Agency for Healthcare Research and Quality
Advancing Excellence in Health Care

NATIONAL GUIDELINE CLEARINGHOUSE

General

Guideline Title

Clinical practice guidelines for recall and maintenance of patients with tooth-borne and implant-borne dental restorations.

Bibliographic Source(s)

Bidra AS, Daubert DM, Garcia LT, Kosinski TF, Nenn CA, Olsen JA, Platt JA, Wingrove SS, Chandler ND, Curtis DA. Clinical practice guidelines for recall and maintenance of patients with tooth-borne and implant-borne dental restorations. J Prosthodont. 2016 Jan;25(Suppl 1):S32-40. [54 references] PubMed

Guideline Status

This is the current release of the guideline.

This guideline meets NGC's 2013 (revised) inclusion criteria.

Recommendations

Major Recommendations

Category of evidence (Ia, Ib, IIa, IIb, III, and IV) and strength of recommendation (A-D) are defined at the end of the "Major Recommendations" field.

Clinical Practice Guidelines for Recall and Maintenance of Patients with Tooth-Borne Dental Restorations

Patient Recall

Patients with tooth-borne restorations (fixed or removable) should be advised to obtain a dental professional examination at least every 6 months as a lifelong regimen. (Strength of recommendation: D)

Patients categorized by the dentist as higher risk based on age, ability to perform oral self care, biological or mechanical complications of natural teeth or tooth-borne restorations should be advised to obtain a dental professional examination more often than every 6 months, depending upon the clinical situation. (Strength of recommendation: D)

Professional Maintenance

Tooth-Borne Removable Restorations (Partial Removable Dental Prostheses)

Professional maintenance for patients with tooth-borne removable restorations should include an extraoral and intraoral health and dental examination, oral hygiene instructions for existing natural teeth and any restorations, oral hygiene intervention (cleaning of natural teeth and restorations), and use of oral topical agents as deemed clinically necessary. (Strengths of recommendation: A, C, D)

Professional maintenance of the partial removable dental prostheses should include hygiene instructions, detailed examination of the prosthesis, prosthetic components and patient education about any foreseeable problems that could impair optimal function with the restoration. The partial removable dental prosthesis should be professionally cleaned extraorally using professionally accepted mechanical and chemical methods. (Strength of recommendation: D)

Professionals should recommend and/or prescribe appropriate oral topical agents and oral hygiene aids suitable for the patient's at-home maintenance needs. (Strength of recommendation: D)

Tooth-Borne Fixed Restorations (Intracoronal Restorations, Extracoronal Restorations, Veneers, Single Crowns, and Partial Fixed Dental Prostheses)

Professional maintenance for patients with tooth-borne fixed restorations should include an extraoral and intraoral health and dental examination, oral hygiene instructions for natural teeth and the fixed restorations, oral hygiene intervention (cleaning of natural teeth and restorations), and use of oral topical agents as deemed clinically necessary. (Strengths of recommendation: A, C, D)

Professionals should recommend and/or prescribe appropriate oral topical agents and oral hygiene aids suitable for the patient's at-home maintenance needs. (Strength of recommendation: D)

When clinical signs indicate the need for an occlusal device, professionals should educate the patient and fabricate an occlusal device to protect the tooth-borne fixed restorations. (Strength of recommendation: D)

Professional maintenance of the occlusal device should include hygiene instructions, detailed examination of the occlusal device, and patient education about any foreseeable problems that could impair optimal function with the occlusal device. The occlusal device should be professionally cleaned extraorally, using professionally accepted mechanical and chemical methods. (Strength of recommendation: D)

At-Home Maintenance

Tooth-Borne Removable Restorations (Partial Removable Dental Prostheses)

Patients with tooth-borne removable restorations should be educated about brushing existing natural teeth and restorations twice daily, and the use of oral hygiene aids such as dental floss, water flossers, air flossers, interdental cleaners, and electric toothbrushes. (Strengths of recommendation: C, D)

Patients with tooth-borne removable restorations should be educated about cleaning their prosthesis at least twice daily using a soft brush and the professional recommended denture-cleaning agent. (Strength of recommendation: D)

Patients with multiple and complex restorations on existing teeth supporting or surrounding the removable restoration should be advised to use oral topical agents such as toothpaste containing 5000 ppm fluoride or toothpaste with 0.3% triclosan, and to add supplemental short-term use of chlorhexidine gluconate when indicated. (Strengths of recommendation: A, C, D)

Patients with tooth-borne removable restorations should be advised to remove the restoration while sleeping. The removed prosthesis should be stored in a prescribed cleaning solution.

