the tooth, including the dental pulp (nerve), leaving teeth unsightly, weakened and with impaired function. The treatment of lesions of dental caries, which are progressing through dentine and have caused the formation of a cavity, involves the provision of dental restorations (fillings). This review updates the previous version published in 2009.

OBJECTIVES: To assess the effects of adhesive bonding on the in-service performance and longevity of dental amalgam restorations.

SEARCH METHODS: We searched the Cochrane Oral Health Group Trials Register (to 21 January 2016), the Cochrane Central Register of Controlled Trials (CENTRAL) (The Cochrane Library 2015, Issue 12), MEDLINE via Ovid (1946 to 21 January 2016) and EMBASE via Ovid (1980 to 21 January 2016). We also searched the US National Institutes of Health Trials Registry (http://clinicaltrials.gov) and the WHO International Clinical Trials Registry Platform (www.who.int/ictrp/search/en) (both to 21 January 2016) for ongoing trials. No restrictions were placed on the language or date of publication when searching the electronic databases.

SELECTION CRITERIA: Randomised controlled trials comparing adhesively bonded versus traditional non-bonded amalgam restorations in conventional preparations utilising deliberate retention, in adults with permanent molar and premolar teeth suitable for Class I and II amalgam restorations only.

DATA COLLECTION AND ANALYSIS: Two review authors independently screened papers, extracted trial details and assessed the risk of bias in the included study.

MAIN RESULTS: One trial with 31 patients who received 113 restorations was included. At two years, 50 out of 53 restorations in the non-bonded group survived, and 55 of 60 bonded restorations survived with five unaccounted for at follow-up. Post-insertion sensitivity was not significantly different (P > 0.05) at baseline or two-year follow-up. No fractures of tooth tissue were reported and there was no significant difference between the groups or matched pairs of restorations in their marginal adaptation (P > 0.05).

AUTHORS' CONCLUSIONS: There is no evidence to either claim or refute a difference in survival between bonded and non-bonded amalgam restorations. This review only found one under-reported trial. This trial did not find any significant difference in the in-service performance of moderately sized adhesively bonded amalgam restorations, in terms of their survival rate and marginal integrity, in comparison to non-bonded amalgam restorations over a two-year period. In view of the lack of evidence on the additional benefit of adhesively bonding amalgam in comparison to non-bonded amalgam, it is important that clinicians are mindful of the additional costs that may be incurred.

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Unique Identifier: 26939413
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Authors: Hamada Y; Shin D; John V.
Authors Full Name: Hamada, Yusuke; Shin, Daniel; John, Vanchit.
Title: Peri-Implant Disease--A Significant Complication of Dental Implant Supported Restorative Treatment. [Review]
Abstract: Over past several decades, oral rehabilitation of fully or partially edentulous patients with dental implants has become a routine procedure in daily practice. Dental implant supported and retained prosthesis can provide a wide variety of treatment options to patients due to their high predictability and survival rate. While many patients treated with dental implants have had high long term success, they are not completely free of complications. Proper patient selection, treatment planning, surgical and prosthodontic procedures, material selection and routine maintenance around the peri-implant tissues are keys to this long term success rate.
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Date Created: 20160304
The restoration of traumatized teeth. [Review]

Abstract

The restoration of a traumatized tooth may require minimally invasive or more extensive treatment options. The majority of injuries occur in the younger population, so management should consider the long-term outcome, failure and future treatment needs over the course of, often, many decades. The aim should be to provide a tooth-restoration complex that closely mimics the functional and aesthetic qualities of an intact tooth for as long as possible. This narrative review will assess the relevant literature pertinent to restoration of traumatized teeth in order to provide guidance for the practising clinician.

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SEARCH STRATEGY TO IDENTIFY DENTAL SURVIVAL ANALYSIS ARTICLES INDEXED IN MEDLINE.

Purpose: Articles reporting survival outcomes (time-to-event outcomes) in patients over time are challenging to identify in the literature. Research shows the words authors use to describe their dental survival analyses vary, and that all location of medical subject headings by MEDLINE indexers is inconsistent. Together, this undermines accurate article identification. The present study aims to develop and validate a search strategy to identify dental survival analyses indexed in MEDLINE (Ovid).

