Approximal and occlusal caries lesions

Restorative treatment decisions by California dentists

Peter Rechmann, DMD, PhD; Sophie Doméjean, DDS, PhD; Beate M. T. Rechmann; Richard Kinsel, DDS; John D. B. Featherstone, MSc, PhD

Clinicians increasingly have accepted minimally invasive treatment concepts.[1-3] Decisions for restorative treatment have been delayed toward a more advanced caries lesion stage.[4]

Caries preventive measures are more successful when frequently applied.[5,6] Assessing the patient's caries risk and assigning individualized preventive, nonoperative care measures based on that risk have led to less need for invasive operative treatments.[7,8]

Classifying caries lesions at a noncavitated stage[9] could allow dentists to evaluate whether noninvasive measures would be successful.[10] Noncavitated caries lesions in enamel and dentin can be managed by means of remineralization without restorative intervention.[11,12]

Monitoring topical fluoride application and pit-and-fissure sealants is considered the best practice according to the literature and should become the standard treatment modality for noncavitated caries lesions.[13-15] The International Caries Classification and Management System and Caries Management by Risk Assessment recommend minimal intervention treatment according to the patient's caries risk level.[10,16]

Surveys in which investigators have evaluated the restorative treatment thresholds of dentists and management strategies have been performed in many countries and reveal wide variations. Those management differences exist among countries and among dentists within each country.[17-25]

With the background of the success of preventive and noninvasive measures in caries management, we designed this study to determine California (CA) dentists' restorative threshold for approximal and occlusal lesions by using a Web-based survey. To our knowledge, this is the first time such a study has been performed in CA.

ABSTRACT

Background. Investigators use questionnaire surveys to evaluate treatment philosophies in dental practices. The aim of this study was to evaluate the management strategies California dentists use for approximal and occlusal caries lesions.

Methods. In May 2013, the authors e-mailed a questionnaire that addressed approximal and occlusal caries lesion management (detection and restorative threshold, preferred preparation type, and restorative materials) to 16,960 dentists in California. The authors performed a χ^2 statistical analysis to investigate the relationship between management strategies and respondent demographic characteristics.

Results. The authors received responses from 1,922 (11.3%) dentists; 42.6% of the respondents would restore approximal lesions at the dentinoenamel junction, and 33.4% would wait until the lesion reached the outer one-third of dentin. The preferred preparation type was the traditional Class II preparation. Dentists who graduated more recently (20 years or less) were more likely to delay approximal restorations ($P < .0001$); 49.9% of the more recent graduates would wait to restore an occlusal lesion until the outer one-third of dentin was involved, and 42.6% would restore a lesion confined to enamel.

Conclusions. There is wide variety among California dentists regarding their restorative treatment decisions, with most dentists restoring a tooth earlier than the literature would advise. More recent dental graduates were more likely to place their restorative threshold at deeper lesions for approximal caries lesions.

Practical Implications. Clinical evidence shows that noncavitated caries lesions can be remineralized; therefore, early restorative treatment may no longer be necessary or appropriate. Noninvasive and minimally invasive measures should be taken into consideration.

Key Words. Caries lesions; approximal caries; occlusal lesions; diagnosis; decision making; restorative treatment threshold; California dentists.

JADA 2016:■(■):■-■

http://dx.doi.org/10.1016/j.adaj.2015.10.006

TABLE 1

Demographic characteristics of contacted California dentists and respondents.

CHARACTERISTIC	DENTISTS CONTACTED (N = 16,960)	RESPONDENTS (n = 1,842)
Sex, %		n = 1,786*
Male	68.2	68.4
Female	31.8	31.6
Age, y†		n = 1,756*
Mean (standard deviation)	49.2 (18.0)	50.4 (12.2)‡
Years Since Graduation†		n = 1,816* Mean (standard deviation): 22.8 (13)§
More than 20 y ago	Not applicable	753 (41.5%)
20 y ago or less	Not applicable	1,063 (58.5%)
Type of Practice		n = 1,829*
General practitioners	14,182 (78.4%)	1,600 (87.5%)
Specialists	3,896 (21.6%)	229 (12.5%)
Pediatric dentists	703 (3.9%)	108 (5.9%)

* Total number of respondents to this question.
† At the time of the survey (2013).
‡ Minimum: 25. Maximum: 73.
§ Minimum: 1. Maximum: 53.