Tooth-Borne Fixed Restorations (Intracoronal Restorations, Extracoronal Restorations, Veneers, Single Crowns, and Partial Fixed Dental Prostheses)

Patients with tooth-borne fixed restorations should be educated about brushing twice daily and the use of oral hygiene aids such as dental floss, water flossers, air flossers, interdental cleaners, and electric toothbrushes. (Strengths of recommendation: A, D)

Patients with multiple and complex restorations on existing teeth should be advised to use oral topical agents such as toothpaste containing 5000 ppm fluoride or toothpaste with 0.3% triclosan, and to add supplemental short-term use of chlorhexidine gluconate when indicated. (Strengths of recommendation: A, C, D)

Patients prescribed with occlusal devices should be educated to wear the occlusal device during sleep. (Strength of recommendation: D)

Patients prescribed with occlusal devices should be educated about cleaning their occlusal device before and after use, with a soft brush and the prescribed cleaning agent. Patients should also be educated about proper methods for storage of the occlusal device when not in use.

Clinical Practice Guidelines for Recall and Maintenance of Patients with Implant-Borne Dental Restorations

Patient Recall

Patients with implant-borne restorations (fixed or removable) should be advised to obtain a dental professional examination visit at least every 6 months as a lifelong regimen. (Strength of recommendation: D)

Patients categorized by the dentist as higher risk based on age, ability to perform oral self care, biological or mechanical complications of remaining natural teeth, tooth-borne restorations or implant-borne restorations should be advised to obtain a dental professional examination more often than every 6 months, depending upon the clinical situation. (Strength of recommendation: D)

Professional Maintenance (Biological)

Implant-Borne Removable Restorations (Implant-Supported Partial Removable Dental Prostheses and Implant-Supported Overdenture Prostheses)

Professional biological maintenance for patients with implant-borne removable restorations should include an extraoral and intraoral health and dental examination, oral hygiene instructions, hygiene instructions for the prostheses and oral hygiene intervention (cleaning of any natural teeth, tooth-borne restorations, implant-borne restorations, or implant abutments). (Strengths of recommendation: A, C, D)

Professionals should use chlorhexidine gluconate as the oral topical agent of choice when antimicrobial effect is needed clinically. (Strengths of recommendation: A, C)

Professionals should use cleaning instruments compatible with the type and material of the implants, abutments and restorations, and powered instruments such as the glycine powder air polishing system. (Strengths of recommendation: A, C, D)

Implant-supported partial removable dental prostheses and implant-supported overdenture prostheses should be professionally cleaned extraorally using professionally accepted mechanical and chemical cleaning methods. (Strength of recommendation: D)

Professionals should recommend and/or prescribe appropriate oral topical agents and oral hygiene aids suitable for the patient's at-home maintenance needs. (Strengths of recommendation: A, C, D)

Professional Maintenance (Mechanical)

Implant-Borne Removable Restorations (Implant-Supported Partial Removable Dental Prostheses and Implant-Supported Overdenture Prostheses)

Professional mechanical maintenance for patients with implant-borne removable restorations should include a detailed examination of the prosthesis, intra- and extraoral prosthetic components, and patient education of foreseeable problems that could impair optimal function of the restoration. (Strengths of recommendation: C, D)

Professionals should recommend and perform adjustment, repair, replacement, or remake of any or all parts of the prosthesis and prosthetic components that could compromise function. (Strengths of recommendation: C, D)

Professional Maintenance (Biological)

Implant-Borne Fixed Restorations (Implant-Supported Single Crowns, Partial Fixed Dental Prostheses and Implant-Supported Complete Arch Fixed Prostheses)