Materials and Methods: A gold standard cohort of articles was identified to derive the search terms, and an independent gold standard cohort of articles was identified to test and validate the proposed search strategies. The first cohort included all 6,955 articles published in the 50 dental journals with the highest impact factors in 2008, of which 95 articles were dental survival articles. The second cohort included all 6,514 articles published in the 50 dental journals with the highest impact factors for 2012, of which 148 were dental survival articles. Each cohort was identified by a systematic hand search. Performance parameters of sensitivity, precision, and number needed to read (NNR) for the search strategies were calculated.

Results: Sensitive, precise, and optimized search strategies were developed and validated. The performances of the search strategy maximizing sensitivity were 92% sensitivity, 14% precision, and 7.11 NNR; the performances of the strategy maximizing precision were 93% precision, 10% sensitivity, and 1.07 NNR; and the performances of the strategy optimizing the balance between sensitivity and precision were 83% sensitivity, 24% precision, and 4.13 NNR. The methods used to identify search terms were objective, not subjective. The search strategies were validated in an independent group of articles that included different journals and different publication years.

Conclusions: Across the three search strategies, dental survival articles can be identified with sensitivity up to 92%, precision up to 93%, and NNR of less than two articles to identify relevant records. This research has highlighted the impact that...
variation in reporting and indexing has on article identification and has improved researchers’ ability to identify dental survival articles.

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Journal Article.

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Webman, Mark; Mulki, Ezat; Roldan, Rosie; Arevalo, Oscar; Roberts, John F; Garcia-Godoy, Franklin.

Title
A Retrospective Study of the 3-Year Survival Rate of Resin-Modified Glass-Ionomer Cement Class II Restorations in Primary Molars.

Source

Abstract
OBJECTIVE: To determine the three-year survival rate of Class II resin-modified glass-ionomer cement (RMGIC), Vitremer, restorations in primary molars and to compare these results with measurements of survival of Class II restorations of standard restorative materials.

STUDY DESIGN: Data on Class II restorations placed in primary molars during a six-year period were collected through a chart review and radiographic evaluation in the office of a board-certified pediatric dentist. A radiograph showing that the restoration was intact was required at least 3 years after placement to qualify as successful. If no radiograph existed, the restoration was excluded. If the restoration was not found to be intact radiographically or was charted as having been replaced before three years it was recorded as a failure. The results of this study were then compared to other standard restorative materials using normalized annual failure rates.

RESULTS: Of the 1,231 Class II resinmodified glass-ionomer cement restorations placed over six years 427 met the inclusion criteria. There was a 97.42% survival rate for a 3-year period equivalent to an annual failure rate of 0.86%.

CONCLUSIONS: A novel approach comparing materials showed that in this study Vitremer compared very favorably to previously published success rates of other standard restorative materials (amalgam, composite, stainless steel crown, compomer) and other RMGIC studies.

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Comparative Study. Journal Article.

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Title
Effect of Industry Sponsorship on Dental Restorative Trials. [Review]

Source

Abstract
LOCAL MESSAGES
THIS JOURNAL IS AVAILABLE IN THE BDA LIBRARY, TO REQUEST THIS ARTICLE FROM THE LIBRARY GO TO:
Abstract

Industry sponsorship was found to potentially introduce bias into clinical trials. We assessed the effects of industry sponsorship on the design, comparator choice, and findings of randomized controlled trials on dental restorative materials. A systematic review was performed via MEDLINE, CENTRAL, and EMBASE. Randomized trials on dental restorative and adhesive materials published 2005 to 2015 were included. The design of sponsored and nonsponsored trials was compared statistically (risk of bias, treatment indication, setting, transferability, sample size). Comparator choice and network geometry of sponsored and nonsponsored trials were assessed via network analysis. Material performance rankings in different trial types were estimated via Bayesian network meta-analysis. Overall, 114 studies were included (15,321 restorations in 5,232 patients). We found 21 and 41 (18% and 36%) trials being clearly or possibly industry sponsored, respectively. Trial design of sponsored and nonsponsored trials did not significantly differ for most assessed items. Sponsored trials evaluated restorations of load-bearing cavities significantly more often than nonsponsored trials, had longer follow-up periods, and showed significantly increased risk of detection bias. Regardless of sponsorship status, comparisons were mainly performed within material classes. The proportion of trials comparing against gold standard restorative or adhesive materials did not differ between trial types. If ranked for performance according to the need to re-treat (best: least re-treatments), most material combinations were ranked similarly in sponsored and nonsponsored trials. The effect of industry sponsorship on dental restorative trials seems limited.

