

Treatment recommendations for single-unit crowns

Findings from The National Dental Practice-Based Research Network

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Dentists recommend single-unit crowns for many reasons. A tooth might have a large carious lesion, a fracture, or a large restoration, putting the tooth at risk of experiencing further breakdown. A tooth might be a source of pain, suggesting a crack, or a tooth might have been endodontically treated. These situations may prompt a dentist to recommend a crown to increase the tooth's longevity and optimize the patient's oral health.¹

However, little scientific evidence exists to guide dentists when making certain treatment recommendations.^{2,3} Most dentists would agree, for example, that a large restoration might be a reason to recommend a crown for a particular tooth. The question then becomes exactly how large a restoration has to be to justify recommending a crown for the tooth. Some dentists might repair a particular restoration, others might replace it, and still others might recommend placing an inlay or a single-unit crown.⁴⁻⁶

When making treatment recommendations, practitioners must manage a complex mix of clinical, social, and diagnostic factors.^{7,8} They base their recommendations on patient assessment, perceived risks and benefits, personal preference, treatment cost, and clinical experience.⁹ These complexities lead to variation in treatment recommendations among practitioners.¹⁰⁻¹³

ABSTRACT

Background. The objectives of this study were to quantify practitioner variation in likelihood to recommend a crown and test whether certain dentist, practice, and clinical factors are associated significantly with this likelihood.

Methods. Dentists in The National Dental Practice-Based Research Network completed a questionnaire about indications for single-unit crowns. In 4 clinical scenarios, practitioners ranked their likelihood of recommending a single-unit crown. The authors used these responses to calculate a dentist-specific crown factor (range, 0-12). A higher score implied a higher likelihood of recommending a crown. The authors tested certain characteristics for statistically significant associations with the crown factor.

Results. A total of 1,777 of 2,132 eligible dentists (83%) responded. Practitioners were most likely to recommend crowns for teeth that were fractured, cracked, or endodontically treated or had a broken restoration. Practitioners overwhelmingly recommended crowns for posterior teeth treated endodontically (94%). Practice owners, practitioners in the Southwest, and practitioners with a balanced workload were more likely to recommend crowns, as were practitioners who used optical scanners for digital impressions.

Conclusions. There is substantial variation in the likelihood of recommending a crown. Although consensus exists in some areas (posterior endodontic treatment), variation dominates in others (size of an existing restoration). Recommendations varied according to type of practice, network region, practice busyness, patient insurance status, and use of optical scanners.

Practical Implications. Recommendations for crowns may be influenced by factors unrelated to tooth and patient variables. A concern for tooth fracture—whether from endodontic treatment, fractured teeth, or large restorations—prompted many clinicians to recommend crowns.

Key Words. Dentistry; prosthodontics; crowns.

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Some treatment recommendations are not related directly to the clinical circumstance of the tooth.¹⁴ For example, patients with a college education may be less likely to receive a recommendation for a crown.^{15,16}

In circumstances for which clinical scientific evidence is absent, clinicians may gain valuable insight by observing colleagues and knowing which techniques other dentists report as effective. The results presented in this study detail clinicians' treatment decisions for single-unit crowns and which factors led to these recommendations. In addition, we identify nonpatient factors that may influence the decision to recommend a crown. The objectives for this study were to describe and quantify practitioner variation in likelihood to recommend a single-unit crown and test whether certain dentist, practice, and clinical factors are associated significantly with this likelihood.

METHODS

This study is based on a questionnaire completed by dentists in The National Dental Practice-Based Research Network (PBRN). The National Dental PBRN is a consortium of dental practices and dental organizations focused on improving the scientific basis for clinical decision making.¹⁷ Detailed information about the network is available at its website (<http://www.nationaldentalpbrn.org>). The National Dental PBRN's applicable institutional review boards approved the study; all participants provided informed consent after receiving a full explanation of the procedures.

Enrollment questionnaire. As part of the enrollment process, practitioners completed an enrollment questionnaire that describes themselves, their practices, and their patient populations. This questionnaire is publicly available at <http://www.nationaldentalpbrn.org/study-results/2016/> under the heading *Factors for Successful Crowns* and collects information about practitioner, practice, and patient characteristics. Questionnaire items, which had documented test-retest reliability, were from our previous work in a practice-based study of dental care.^{18,19} The typical enrollee completes the questionnaire online, although a paper option is available.

Study questionnaire development. A study group of the authors, dentists with clinical expertise, statisticians, and laboratory technicians developed the questionnaire for this study. Its purpose was to measure practices in fabricating crowns and treatment recommendations for single-unit crowns. Instrument Design, Evaluation, and Analysis Services, a group with expertise in questionnaire development and implementation, as well as National Institute of Dental and Craniofacial Research program officers and practitioners with prosthodontic content expertise, reviewed the survey. After extensive internal review, Instrument Design, Evaluation, and Analysis Services pretested the questionnaire via cognitive

interviewing by telephone with a regionally diverse group of 8 practicing dentists. Cognitive interviewers probed the dentist's comprehension of each question. The interviewers also asked practitioners to identify items of clinical interest that were not addressed in the survey. Results from the pretest prompted further modification of the questionnaire.

Dentists enrolled in the National Dental PBRN were eligible for the study if they met all of these criteria: completed an enrollment questionnaire, were practicing and treating patients in the United States, were in the National Dental PBRN's limited or full network participation category, and reported on the enrollment questionnaire that they perform at least some restorative dentistry in their practices. A total of 2,299 National Dental PBRN clinicians met these criteria.

We mailed (via the US postal system) preprinted invitation letters to eligible practitioners, informing them that they would receive an e-mail with a link to the electronic version of the questionnaire. At the time of the e-mail, we gave practitioners the option to request a paper version of the survey because this has been shown to improve response rates.²⁰ We asked practitioners to complete the questionnaire within 2 weeks. We sent a reminder letter after the second and fourth weeks to those who had not completed the questionnaire. After 6 weeks, we sent e-mail and postal mail reminders with a printed version of the questionnaire and offered practitioners the option of completing the online or paper versions. After 8 weeks, we made a final attempt by mailing the questionnaire with a letter that also encouraged the dentist to complete the questionnaire online. Data collection was closed after 12 weeks from the original e-mail invitation. We remunerated practitioners or their business entities \$75 for completing the questionnaire if desired. We collected data from February 2015 through August 2015.

Questionnaire content. The first question of the survey confirmed that the invited clinician placed at least 1 crown in a typical month. The questionnaire is publicly available (<http://www.nationaldentalpbrn.org/study-results/2016/>) under the heading *Factors for Successful Crowns*. Among other questions, we asked practitioners why they recommended crowns for patients. We asked dentists to "rank the top three MOST COMMON reasons you recommend a crown in your practice, with 1 being the most common and 3 being the least common," and we gave them the following list: active caries, endodontic therapy, large restoration, broken restoration, esthetics, change vertical dimension, removable partial denture abutment, and other. The other category received a large number of responses related to fractured teeth or cracked teeth; we subsequently categorized these

ABBREVIATION KEY. CF: Crown factor. PBRN: Practice-Based Research Network. MOD: Mesio-occluso-distal.

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