METHODS

We obtained approval for the survey study from the Committee on Human Research at University of California, San Francisco (institutional review board approval 12-10135). We sent a Web-based questionnaire electronically (May 2013; including an online consent form) to 16,960 CA-licensed dentists by using SurveyMonkey (SurveyMonkey). We sent an electronic reminder 15 days later. Table 1 provides the demographic characteristics of the dentists contacted.

Espelid and colleagues[17] and Tveit and colleagues[18] designed the questionnaire used in our study, and we used it with their permission (materials reproduced here permission of the publisher). After users provided electronic consent, the Web-based questionnaire assessed the stage of lesion progression at which the respondents considered restorative strategies appropriate by using diagrams of different stages of approximal and occlusal caries lesions. The survey recorded preferred restorative technique and restorative material of choice for treatment of these hypothetical lesions, along with the sex, age, year of graduation, and type of practice (general practitioner [GP] or specialist and the specialty).

For all questions, an imaginary 20-year-old patient was described. This patient visits a dentist annually, has low caries activity and good oral hygiene, and uses a fluoridated toothpaste. The items of the questionnaire are shown in the box and Figures 1-4.[19]

BOX

Survey*

APPROXIMAL LESION (FIGURE 1)[19]

- Question 1: "The picture illustrates different radiographic stages of caries progression (approximal lesion, grade 1 to 6). Starting with which lesion size do you think an immediate restorative treatment is required? In other words—pick the Figure number with the smallest lesion size for which you would not postpone restorative treatment under any circumstances even if the patient has low caries activity and good oral hygiene."
- Question 2: "Which type of preparation would you prefer for the smallest lesion you decided to drill and fill? (Imagine that the approximal lesion is situated distally on the second premolar in the upper jaw.)"
- Question 3: "Which restorative material would you choose for the smallest approximal lesion you would restore?"

OCCLUSAL LESION (FIGURE 2)[19]

- Question 1: "The picture 2 illustrates different clinical appearances of occlusal caries in a lower second molar (grade 1 to 5). Starting at which lesion do you think immediate restorative (operative) treatment is required? Please, pick the smallest lesion size you think requires immediate restorative treatment. In other words, that is the lesion for which you would not postpone restorative treatment under any circumstances. The patient is 20 years old, has low caries activity and good oral hygiene."
- Question 2: "Which type of preparation would you prefer for the smallest of the lesions you decided to drill and fill?"
- Question 3: "Which restorative material would you choose for the smallest approximal lesion you would restore?"

CLINICAL CASE 1 (FIGURE 3)[19]

- Question 1: "Do you think that, from its clinical and radiographic appearance, the tooth has occlusal (enamel or dentin) caries?"
- Question 2: "How would you treat this occlusal surface? You have not seen the patient before, and 2 years have elapsed since his last dental examination. The patient uses fluoride toothpaste on a daily basis and dietary and oral hygiene habits are considered satisfactory."

CLINICAL CASE 2 (FIGURE 4)[19]

- Question 1: "Do you think that, from its clinical and radiographic appearance, the tooth has occlusal (enamel or dentin) caries?"
- Question 2: "How would you treat this occlusal surface? You have not seen the patient before, and 2 years have elapsed since his last dental examination. The patient uses fluoride toothpaste on a daily basis and dietary and oral hygiene habits are considered satisfactory."

* Adapted with permission of the publisher from Espelid and colleagues[17] and Tveit and colleagues.[18]

We performed descriptive analyses to characterize the respondent population and the responses to the different questions related to the management strategies for approximal and occlusal caries lesions. We used a χ^2 test to assess the relationship between the management strategies and some demographic characteristics (sex, years since graduation, and the respondents' type of practice). We used subgroups for further analyses. The first set of subgroups was years since graduation (20 years or less versus more than 20 years ago). For the second set of subgroups, we merged grades for both approximal and occlusal thresholds with regard to clinical relevance. Merging occurred with regard to potential treatment options and likelihood of successful lesion remineralization. The approximal caries lesion restorative

ABBREVIATION KEY. **CA:** California. **DEJ:** Dentinoenamel junction. **GP:** General practitioner.