Defective restoration repair or replacement

An American Dental Association Clinical Evaluators Panel survey

Survey Results

Data reflect the responses of 400 American Dental Association Clinical Evaluators (ACE) Panel member dentists in the United States.

Do you repair defective restorations?

83%

of respondents repair defective restorations

Top 3 conditions for making restoration repairs*

87%
Noncarious marginal defect

79%
Partial loss or fracture of restoration

73%
Crown margin repair due to carious lesion

1/3 **of respondents do NOT** repair **amalgam** or **glass ionomer** or **fractured indirect all-ceramic crown** restorations

98% **of respondents** repair **direct resin composite** restorations.

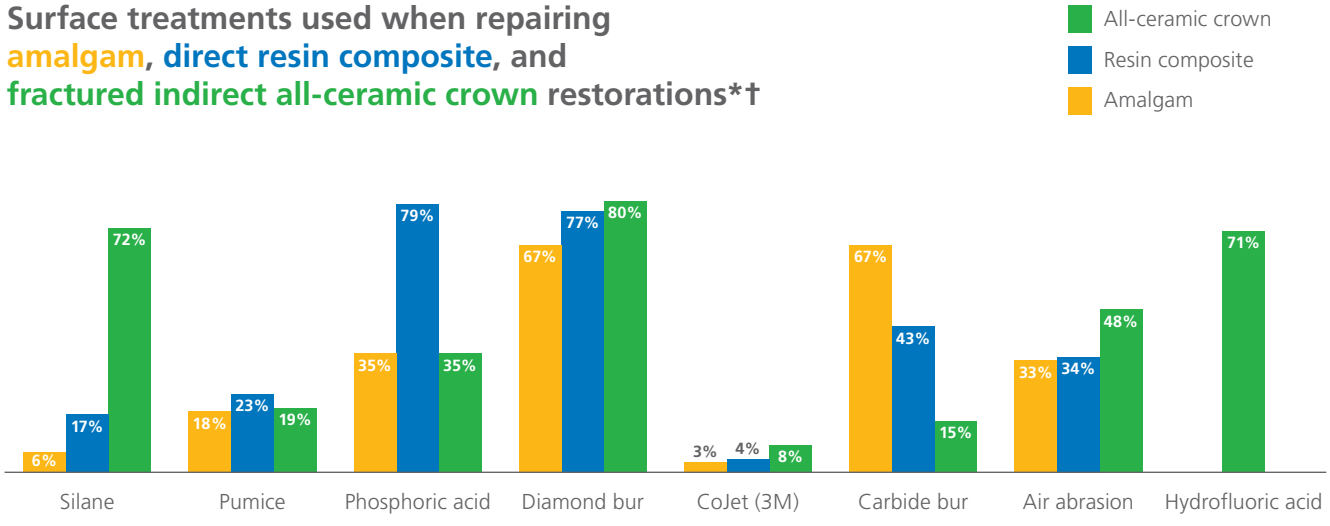
Materials used for restoration repairs*

Glass ionomer cement restoration

Amalgam restoration

Direct resin composite restoration

Surface treatments used when repairing amalgam, direct resin composite, and fractured indirect all-ceramic crown restorations*†



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Demographics (n = 400)

Age, y, Mean (Standard Deviation)	57.0 (14)
Female/Male, %*	24.3/75.8
Region, %†	
Northeast	22.4
Midwest	24.6
West	24.1
South	28.9
Race or Ethnicity, %*‡	
White	79.7
Asian	10.4
Hispanic or Latino	1.8
Black or African American	1.5
Native Hawaiian or other Pacific Islander	0.5
American Indian or Alaskan Native	0.3
Other or multiracial	5.6
Practice Type, %	
General practice	92.3
Specialty	7.7
Occupation, %	
Full-time practice (≥ 30 h/wk)	75.3
Part-time practice (< 30 h/wk)	8.5
Dental school faculty	6.5
Part-time faculty and practice	2.5
Other	8.2

* Percentages do not sum to 100% owing to rounding.; † Geographic region was missing for 2 respondents.; ‡ Race or ethnicity was missing for 6 respondents.

Clinical Insights

Repairing defective restorations is an alternative to replacing them. However, restoration repair protocols are inconsistent, making decisions to replace or repair the restorations difficult.

When the defect is limited and localized and the remaining tooth structure's condition is sound, repairing may be a more conservative, minimally invasive approach.[1,2] Restoration replacement, which leads to repeated restorations that cause the tooth to weaken from tooth structure loss and repeated iatrogenic pulp insults, may lead to loss of pulp vitality.[3] Deciding whether to repair or replace a defective restoration may be influenced by the patient's caries risk.[2] Success for defective restoration repair is proper case selection and technique.

Typically, restoration repair involves removing part of the restoration at the defective site to eliminate a localized restorative material or tooth defect or to facilitate access to secondary carious lesions. Amalgam[2] and composite[1,2,4] repairs are effective in increasing the original restoration's survival rate and may last as long as replacements.[2] When repairing amalgam restorations, mechanical retention in the remaining amalgam and roughening the surface with a diamond bur before applying new amalgam are recommended.[5] There are several protocols for tooth preparation before resin composite application. The recommended surface treatment protocol from the only long-term randomized controlled trial is applying an adhesive system containing etchant, primer, and bonding agent followed by resin composite application.[2]

* This question allowed for multiple answers.

