

Use of Selective Caries Removal by Dentists in the National Dental Practice-Based Research Network

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Background

The Global Burden of Disease 2015 study identified untreated caries in permanent teeth as the most common condition. As the U.S. population ages and fewer people are without teeth, the prevalence of untreated caries is projected to increase. The International Caries Consensus Collaboration (ICCC) advises selective caries removal to conserve hard tissue and restore the tooth's normal form and function. However, many dentists continue to perform non-selective caries removal for deep carious lesions (DCLs), despite these guidelines.

Results

- 500 of 698 dentists (72%) responded to the questionnaire and 467 dentists were included in the final analysis.
- Respondents were 43% female, primarily from white race and a mean age of 51 years.
- Nearly half (46%) treated 7 or more adult patients with deep caries lesions per month.
- Concordance with guidelines was higher for teeth with asymptomatic carious lesions compared to teeth with symptomatic carious lesion.
- 50% of providers were concordant with ICCC guidelines 49.3% of the time for teeth with symptomatic caries.
- 50% of providers were concordant with ICCC guidelines 62.4% of the time for asymptomatic caries.

TABLE 1.

- On average, Network dentists reported using selective caries removal (Option 1) 54% of the time in patients with asymptomatic teeth and 44% of the time for patients with symptomatic teeth.
- For asymptomatic teeth, non-selective caries removal was split evenly between direct pulp cap placement (23%) and root canal therapy (24%).
- For symptomatic teeth, the use of non-selective caries removal was more common (root canal therapy (36%) and direct pulp cap (20%) compared to selective caries removal (44%).

FIGURE 2.

- When looking at the importance of patient or treatment factors to make a clinical decision regarding deep caries removal strategies, the factor rated most highly was the patient's oral health including anticipated compliance with future appointments, which 87% of dentists (95% CI; 86 to 89) rated as highly important (4 or 5 on a Likert scale, ranging from 1 [not at all important] to 5 [extremely important]).

Conclusions

Network dentists have reported a higher frequency of using selective caries removal strategies for deep carious lesions than previously documented in Network studies in the US and Japan. There are opportunities for spreading knowledge and continuing education activities, as well as conducting implementation studies to understand the obstacles and aids to adoption, thereby promoting the use of selective caries removal when clinically indicated.

Methods


Study Design and Participants

- Cross-sectional questionnaire exploring practice patterns using two clinical case scenarios.
- Network dentists who provide non-implant restorative dental treatment occasionally or routinely (N= 698).

Measures and Data Analysis

- Case scenarios for treating both asymptomatic and symptomatic (mild reversible pulpitis) teeth, accompanied by images (see **Figure 1.**) and descriptions of selective and non-selective (complete) caries removal.
- For each clinical scenario, providers were asked to rate what percent of the time they chose each of 3 treatment options:
 - Option 1: Remove all caries at the periphery of the cavity; remove as much caries as possible pulpally and stop before the pulp is exposed.
 - Option 2: Remove all caries and proceed with a direct pulp cap if the pulp is exposed.
 - Option 3: Remove all caries and proceed with endodontic-related procedures if the pulp is exposed.

FIGURE 1. Descriptions and images of caries removal strategies from questionnaire



- **Selective Caries Removal:**The periphery of the cavity is cleaned to hard dentin, while pulpally as much carious tissue is removed while avoiding pulp exposure (leaving softened dentin if necessary) and removing enough tissue to place a durable restoration.
- **Non-Selective Caries Removal (also known as complete caries removal):** Both at the periphery of the cavity and pulpally, all carious tissue is removed to reach hard dentin, leaving no softened dentin.
- **Radiograph showing caries extending to inner one-third of dentin without an obvious pulpal exposure in the mandibular right first molar.**

TABLE 1. Percent of time choosing each of three treatment options for each clinical scenario (n=467)

| Asymptomatic tooth with deep carious lesion extending to inner 1/3 of dentin without an obvious potential pulpal exposure | | Symptomatic tooth (mild reversible pulpitis) with deep carious lesion extending to inner 1/3 of dentin without an obvious potential pulpal exposure | |
|---|-------------------------|---|-------------------------|
| | mean (SD) ¹ | | mean (SD) ¹ |
| Option 1- Selective Caries Removal | 53.7(39.9) ² | Option 1- Selective Caries Removal | 44.1(38.1) ² |
| Option 2- Direct pulp cap | 22.6(29.5) | Option 2- Direct pulp cap | 19.8(26.1) |
| Option 3- Root canal therapy | 23.7(33.0) | Option 3- Root canal therapy | 36.1(37.4) |

FIGURE 2. Importance of patient or treatment factors when making a clinical decision regarding deep caries removal strategies (n=467)