Professional biological maintenance for patients with implant-borne fixed restorations should include an extraoral and intraoral health and dental examination, oral hygiene instructions, and oral hygiene intervention (cleaning of any natural teeth, tooth-borne restorations, implant-borne restorations, or implant abutments). (Strengths of recommendation: A, C, D)

Professionals should use chlorhexidine gluconate as the oral topical agent of choice when antimicrobial effect is needed clinically. (Strengths of recommendation: A, C)

Professionals should use cleaning instruments compatible with the type and material of the implants, abutments, and restorations, and powered instruments such as the glycine powder air polishing system. (Strengths of recommendation: A, C, D)

In patients with implant-supported fixed prostheses, the decision to remove the prosthesis for biological maintenance should be based on the patient's demonstrated inability to perform adequate oral hygiene. The prosthesis contours should be reassessed to facilitate at-home maintenance. (Strength of recommendation: D)

Professionals should consider using new prosthetic screws when an implant-borne restoration is removed and replaced for professional biological maintenance. (Strength of recommendation: D)

Professional Maintenance (Mechanical)

Implant-Borne Fixed Restorations (Implant-Supported Single Crowns, Partial Fixed Dental Prostheses and Implant-Supported Complete Arch Fixed Prostheses)

Professional mechanical maintenance for patients with implant-borne fixed restorations should include a detailed examination of the prosthesis, prosthetic components, and patient education about any foreseeable problems that could compromise function. (Strengths of recommendation: C, D)

Professionals should recommend and perform adjustment, repair, replacement, or remake of any or all parts of the prosthesis and prosthetic components that could impair patient's optimal function. (Strengths of recommendation: C, D)

Professionals should consider using new prosthetic screws when an implant-borne restoration is removed and replaced for professional mechanical maintenance. (Strength of recommendation: D)

When clinical signs indicate the need for an occlusal device, professionals should educate the patient and fabricate an occlusal device to protect implant-borne fixed restorations. (Strength of recommendation: D)

Professional maintenance of the occlusal device should include hygiene instructions, detailed examination of the occlusal device, and patient education about any foreseeable problems that could impair optimal function with the occlusal device. The occlusal device should be professionally cleaned extraorally using professionally accepted mechanical and chemical methods. (Strength of recommendation: D)

Patients with multiple and complex restorations on existing teeth should be advised to use oral topical agents such as toothpaste containing 5000 ppm fluoride or toothpaste with 0.3% triclosan, and to add supplemental short-term use of chlorhexidine gluconate when indicated. (Strengths of recommendation: A, C, D)

Patients prescribed with occlusal devices should be educated to wear the occlusal device during sleep. (Strength of recommendation: D)

At-Home Maintenance

Implant-Borne Removable Restorations (Implant-Supported Partial Removable Dental Prostheses and Implant-Supported Overdenture Prostheses)

Patients with implant-supported partial removable dental prostheses should be educated about brushing existing natural teeth and restorations twice daily, and the use of oral hygiene aids such as dental floss, water flossers, air flossers, interdental cleaners, and electric toothbrushes. (Strengths of recommendation: C, D)

Patients with implant-borne removable restorations should be advised to clean their intraoral implant components at least twice daily, using a soft brush and the professionally recommended oral topical agent. (Strength of recommendation: D)

Patients with implant-borne removable restorations should be advised to clean their prosthesis at least twice daily using a soft brush with a professional recommended denture-cleaning agent. (Strength of recommendation: D)

Patients with implant-borne partial or complete removable restorations should be advised to remove the restoration while sleeping. The removed prosthesis should be stored in a prescribed cleaning solution. (Strength of recommendation: D)

Implant-Borne Fixed Restorations (Implant-Supported Single Crowns, Partial Fixed Dental Prostheses and Implant-Supported Complete Arch Fixed Prostheses)

Patients with implant-borne fixed restorations should be educated about brushing twice daily and the use of oral hygiene aids such as dental floss, water flossers, air flossers, interdental cleaners and electric toothbrushes. (Strengths of recommendation: C, D)