RESULTS: After search and evaluation of the literature according to the inclusion criteria, 34 studies involving 1,977 patients and 3,119 implants were included. Eighty-four out of 102 implant failures documented in the studies occurred within 1 year of functional loading. Statistically significant differences in the cumulative survival rates were found in the graft and nongraft groups (95.89% and 97.30%, respectively; P < .05). In the nongraft group, no statistically significant difference in the cumulative survival rate was found when implants were placed at RBH < 5 mm or > 5 mm (95.04% and 97.63%, respectively; P = .12). In the graft group, however, a statistically significant difference was found when implants were placed at RBH < 5 mm or > 5 mm (92.19% and 97.59%, respectively; P < .01). Significantly lower weighted mean cumulative implant survival rates were found in the shorter (< 8 mm) implant group than in the longer (> = 8 mm) implant group (83.33% and 96.28%, respectively; P < .01).

CONCLUSION: The cumulative survival rates were significantly higher in the nongraft group than in the graft group. Early failures (< 1 year functional loading) accounted for the vast majority of the implant failures. The cumulative survival rates in the graft group were significantly lower when the RBH was < 5 mm, while the cumulative survival rates in the nongraft group demonstrated no statistically significant difference based on RBH. Shorter (< 8 mm) implants demonstrated significantly lower cumulative survival rates than longer implants.
Feasibility of Dental Implant Replacement in Failed Sites: A Systematic Review. [Review]

**Purpose:** To assess the clinical outcomes of replaced implants after removal of failed ones. In addition, associated risk factors that might affect the final outcome of these procedures were also explored.

**Materials and Methods:** An electronic literature search was conducted by two reviewers in several databases for articles written in English up to November 2014. Human clinical trials with a minimum of 10 subjects enrolled that reported clinical outcomes with a mean follow-up period of at least 12 months after implant replacement were included. Implant survival and nonmodifiable/modifiable factors at second and third implant placement attempts were studied. Hence, the PICO question that was aimed to be addressed was: Do patients undergoing implant replacement (second and third attempts) in previous failed sites have comparable clinical outcomes by means of implant survival/failure rate to implants placed at the first attempt?

**Results:** Five retrospective clinical cohort studies and two case series satisfied the selection criteria and thus were included in this review. In total, 396 patients were studied due to implant replacement in previous failed sites. The survival rate for implant replacement at the second attempt was 88.84% (390/439; range, 71% to 94.6%) with a mean follow-up of 41.59 +/- 16.77 months. Thirty-one implants were replaced for a third attempt with a mean survival rate of 74.19% (23/31) at the follow-up of 29.66 +/- 14.71 months. Major risk indicators were generally divided into patient-related factors (health status, smoking habits, and oral hygiene maintenance), implant characteristics (dimensions, coating, and loading), and site characteristics (bone quality and density, vertical and horizontal dimensions, soft tissue around the implant).

**Conclusion:** Implant replacement is a reasonably feasible option for scenarios of early and late implant failure. However, modifiable risk factors must be controlled before proceeding for implant replacement.

**Rehabilitation of severely worn teeth: A systematic review. [Review]**

**Objectives:** The aim of this systematic review was to evaluate the treatment performance/longevity of dental materials/techniques indicated to restore teeth with severe wear.
MATERIALS AND METHODS: A systematic literature search was conducted to select retrospective studies (cohort and case series) and prospective studies that evaluated or compared techniques/materials to restore teeth with severe wear. A search was conducted in Medline (via Pubmed - June 2015) with no limits for publication year or language to identify clinical studies. Two reviewers independently selected studies, extracted data and assessed the risk of bias of randomized controlled trials included. The annual failure rate (AFR%) of restorations was calculated for each study.

RESULTS: A total of 511 articles were found and 23 studies were eligible for full-text analysis; hand search included 7 more papers. From the 30 studies, 12 were eligible for the review. Most of these studies presented good performance of the restorations in teeth with severe wear. AFR ranged from 0.4% (microhybrid) to 26.3% (microfilled) for direct resin composite, 0% to 14.9% for indirect resin composite and 2.7% for porcelain veneers.

