



COVER STORY

Twenty-month follow-up of occlusal caries lesions deemed questionable at baseline

Findings from The National Dental Practice-Based Research Network

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Although the prevalence of dental caries in many populations across the world has decreased substantially,¹ dental caries remains a prominent health problem² that is experienced by more than 90 percent of all dentate adults in the United States and more than two-thirds of children in the United States, with a wide range of severity.^{3,4} Caries prevalence has decreased to a fraction of the levels seen in the past,⁵ partly because of the introduction of fluoride.⁶ However, the use of fluoride has led to difficulty in detecting occlusal caries lesions because it can result in an intact surface that has subsurface demineralization.^{7,8} This can lead to changes in the clinical appearance of these caries lesions.⁹

There are essentially two types of such lesions. In hidden caries, demineralization has progressed to the point at which it is detectable radiographically. In questionable occlusal caries (QOC) lesions, which are the focus of this study, the tooth has no cavitation and no radiographic evidence of caries, but the presence of a caries lesion is suspected owing to roughness, surface opacities or staining. Such lesions may be difficult to diagnose and treat correctly.⁹⁻¹² Having more information about the characteristics of these lesions when they first are diagnosed, as well as whether these lesion characteristics change over time and which kind of

ABSTRACT

Background. A questionable occlusal caries (QOC) lesion can be defined as an occlusal surface with no radiographic evidence of caries, but caries is suspected because of clinical appearance. In this study, the authors report the results of a 20-month follow-up of these lesions.

Methods. Fifty-three clinicians from The National Dental Practice-Based Research Network participated in this study, recording lesion characteristics at baseline and lesion status at 20 months.

Results. At baseline, 1,341 QOC lesions were examined; the treatment that was planned for 1,033 of those at baseline was monitoring (oral hygiene instruction, applying or prescribing fluoride or varnish, or both), and the remaining 308 received a sealant (n = 192) or invasive therapy (n = 116). At the 20-month visit, clinicians continued to monitor 927 (90 percent) of the 1,033 monitored lesions. Clinicians decided to seal 61 (6 percent) of the 1,033 lesions (mean follow-up, 19 months) and invasively treat 45 (4 percent) of them (mean follow-up, 15 months). Young patient age (< 18 years) (odds ratio = 3.4; 95 percent confidence interval, 1.7-6.8) and the lesion's being on a molar (odds ratio = 1.8; 95 percent confidence interval, 1.3-2.6) were associated with the clinician's deciding at some point after follow-up to seal the lesion or treat it invasively.

Conclusions. Almost all (90 percent) QOC lesions for which the treatment planned at baseline was monitoring still were planned to undergo monitoring after 20 months. This finding suggests that noninvasive management is appropriate for these lesions.

Practical Implications. Previous study results from baseline indicated a high prevalence of QOC lesions (34 percent). Clinicians should consider long-term monitoring when making treatment decisions about these lesions.

Key Words. Evidence-based dentistry; private practice; caries; practice-based research; questionable lesions; multicenter studies; clinical research; dental caries; longitudinal study.

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treatment ultimately becomes advisable, may be the first step toward improving our understanding about how best to diagnose and treat these lesions.

To date, there have been few studies regarding the characteristics, management and treatment of these lesions^{8,10-13} and only one in which the investigators examined their progression.¹⁴ As a result, there is no consensus about how best to manage them. An earlier analysis of initial data from this study indicates that among patients receiving care at dental practices in The National Dental Practice-Based Research Network (the “network”), the prevalence of QOC lesions was substantial and varied significantly across regions, with an overall patient prevalence of 34 percent.¹⁵ Our purpose in this study was to follow 1,341 QOC lesions identified in general and pediatric community practice settings, relating the characteristics of these lesions at baseline to their characteristics and treatment received during the subsequent 20-month follow-up.

METHODS

Study population. We conducted this study with patients visiting dental practices in the network. At the time of data collection for the investigation, the network was one of three regional practice-based research networks established in 2005 with a seven-year grant from the National Institute of Dental and Craniofacial Research. The network included practitioners from the United States and Scandinavia. The following regions participated in this study: Alabama/Mississippi (AL/MS), Florida/Georgia (FL/GA), Minnesota (MN) and Denmark (DK). The network subsequently evolved into its current form,¹⁶ under the aegis of which we prepared the manuscript of this article. The respective institutional review board in each region approved the study. All participants in this investigation provided informed consent after receiving a full explanation of the nature of the procedures.

Selection and recruitment process. Selection and recruitment have been described elsewhere,¹⁵ but we will provide a brief overview of the process here. To be eligible for this study, practitioners had to complete both the network’s enrollment questionnaire and a questionnaire regarding how they diagnose and treat dental caries (“Assessment of Caries Diagnosis and Caries Treatment” questionnaire, available at <http://nationaldentalpbrn.org/study-results.php>), attend an orientation session or watch a video of it, and complete their training in protection of human participants. The enrollment questionnaire, which is publicly available at <http://nationaldentalpbrn.org/enrollment.php>, is used to collect information about practitioner, practice and patient characteristics.

Study design. The study design also has been described elsewhere,¹⁷ but essentially, practitioners collected data in their offices. If a patient had a QOC

lesion, met the requirement of having a radiograph no older than six months and consented to participate in the study, the practitioner completed a data collection form. Up to two lesions could be enrolled per patient. The data collection form included information specific to the patient and lesion. Practices were asked to enroll approximately 25 lesions. Practitioners saw patients approximately 20 months later (referred to as a “scheduled” visit to coincide with their regular treatment, in keeping with the principles of practice-based research) and completed a data collection form with information gathered about the enrolled lesion. If planned treatment was changed from monitoring at baseline to either sealant placement or invasive therapy (enameloplasty, preventive resin restoration or full restoration) at an interim visit (that is, a visit between the baseline visit and the scheduled 20-month visit), the practitioner completed a change-of-treatment form. Example data collection forms are available at <http://nationaldentalpbrn.org/study-results.php>.

Statistical methods. We determined whether or not an interim visit occurred; whether or not the reason for the visit, be it interim or scheduled follow-up, was because of the QOC lesion; and whether or not the forms were completed by the same practitioner (for the baseline visit and either an interim visit or scheduled follow-up visit). We calculated time from baseline visit to scheduled follow-up visit and to interim visit, if applicable. We ascertained the distributions of patient, tooth, lesion and visit characteristics overall, and among lesions for which the treatment planned at baseline was monitoring (oral hygiene instruction and/or applying or prescribing fluoride or varnish), according to type of treatment recommended at follow-up visit (either interim or scheduled follow-up). If planned treatment was changed from monitoring at baseline to either sealant placement or invasive therapy at an interim visit and not changed again at the scheduled follow-up visit, then we assigned the treatment planned at follow-up as the treatment planned during the interim visit, and we assigned the length of follow-up (in months) as the number of months between the baseline and interim visits.

Among the lesions for which the treatment planned at baseline was monitoring, we examined whether there was an association between whether the lesion was still recommended for monitoring at the follow-up visit (interim or scheduled) and the lesion’s baseline characteristics. We built a predictive model with the outcome being that the treatment planned at follow-up was either sealant placement or invasive therapy (primarily, restoration). Then we constructed separate models for the outcomes of “sealed” and “restored.” For models for which the outcome was “sealed,” we excluded lesions that were

ABBREVIATION KEY. AL/MS: Alabama/Mississippi. FL/GA: Florida/Georgia. MN: Minnesota. NA: Not applicable. NS: Not significant. QOC: Questionable occlusal caries.

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