Patients with multiple and complex implant-borne fixed restorations should be advised to use oral topical agents such as toothpaste containing 0.3% triclosan and to add supplemental short-term use of chlorhexidine gluconate when indicated. (Strengths of recommendation: A, C, D)

Patients prescribed with occlusal devices should be educated to wear the occlusal device during sleep. (Strength of recommendation: D)

Patients prescribed with occlusal devices should be educated about cleaning their occlusal device before and after use, with a soft brush and the prescribed cleaning agent. Patients should also be educated about proper methods for storage of the occlusal device when not in use. (Strength of recommendation: D)

<u>Definitions</u>

Levels and Category of Evidence*

Level	Category of Evidence
Ia	Evidence from systematic review of randomized controlled trials
Ib	Evidence from at least one randomized controlled trial
IIa	Evidence from at least one controlled study without randomization
IIb	Evidence from at least one other type of quasi-experimental study, such as time series analysis or studies in which the unit of analysis is not the individual
III	Evidence from non-experimental descriptive studies, such as comparative studies, correlation studies, cohort studies, and case-control studies
IV	Evidence from expert committee reports or opinions or clinical experience of respected authorities or both

Rating Scheme for the Strength of Recommendation*

Classification	Strength of Recommendation
A	Directly based on category I evidence
B	Directly based on category II evidence or extrapolated from category I evidence
C	Directly based on category III evidence or extrapolated from category I or II evidence
D	Directly based on category IV evidence or extrapolated from category I, II, or III evidence

*As described by: Shekelle PG, Woolf SH, Eccles M, et al. Clinical guidelines: developing guidelines. Brit Med J. 1999;318:593-6.

Clinical Algorithm(s)

None provided

Scope

Disease/Condition(s)

Oral and dental health conditions related to tooth-borne and/or implant-borne removable and fixed restorations, including restoration failure, oral and dental disease (caries and periodontitis), and failure of supporting teeth and implants

Guideline Category

Counseling

Management

Treatment

Clinical Specialty

Dentistry

Intended Users

Allied Health Personnel

Dentists

Health Plans

Nurses

Other

Patients

Public Health Departments

Social Workers

Students

Utilization Management

Guideline Objective(s)

To provide: (1) guidelines for patient recall regimen, professional maintenance regimen, and at-home maintenance regimen for patients with tooth-borne restorations and (2) guidelines for patient recall regimen, professional maintenance regimen, and at-home maintenance regimen for patients with implant-borne restorations

Target Population

Patients with tooth- and implant-borne removable and fixed restorations

Note: Management of patients with conditions such as bruxism, xerostomia, periodontal disease, peri-implant disease, or other conditions is outside the scope of these clinical practice guidelines (CPGs); however, the recall and maintenance regimen guidelines made in this document would likely be helpful to these patients.

Interventions and Practices Considered

1. Patient recall (frequency of examinations)
2. Professional maintenance
    - Maintenance of tooth-borne removable restorations (partial removable dental prostheses)
    - Maintenance of tooth-borne fixed restorations (intracoronal restorations, extracoronal restorations, veneers, single crowns, and partial fixed dental prostheses)
    - Biological and mechanical maintenance of implant-borne removable restorations (implant-supported partial removable dental prostheses and implant-supported overdenture prostheses)
    - Biological and mechanical maintenance of implant-borne fixed restorations (implant-supported single crowns, partial fixed dental prostheses and implant-supported complete arch fixed prostheses)
3. At-home maintenance
    - Maintenance of tooth-borne removable restorations (partial removable dental prostheses)
    - Maintenance of tooth-borne fixed restorations (intracoronal restorations, extracoronal restorations, veneers, single crowns, and partial fixed dental prostheses)
    - Maintenance of implant-borne removable restorations (implant-supported partial removable dental prostheses, and implant-supported overdenture prostheses)
    - Maintenance of implant-borne fixed restorations (implant-supported single crowns, partial fixed dental prostheses and implant-supported complete arch fixed prostheses)

Major Outcomes Considered

- Risk for failure of tooth-borne restorations

- Risk for failure of implant-borne restorations
- Oral hygiene level
- Dental caries
- Periodontal disease

Methodology

Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Secondary Sources)

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

Two separate systematic reviews of the literature were conducted to evaluate the recall and maintenance regimens for tooth- and implant-borne restoration. The detailed methodology for the search processes are described in the respective systematic review articles (see the "Availability of Companion Documents" field).