CONCLUSION: There is no strong evidence to suggest that any material is better than another. Direct or indirect materials may be feasible options to restore severely worn teeth.
Clinical practice guidelines for recall and maintenance of patients with tooth-borne and implant-borne dental restorations.

Abstract

The purpose of this article is to provide guidelines for patient recall regimen, professional maintenance regimen, and at-home maintenance regimen for patients with tooth-borne and implant-borne removable and fixed restorations. The American College of Prosthodontists (ACP), American Dental Association, Academy of General Dentistry, and American Dental Hygienists Association, who critically evaluated and debated recently published findings from 2 systematic reviews on this topic. The major outcomes and consequences considered during formulation of the clinical practice guidelines (CPGs) were risk for failure of tooth- and implant-borne restorations. The panel conducted a roundtable discussion of the proposed guidelines, which were debated in detail. Feedback was used to supplement and refine the proposed guidelines, and consensus was attained. A set of CPGs was developed for tooth-borne restorations and implant-borne restorations. Each CPG comprised (1) patient recall, (2) professional maintenance, and (3) at-home maintenance. For tooth-borne restorations, the professional maintenance and at-home maintenance CPGs were subdivided for removable and fixed restorations. For implant-borne restorations, the professional maintenance CPGs were subdivided for removable and fixed restorations and further divided into biological maintenance and mechanical maintenance for each type of restoration. The at-home maintenance CPGs were subdivided for removable and fixed restorations. The clinical practice guidelines presented in this document were initially developed using the 2 systematic reviews. Additional guidelines were developed using expert opinion and consensus, which included discussion of the best clinical practices, clinical feasibility, and risk-benefit ratio to the patient. To the authors’ knowledge, these are the first CPGs addressing patient recall regimen, professional maintenance regimen, and at-home maintenance regimen for patients with tooth-borne and implant-borne restorations. This document serves as a baseline with the expectation of future modifications when additional evidence becomes available.

The use of composite restorations for patients with tooth wear is considered as a more conservative treatment option. The aim of this study was to systematically review the literature investigating the survival rates of anterior composite restorations when used in managing tooth wear in patients. PubMed and MEDLINE (Ovid) databases were screened for studies from 1995 to 2015. Cross-referencing was used to further identify articles. Article selection and data extraction were performed in duplication. Languages were restricted to English. A quality appraisal of included studies was carried out using the Strength of Recommendation Taxonomy system. Six hundred and sixty-six articles were initially identified from which eight articles were full-text reviewed. Six articles involving five studies were selected for inclusion. Three studies were prospective and two retrospective. Included studies involved placement of 772 direct and indirect anterior composite restorations in 100 patients with follow-up periods between 5 months and 10 years. The survival rates of anterior composites were >90% and 50% at 2.5 and 5 years, respectively. Posterior occlusion was re-established in 91% of patients within 18 months. Meta-analysis could not be performed due to the heterogeneity of included studies. The systematic review’s overall strength of recommendation was graded B. There is evidence to support the use of anterior composite restorations at an increased vertical dimension of occlusion in the short/medium-term management of tooth wear. Long-term reporting of outcomes remains limited. Further research is needed with standardised study design, detailed reporting of outcomes and long-term review.
The purpose of this review was to test the null hypothesis of no difference in marginal bone loss and implant failure rates between smokers and non-smokers with respect to the follow-up period. An extensive electronic search was performed in PubMed, Web of Science, and the Cochrane Central Register of Controlled Trials to identify relevant articles published up to February 2015. The eligibility criteria included randomized and non-randomized clinical studies. After an exhaustive selection process, 15 articles were included. The meta-analysis was expressed in terms of the odds ratio (OR) or standardized mean difference (SMD) with a confidence interval (CI) of 95%. There was a statistically significant difference in marginal bone loss favouring the non-smoking group (SMD 0.49, 95% CI 0.07-0.90; P=0.02). An independent analysis revealed an increase in marginal bone loss in the maxilla of smokers, compared to the mandible (SMD 0.40, 95% CI 0.24-0.55; P<0.00001). A statistically significant difference in implant failure in favour of the non-smoking group was also observed (OR 1.96, 95% CI 1.68-2.30; P<0.00001). However, the subgroup analysis for follow-up time revealed no significant increase in implant failure proportional to the increase in follow-up time (P=0.26).