† Thirty-one percent of respondents do not use a surface treatment when repairing amalgam restorations, 2% when repairing direct composite restorations, and 4% when repairing fractured indirect all-ceramic crown restorations.

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This article has an accompanying online continuing education activity available at: https://ebusiness.ada.org/education/viewcourse.aspx?id=509.

Abstract

Background. Clinicians often encounter defective restorations and are faced with the difficult decision of whether to repair the existing restoration or replace it.

Methods. An electronic survey on repairing or replacing defective restorations was developed to assess how clinicians are making these decisions and the technical aspects considered when making a repair. E-mails containing the survey link were sent to the American Dental Association Clinical Evaluators (ACE) Panel on August 14, 2019, and the survey remained open for 2 weeks. Nonrespondents were sent reminders 1 week after deployment.

Results. Approximately 4 of every 5 respondents repair defective restorations. The top 3 conditions for making these repairs were noncarious marginal defects (87%), partial loss or fracture of the restoration (79%), and crown margin repair due to carious lesions (73%). Among respondents who repair defective restorations, almost all repair direct resin composite (98%), whereas approximately one-third do not repair the other restorative materials (that is, amalgam, glass ionomer, and fractured indirect all-ceramic crowns). Resin composite is used most often to repair resin direct composite restorations, and likewise, glass ionomer is used most often to repair glass ionomer restorations. Only 54% of respondents use amalgam to repair amalgam restorations. Surface treatments varied among the 3 available restorations types.

Conclusions. Many dentists are actively making restoration repairs, but choosing clinical scenarios to make these repairs is material dependent.

Practical Implications. The repair of defective restorations is an acceptable and more conservative alternative than restoration replacement, and its success depends on proper case selection, material, and technique.

American Dental Association Clinical Evaluators Panel Methodology

History of the American Dental Association Clinical Evaluators Panel

The American Dental Association Clinical Evaluators (ACE) Panel[6] was first convened in 2006 as a volunteer group of American Dental Association (ADA) members who provided clinical feedback on professional product evaluations for a professional product evaluation newsletter known as *ADA Professional Product Review.*

In 2013, the ADA Division of Science received software to conduct its own surveys, and the first professional product review survey was deployed in September 2013 to the ACE Panel and a separate random sample of 3,000 dentists. Since then, ADA Science Institute and, later, ADA Science and Research Institute (SRI) staff members have worked with the ACE Panel Oversight Subcommittee of the Council on Scientific Affairs to generate ACE Panel survey results reports.

As of January 2020, the ACE Panel is used to take the pulse of ADA member perceptions and feedback regarding professional products, materials, and clinical techniques. The ACE Panel comprises 951 ADA members who have the opportunity to participate in quarterly surveys.

Purpose of the American Dental Association Clinical Evaluators Panel

The ACE Panel is a network of practicing ADA members who want to learn from one another by sharing clinical insights and experiences that can help build science content focused on dental materials and clinical-based research. The ACE Panel is a valuable resource in that it enables ADA members to expand their clinical knowledge about dental products, materials, devices, and drugs. In addition, the ACE Panel provides a platform for dentists to expand their professional network of dental experts and clinical scientists. ACE Panel members also have the opportunity to identify knowledge gaps and areas of future research for the ADA SRI.

Panel Recruitment and Composition

The ADA SRI actively recruits new ACE Panel members through the ADA Meeting, targeted e-mail campaigns, ADA News stories, the ADA Morning Huddle, and science-related ADA continuing education courses for clinicians. Any ADA member can join the ACE Panel by visiting the ACE Panel home page.

Survey Development

A subcommittee of the ADA Council on Scientific Affairs selects topics for each survey on the basis of suggestions from the ACE Panel and ADA SRI priorities. After topic selection, the subcommittee and the ADA staff methodologist

(O.U.) develop the survey content in the Qualtrics Research Core platform.[7] When a topic is outside the expertise of the subcommittee, ADA SRI staff members and subcommittee members consult subject matter experts. Before deployment to the ACE Panel, ADA SRI staff members and the subcommittee conduct an iterative process of pretesting the questions with another group of ADA SRI staff members and the subcommittee members to help ensure the comprehensiveness of answer choices, brevity (that is, surveys should take approximately 5 minutes to complete), clarity in question wording, logic, and response options and response scales (for example, Likert scales and numerical rating scales), among other survey methodology best practices. ADA SRI staff members and the subcommittee deploy the surveys to the ACE Panel electronically via e-mail, including a link to access the questionnaire. All links are set to expire 2 weeks after deployment. One week after deployment, ADA SRI staff members and the subcommittee send e-mail reminders to nonrespondents.

Data Analysis and Reporting

After respondents take the survey, they immediately have access to an interim report containing aggregate data from all respondents to that particular point in time. Two weeks after deployment, ADA SRI staff members export the final data set from Qualtrics Research Core platform to a .csv file and import the file into SAS Version 9.4 for data cleaning, relabeling of variables, and conducting exploratory and descriptive analysis (for example, participant demographics [including sex, age, region, race, practice type, and occupation] and means for continuous variables and proportions for discrete variables). These analyses provide insights as to which data will be prioritized for reporting and in which format. Next, in consultation with a graphic designer, ADA SRI staff members develop infographics to illustrate the most relevant results and elaborate clinical insights to facilitate the use and contextualization of the information from the survey. The collection of final reports for ACE Panel surveys are published in *The Journal of the American Dental Association* and are available electronically in the ACE Panel report library.[8]

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