Tooth-Borne Restorations

Materials and Methods

An electronic search of the English language literature was performed independently by two investigators using the PubMed search engine and Cochrane Library database. The specific search terms, search string, and limits are presented in Table 1 in the systematic review on tooth-borne restorations.

The specific PICO (Patient, Intervention, Comparatives, Outcomes) question for this systematic review was: in patients with tooth-borne restorations, does one specific recall regimen and dental maintenance regimen, or no regimen, improve clinical outcomes and patient care and optimize maintenance of oral health?

The period searched was from January 1, 1999 to December 31, 2014. The search limits applied to the electronic search were the English language, search period, and clinical studies. The anticipated tooth-borne restorations of interest in this study were intracoronal restorations, extracoronal restorations, single crowns, veneers, fixed dental prostheses (FDP), and partial removable dental prostheses (RDP).

The predetermined inclusion criteria were (1) English language article in a peer-reviewed journal; (2) any clinical study published between January 1, 1999 to December 31, 2014; and (3) any clinical study with the primary focus on patient recall regimen, professional maintenance, or home maintenance regimen for tooth-borne restorations, in healthy patients.

The predetermined exclusion criteria were (1) articles that did not pertain to items described in the inclusion criteria; (2) articles that did not pertain to the objectives of the systematic review; (3) articles that did not describe data on recall and maintenance of patients with tooth-borne restorations; (4) articles that described data on unhealthy patients or patients with periodontal disease; (5) review articles or technique articles without associated clinical study and data; (6) patients or data being repeated in other included articles; and (7) article description that would not allow extraction of qualitative or quantitative data related to objectives of the study.

The electronic search process was systematically conducted in three stages. A PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-analyses) format was used as a filter to remove duplicate articles and to ensure a systematic search process. In stage 1, the investigators independently screened all relevant titles of the electronic search, and any disagreement was resolved by discussion. In situations where the application of the exclusion criteria was not clear, the controversial article was included for consideration in the abstract stage. In stage 2, the investigators independently analyzed the abstracts of all selected titles, and disagreements were resolved by discussion. In situations of uncertainty, the abstract was included for the subsequent full-text stage.

After the application of the exclusion criteria, the definitive list of articles was screened at stage 3 by the investigators to extract qualitative and quantitative data (when available). A supplemental electronic search for articles from Scopus, Google Scholar, and CINAHL (Cumulative Index to Nursing and Allied Health Literature) search engines along with a hand search of references of all included articles was conducted using systematic methods. Additionally, articles that had a lag time to appear on the PubMed search engine were also screened for the three stages, as part of the

supplemental search. Data from all included studies were then tabulated, analyzed, and compared to satisfy the objectives of the review.

Implant-Borne Restorations

Materials and Methods

An independent electronic search of the English language literature was performed by two investigators using the PubMed search engine and Cochrane Library database. The specific search terms, search string, and limits are presented in Table 1 in the systematic review on implant-borne restorations.

The specific PICO question for this systematic review was: in patients with implant-borne restorations, does one specific recall regimen and dental maintenance regimen compared to others, or no regimen, improve clinical outcomes and patient care, and optimize maintenance of oral health?

The period searched was from January 1, 2004 to December 31, 2014. The only search limits applied to the electronic search were the English language, the search period, and clinical studies. The anticipated implant-borne restorations of interest in this study were: implant-supported single crowns, implant-supported partial FDPs, implant-supported complete FDPs, implant-supported partial RDPs, and implant-supported complete RDPs.

The predetermined inclusion criteria were: (1) English language article in a peer-reviewed journal; (2) any clinical study published between January 1, 2004 and December 31, 2014; and (3) any clinical study with the primary focus on patient recall regimen, professional maintenance, or at-home maintenance regimen for implant-borne restorations, in healthy patients.

