BDA LIBRARY MEDLINE SEARCH

RECENT REVIEWS RELATED TO RESTORATIVE DENTISTRY

Database: Ovid MEDLINE(R) Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Ovid MEDLINE(R) Daily, Ovid MEDLINE and Versions(R)
Search Strategy:

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1 exp "Dental Restoration, Permanent/" (14570)
2 exp "Dentistry, Operative/" (20176)
3 (restorative or restoration$ or operative).ti. (62749)
4 limit 3 to dentistry journals (14371)
5 1 or 2 or 4 (27450)
6 limit 5 to english language (21812)
7 limit 6 to ("review" or systematic reviews) (1844)
8 review.ti. and 6 (551)
9 7 or 8 (1919)
10 exp animals/ not humans/ (4445100)
11 9 not 10 (1902)
12 limit 11 to yr="2016 -Current" (72)
13 remove duplicates from 12 (65)

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<1>
Unique Identifier
28319206
VI 1
Status
MEDLINE
Authors
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Title
Bone Quality and Quantity and Dental Implant Failure: A Systematic Review and Meta-analysis. [Review]
Source
Local Messages
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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.
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2017

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28376962
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Status
MEDLINE
Authors
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Title
Acid Erosion: An Increasingly Relevant Dental Problem. Risk Factors, Management and Restoration. [Review]
Abstract
A review of risk factors and management of acid erosion. Particular emphasis is placed on the use of direct composite as a reversible and relatively straightforward restorative option.

Publication Type
Journal Article. Review.

Year of Publication
2017

Unique Identifier
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Title
Abrasion: A Common Dental Problem Revisited. [Review]

Source

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.

Publication Type
Journal Article. Review.

Year of Publication
2017

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28267829

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

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
RECENT REVIEWS RELATED TO RESTORATIVE DENTISTRY

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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28318391
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Title
Models of Caries Formation around Dental Composite Restorations. [Review]
Source

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

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Title
From restoration to regeneration: periodontal aging and opportunities for therapeutic intervention. [Review]
Source

Abstract
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 and this, in turn, has a dramatic effect on tissue homeostasis and 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 homeostasis and healing back to the levels we appreciated when we were young.
**Recent Reviews Related to Restorative Dentistry**

In-Process
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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
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.

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**Recent Reviews Related to Restorative Dentistry**

In-Process
Authors
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Title
Survival of all-ceramic restorations after a minimum follow-up of five years: A systematic review.
Source
Abstract
**OBJECTIVE:** The purpose of this systematic review was to compare the survival and complication rates of all-ceramic restorations after a minimum follow-up time of 5 years.
RESULTS: Twenty-nine studies were selected for the final analysis from an initial yield of 514. Only four studies fulfilled the requirement of having a randomized design, and 25 studies were prospective with a mean follow-up period of 5 to 16 years. Overall, the 5-year complication rates were low. The most frequent complications were secondary caries, endodontic problems, ceramic fractures, ceramic chipping, and loss of retention.

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 many 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.
**Failure rates of class V restorations in the management of root caries in adults - a systematic review.**

**Title**
Failure rates of class V restorations in the management of root caries in adults - a systematic review. [Review]

**Source**

**Abstract**
OBJECTIVE: The aim of this systematic review was to compare cumulative failure rates of different restorative materials in carious class V lesions on the root surfaces of adult patients.

BACKGROUND: The prevalence of root caries is set to increase in the coming years as a result of ageing of the population and a concomitant reduction in levels of edentulousness. Evidence is needed to assist practitioners to select the most appropriate restorative material for use in these lesions.

METHODS: A search of the literature was undertaken using the electronic databases of PubMed, Embase, CENTRAL and OpenSIGLE using keywords relevant to the search question. Two review authors conducted the electronic search independently, and any conflict was resolved by discussion. The references quoted in the full text articles extracted were hand searched for any further eligible studies.

RESULTS: Sixty non-duplicate citations were screened. Following review of the titles, abstracts, texts and application of the predetermined inclusion/exclusion criteria, five studies remained.

CONCLUSION: There is a need for more research in this area as many of the studies identified in this systematic review treated post-radiation, xerostomic patients which are not typical of the general population. Increased adherence to CONSORT guidelines for reporting is also advised to facilitate future systematic review and meta-analysis in this area.

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OBJECTIVE: To evaluate the long-term clinical performance of direct versus indirect composite inlays/onlays in posterior teeth.

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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Endocrown restorations: A systematic review and meta-analysis. [Review]

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.

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, 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.
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.
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-borne 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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### 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).