The predetermined exclusion criteria were: (1) articles that did not pertain to items described in the inclusion criteria; (2) articles that did not pertain to the objectives of the systematic review; (3) articles that did not describe data on recall and maintenance of patients with implant-borne restorations; (4) articles that described data on unhealthy patients or patients with peri-implantitis; (5) articles with a focus on outcomes after implant surgery; (6) review articles or technique articles without associated clinical study and data; (7) patients or data being repeated in other included articles; and (8) article description that would not allow extraction of qualitative or quantitative data related to objectives of the study.

The electronic search process was systematically conducted in three stages. A PRISMA format was used as a filter to remove duplicate articles and to ensure a systematic search process. In stage 1, the investigators independently screened all relevant titles of the electronic search, and any disagreement was resolved by discussion. In situations where the application of the exclusion criteria was not clear, the controversial article was included for consideration in the abstract stage. In stage 2, the investigators independently analyzed the abstracts of all selected titles, and disagreements were resolved by discussion. In situations of uncertainty, the abstract was included for the subsequent full-text stage.

After the application of the exclusion criteria, the definitive list of articles was screened at stage 3 by the investigators to extract qualitative and quantitative data (when available). A supplemental electronic search for articles from Scopus, Google Scholar and CINAHL search engines along with a hand search of references of all included articles was conducted using systematic methods. Additionally, articles that had a lag time to appear on the PubMed search engine were also screened for the three stages, as part of the supplemental search.

Number of Source Documents

Tooth-borne Restorations

The initial electronic search using the specific search terms from the PubMed search engine resulted in a total of 2161 titles, out of which 54 abstracts were applicable to the study. Reviewing the abstracts resulted in 22 full-text articles being appropriate for further review. Incorporating a supplemental and electronic hand search process and systematic exclusion, eventually resulted in 16 full text articles, all of which reported data on maintenance of dental restorations on natural teeth.

See Figure 1 in the systematic review on tooth-borne restorations for a flow diagram of the systematic search process (see the "Availability of Companion Documents" field).

Implant-borne Restorations

The initial electronic search using the specific search terms from the PubMed search engine resulted in a total of 2816 titles, out of which 83 abstracts were applicable to the study. Further scrutiny resulted in detailed analysis of 44 full-text articles from which 30 articles were excluded. Incorporating a supplemental and electronic hand search process and systematic exclusion eventually resulted in 20 full-text articles, all of which reported data on patient recall and maintenance of dental restorations on implants.

See Figure 1 in the systematic review on implant-borne restorations for a flow diagram of the systematic search process (see the "Availability of

Companion Documents" field).

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Levels and Category of Evidence*

Level	Category of Evidence
Ia	Evidence from systematic review of randomized controlled trials
Ib	Evidence from at least one randomized controlled trial
IIa	Evidence from at least one controlled study without randomization
IIb	Evidence from at least one other type of quasi-experimental study, such as time series analysis or studies in which the unit of analysis is not the individual
III	Evidence from non-experimental descriptive studies, such as comparative studies, correlation studies, cohort studies, and case-control studies
IV	Evidence from expert committee reports or opinions or clinical experience of respected authorities or both

*As described by: Shekelle PG, Woolf SH, Eccles M, et al. Clinical guidelines: developing guidelines. Brit Med J. 1999;318:593-6.

Methods Used to Analyze the Evidence

Review of Published Meta-Analyses

Systematic Review with Evidence Tables

Description of the Methods Used to Analyze the Evidence

Two separate systematic reviews of the literature were conducted to evaluate the recall and maintenance regimens for tooth-borne and implant-borne restoration. The detailed methodology is described in the respective systematic review articles (see the "Availability of Companion Documents" field). Results from studies reported in these two reviews were scrutinized, tabulated, and analyzed to formulate conclusions and then create the clinical practice guidelines.

Tooth-Borne Restorations

Given the nature of the topic and PICO (Patient, Intervention, Comparatives, Outcomes) question posed in this systematic review, the authors did not identify any significant quantitative data. Therefore, no statistical analysis was performed.

To segregate the qualitative data and provide a meaningful method of understanding outcomes, the analyzed data were grouped into three categories: (1) outcomes related to patient-specific restorative treatment; (2) outcomes related to maintenance using oral topical agents, and (3) outcomes related to maintenance using professional intervention (see Table 3 in the systematic review on tooth-borne restorations).

Implant-Borne Restorations

The authors did not identify a significant amount of quantitative data from the data extraction, which may be related to the nature of the topic and PICO question posed in this systematic review. Therefore, no statistical analysis was performed.

To segregate the qualitative data and provide a meaningful method of understanding outcomes, the analyzed data were grouped into three categories: (1) outcomes related to patient-specific restorative treatment; (2) outcomes related to maintenance using oral topical agents and hygiene aids; and (3) outcomes related to maintenance using professional intervention. Additionally, the professional intervention for patients with implant-borne restorations was dichotomized as biological maintenance and mechanical maintenance (see Table 3 in the systematic review on implant-

borne restorations).

Methods Used to Formulate the Recommendations

Expert Consensus

Description of Methods Used to Formulate the Recommendations

A scientific panel comprising experts appointed by the American College of Prosthodontists (ACP), American Dental Association (ADA), Academy of General Dentistry (AGD), and American Dental Hygienists Association (ADHA) critically evaluated and debated the published evidence from the two systematic reviews on this topic (see the "Availability of Companion Documents" field). A rating scheme for strength of recommendation as described by Shekelle et al. was used as it was most applicable to this topic and is widely used and validated in the medical literature (see the "Rating Scheme for the Strength of the Recommendations" field). The major outcomes and consequences considered during formulation of these clinical practice guidelines (CPGs) were (1) risk for failure of tooth-borne restorations and (2) risk for failure of implant-borne restorations. Thereafter, the members of the task force conducted a roundtable peer review/evaluation discussion of the proposed guidelines, and the guidelines were debated in detail. These inputs were used to supplement and refine the proposed guidelines, and consensus was attained for the various guidelines presented.

The strength of evidence and subsequent recommendations that is presently available was applied for each guideline. When a guideline comprised multiple aspects, multiple strengths of available recommendations in descending order were applied. Additionally, when multiple strengths of recommendations were available for a specific guideline, they were all applied accordingly.

A potential source of bias that was considered during development of the CPGs was the same group serving as authors of the systematic reviews as well as panel members for the CPG. To minimize this potential bias, efforts were made during the scientific panel meetings to debate and justify each guideline in an open and transparent format. Strength of evidence was debated for every guideline. Thus, the effect of "groupthink" may not be a source of bias in this baseline CPG document. Conversely, having the same author group to draft the CPGs may be viewed as a strength of this document, due to the profound insight obtained by the author group during the systematic review process.

Most of the guidelines in this document are graded as category D for strength of recommendation but it is anticipated that the strength of recommendation would be higher in the future. Using Shekelle's method for grading the strength of recommendation allowed incorporation and delineation of various types of evidence, including expert opinion/consensus, into four categories, while formulating these guidelines. Additionally, it allowed extrapolation of higher categories of evidence to lower categories and provided more freedom in designation of an article to a specific category. The authors considered other widely popular alternatives such as the Grading of Recommendations Assessment, Development and Evaluation (GRADE) method, and the Strength of Recommendation Taxonomy (SORT) method. However, these alternatives were less applicable to the topic of this baseline CPG. The GRADE method divides the expression of evidence into only two categories, weak or strong, which was not appropriate for this baseline CPG. The SORT method divides the strength of recommendation into three categories (A, B and C) but does not allow extrapolation of higher categories of evidence to lower categories.

Rating Scheme for the Strength of the Recommendations

Rating Scheme for the Strength of Recommendation*

Classification	Strength of Recommendation
A	Directly based on category I evidence
B	Directly based on category II evidence or extrapolated from category I evidence
C	Directly based on category III evidence or extrapolated from category I or II evidence
D	Directly based on category IV evidence or extrapolated from category I, II, or III evidence

*As described by: Shekelle PG, Woolf SH, Eccles M, et al. Clinical guidelines: developing guidelines. Brit Med J. 1999;318:593-6.

Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

Method of Guideline Validation

External Peer Review

Internal Peer Review

Description of Method of Guideline Validation

A scientific panel appointed by the American College of Prosthodontists (ACP), American Dental Association (ADA), Academy of General Dentistry (AGD), and American Dental Hygienists Association (ADHA) developed and approved the clinical practice guidelines (CPGs).

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

The type of supporting evidence is identified and graded for each recommendation (see the "Major Recommendations" field).

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

- The potential benefits for these guidelines include (1) improved oral health and longevity of natural teeth, tooth-borne, and implant-borne restorations and (2) improved oral health related quality of life.
- Current evidence 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.
- Current evidence demonstrates that the use of specific oral hygiene aids (electric toothbrush, interdental brush, water flossers) and oral topical agents (chlorhexidine and triclosan) can improve professional and at-home biological maintenance of implant-borne restorations.

Potential Harms

The potential harms considered for these guidelines were (1) increased short-term cost to patients to adhere to recall regimen, professional maintenance regimen, and at-home maintenance regimen and (2) adverse effects related to any of the professionally used oral topical agents or at-home oral topical agents and oral hygiene aids.

Contraindications

Contraindications

The contraindications to these guidelines include allergies or adverse effects related to any of the professionally used oral topical agents or at-home oral topical agents.

Qualifying Statements

Qualifying Statements

- This baseline document is intended to improve patient care protocols, but is not intended as a standard of care. The outlined clinical practice guidelines (CPGs) should be supplemented with professional judgment and consideration of the unique needs and preferences of each patient.
- A potential source of bias that was considered during development of the CPGs was the same group serving as authors of the systematic reviews as well as panel members for the CPG. To minimize this potential bias, efforts were made during the scientific panel meetings to debate and justify each guideline in an open and transparent format. Strength of evidence was debated for every guideline. Thus, the effect of "groupthink" may not be a source of bias in this baseline CPG document. Conversely, having the same author group to draft the CPGs may be viewed as a strength of this document, due to the profound insight obtained by the author group during the systematic review process.
- This document serves as a baseline with the expectation of future modifications to reflect best clinical practices and when additional evidence becomes available.

Implementation of the Guideline

Description of Implementation Strategy

An implementation strategy was not provided.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Staying Healthy

IOM Domain

Effectiveness

Patient-centeredness

Identifying Information and Availability

Bibliographic Source(s)

Bidra AS, Daubert DM, Garcia LT, Kosinski TF, Nenn CA, Olsen JA, Platt JA, Wingrove SS, Chandler ND, Curtis DA. Clinical practice guidelines for recall and maintenance of patients with tooth-borne and implant-borne dental restorations. J Prosthodont. 2016 Jan;25(Suppl 1):S32-40. [54 references] PubMed

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

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Guideline Developer(s)

Academy of General Dentistry - Professional Association

American College of Prosthodontists - Medical Specialty Society

American Dental Association - Professional Association

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Guideline Committee

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Financial and organizational conflicts of interests were not identified.

The authors deny any conflicts of interest.

Guideline Status

This is the current release of the guideline.

This guideline meets NGC's 2013 (revised) inclusion criteria.

Guideline Availability

Available to subscribers from the Journal of Prosthodontics Web site .

Availability of Companion Documents

The following are available:

- Bidra AS, Daubert DM, Garcia LT, Gauthier MF, Kosinski TF, Nenn CA, Olsen JA, Platt JA, Wingrove SS, Chandler ND, Curtis DA. A systematic review of recall regimen and maintenance regimen of patients with dental restorations. Part 1: tooth-borne restorations. J Prosthodont. 2016;25(S1):S2-S15. Available to subscribers from the Journal of Prosthodontics Web site .
- Bidra AS, Daubert DM, Garcia LT, Gauthier MF, Kosinski TF, Nenn CA, Olsen JA, Platt JA, Wingrove SS, Chandler ND, Curtis DA. A systematic review of recall regimen and maintenance regimen of patients with dental restorations. Part 2: implant-borne restorations. J Prosthodont. 2016;25(S1):S16-S31. Available to subscribers from the Journal of Prosthodontics Web site .

Patient Resources

None available

NGC Status

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