### 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 dental 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.
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 forethought of creating clinical practice guidelines for recall and maintenance of patients with implant-borne dental restorations.
Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement. The meta-analysis was based on the Mantel-Haenszel and inverse variance methods. Marginal bone loss was the continuous outcome measure evaluated by mean difference (MD), and implant survival and prosthetic complications were the dichotomous outcome measures evaluated by risk ratio (RR), both with corresponding 95% confidence intervals (CI).

RESULTS: The 20 studies selected for review evaluated 2139 participants, whose mean age was 47.14 years and who had received 8989 dental implants. The mean follow-up was 65.4 months (range: 12-180 months). Results of the MD for marginal bone loss showed statistically significant differences in favor of the cement-retained prosthesis (P = .04; MD: -0.19; CI: -0.37 to -0.01). The implant survival rate was higher for the cement-retained prosthesis (P = .01; RR: 0.49; CI: 0.28 to 0.85), and the prosthetic complication rate was higher for the screw-retained prosthesis (P = .04; RR: 0.52; CI: 0.28 to 0.98). Additional analysis of the mean plaque index did not show differences between retention systems (P = .58; MD: 0.13; CI: -0.32 to 0.57).

CONCLUSIONS: The current meta-analysis indicated that cement-retained, fixed implant-supported restorations showed less marginal bone loss than screw-retained, fixed implant-supported restorations during the follow-up period, which ranged from 12 to 180 months. However, the small difference between the mean values may not show clinical significance. The rates of prosthetic complication and implant survival also compared favorably with cement-retained prostheses.
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 lithium disilicate (LD) crowns and fixed dental prostheses (FDPs) to elucidate study designs and testing parameters.

RESULTS: The initial search retrieved 1044 eligible studies. After deduplication, 864 records were examined by titles and the 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.

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Caries lesion prevention and arrestment in approximal surfaces in contact with glass ionomer cement restorations - A systematic review and meta-analysis.
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.
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]

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).
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RECENT REVIEWS RELATED TO RESTORATIVE DENTISTRY

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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Title What is the impact of bisphosphonate therapy upon dental implant survival? A systematic review and meta-analysis. [Review]
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Abstract OBJECTIVE: A systematic review and meta-analysis are carried out to assess the scientific evidence that bisphosphonate therapy can decrease the success rate of dental implants.

MATERIAL AND METHODS: The PubMed (Medline) database was used to search for articles published up until February 22, 2014. The meta-analysis was conducted based on the Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA). The Newcastle-Ottawa scale (NOS) was used to assess study quality.

RESULTS: The combinations of search terms resulted in a list of 256 titles. Fourteen finally met the inclusion criteria and were thus selected for inclusion in the systematic review. Eight studies (six retrospective and two prospective) were included in the meta-analysis, with a total of 1288 patients (386 cases and 902 controls) and 4562 dental implants (1090 dental implants in cases and 3472 in controls). The summary odds ratio (OR = 1.43, P = 0.156) indicates that there is not enough evidence that bisphosphonates have a negative impact upon implant survival. According to the number need to harm (NNH), over 500 dental implants are required in patients receiving bisphosphonate treatment to produce a single implant failure.

CONCLUSION: Our results show that dental implant placement in patients receiving bisphosphonates does not reduce the dental implant success rate. On the other hand, such patients are not without complications, and risk evaluation therefore must be established on an individualized basis, as one of the most serious though infrequent complications of bisphosphonate therapy is bisphosphonate-related osteonecrosis of the jaws. Given the few studies included in our meta-analysis, further prospective studies involving larger sample sizes and longer durations of follow-up are required to confirm the results obtained.

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Annibali, Susanna; Pranno, Nicola; Cristalli, Maria Paola; La Monaca, Gerardo; Polimeni, Antonella.

**Title**
Survival Analysis of Implant in Patients With Diabetes Mellitus: A Systematic Review. [Review]

**Source**

**Abstract**
AIM: To determine the survival trend of dental implants after functional loading for >=1 year in diabetic patients.

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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Bidra, Avinash S; Daubert, Diane M; Garcia, Lily T; Kosinski, Timothy F; Nenn, Conrad A; Olsen, John A; Platt, Jeffrey A; Wingrove, Susan S; Chandler, Donald A.

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

**Source**

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

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. For tooth-borne restorations, the professional 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.

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.

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Failures were related to fractures/chipping (4%), followed by endodontic complications (3%), secondary caries (1%), debonding.

Estimated survival rates for glass ceramic material (feldspathic porcelain vs. glass ceramics) were between 92% and 95% at 5 y. Of 1,389 articles, 14 met the inclusion criteria.

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.

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 = 3151 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.
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.
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.

OBJECTIVES: This paper investigates the structure and some properties of resin infiltrated ceramic network structure materials suitable for CAD/CAM dental restorative applications.
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.

CONCLUSIONS: Within the limitations of the present study, cantilever RBFDPs demonstrate lower clinical failure than two-retainer RBFDPs in the anterior region. The failure of metal-ceramic RBFDPs is independent of the framework design, while the failure of all-ceramic RBFDPs 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 RBFDPs.
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RECENT REVIEWS RELATED TO RESTORATIVE DENTISTRY

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Abstract
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.

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Title
Survival of Implants Using the Osteotome Technique With or Without Grafting in the Posterior Maxilla: A Systematic Review.
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Abstract
PURPOSE: The aim of this review was to systematically appraise survival rates of implants using the osteotome technique with and without grafting in the published literature.

MATERIALS AND METHODS: An electronic search was conducted to identify prospective and retrospective studies on osteotome sinus floor elevation published between January 1, 2000 and October 30, 2015. Studies were included that (1) involved
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.
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).

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.
PURPOSE: 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 indexes 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 0.05 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.
Do glass ionomer cements prevent caries lesions in margins of restorations in primary teeth?: A systematic review and meta-analysis. [Review]

Source

Abstract
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.

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 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.
months, he had regained full strength at his upper extremity and a painless and full range of motion of his cervical spine. Pyogenic cervical facet joint infection is very rare and potentially dangerous. A high clinical suspicion and appropriate imaging, including magnetic resonance imaging, are important for correct diagnosis. Prompt medical and surgical treatment may avert complications, and although the patient presented made a complete recovery, patients may be left with neurological compromise.

**Publication Type**
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**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.
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) convened a scientific panel of experts appointed by the 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.

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 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.

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.
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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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).

**Recent Reviews Related to Restorative Dentistry**

**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.
RECENT REVIEWS RELATED TO RESTORATIVE DENTISTRY

Albrektsson, Tomas. Department of Biomaterials, Goteborg University, Goteborg, Sweden. Wennerberg, Ann. Department of Prosthodontics, Faculty of Odontology, Malmo University, Malmo, Sweden.

Title
Dental implants in irradiated versus nonirradiated patients: A meta-analysis. [Review]

Source

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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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Publication Type

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 synthesisThe 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. ResultsThirteen 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 1,201 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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Abstract
The all-on-four concept may be a viable treatment option for edentulous rehabilitation.

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Publication Type

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 synthesisThe 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. ResultsThirteen 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 1,201 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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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 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

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Abstract
AIM: Dental restorations have long been used for the management of early childhood caries, but there is a need to have an evidence based approach when selecting the most appropriate restorative intervention to treat dentin caries in preschool children. This systematic review aimed to assess the effectiveness of restorative treatments of dentin caries in primary teeth in preschool children.

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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RECENT REVIEWS RELATED TO RESTORATIVE DENTISTRY

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 with non-bonded amalgam, it is important that clinicians are mindful of the additional costs that may be incurred.
It is well known that the service life of contemporary composite restoration is unsatisfactory, and longevity of dentin bonding is one of the major culprits. Bonding is essentially a hybridization process in which dental substrate and adhesive resin interact with each other through an exchange process. Thus, the longevity of dentin bonding can only be improved with enhanced qualities in substrate, adhesive resin, and their interaction within the hybridization zone. This review aims to collect and summarize recent advances in utilizing nonthermal atmospheric plasmas (NTAPs) - a novel technology that delivers highly reactive species in a gaseous medium at or below physiologic temperature to improve the durability of dentin bonding by addressing these 3 issues simultaneously. Overall, NTAP has demonstrated efficacies in improving a number of critical properties for dentin bonding, including deactivation of oral pathogens, modification of surface chemistry/properties, resin polymerization, improvement in adhesive-dentin interactions, and establishment of auxiliary bonding mechanism. While a few preliminary studies have indicated the benefit of NTAP to bond strength and stability, additional researches are warranted to employ knowledge acquired so far and to evaluate these properties in a systematic way.
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.
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. A quality appraisal of included studies was carried out using the Strength of Recommendation Taxonomy system. Six hundred and sixty-two direct and indirect anterior composite restorations in 53,232 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.

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.

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Title
Success of dental implants in smokers and non-smokers: a systematic review and meta-analysis. [Review]

Comments
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Abstract
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).

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