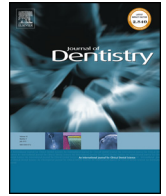




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Repair vs replacement of direct composite restorations: a survey of teaching and operative techniques in Oceania



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ABSTRACT

Objectives: To evaluate the teaching and operative techniques for the repair and/or replacement of direct resin-based composite restorations (DCRs) in dental schools in Oceania.

Methods: A 14-item questionnaire was mailed to the heads of operative dentistry in 16 dental schools in Oceania (Australia, New Zealand, Fiji and Papua New Guinea). The survey asked whether the repair of DCRs was taught within the curriculum; the rationale behind the teaching; how techniques were taught, indications for repair, operative techniques, materials used, patient acceptability, expected longevity and recall systems.

Results: All 16 schools participated in the study. Thirteen (81%) reported the teaching of composite repairs as an alternative to replacement. Most schools taught the theoretical and practical aspects of repair at a clinical level only. All 13 schools (100%) agreed on tooth substance preservation being the main reason for teaching repair. The main indications for repair were marginal defects (100%), followed by secondary caries (69%). All 13 schools that performed repairs reported high patient acceptability, and considered it a definitive measure. Only three schools (23%) claimed to have a recall system in place following repair of DCRs. Most respondents either did not know or did not answer when asked about the longevity of DCRs.

Conclusions: Repair of DCRs seems to be a viable alternative to replacement, which is actively taught within Oceania. Advantages include it being minimally invasive, preserving tooth structure, and time and money saving. However, standardised guidelines need to be developed and further clinical long-term studies need to be carried out.

Clinical significance: The decision between replacing or repairing a defective composite restoration tends to be based on what clinicians have been taught, tempered by experience and judgement. This study investigated the current status of teaching and operative techniques of repair of direct composite restorations in dental schools in Oceania.

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1. Introduction

Composite resins are widely used in dentistry for a variety of purposes, including, amongst others, restorative materials, cavity liners, pit and fissure sealants, cores and inlays and onlays [1]. The properties of adhesive bonding systems and composite resins have improved over the years, increasing the popularity of composite resins both with dentists and patients [2]. Direct composite restorations (DCRs) are tooth-coloured, do not require extensive

tooth preparation and show good performance provided the directions for use are followed meticulously during placement. Modern bonding technologies and techniques have reduced polymerisation shrinkage, microleakage and the occurrence of secondary caries [3]. For these reasons, composite resins are the first choice for a large and increasing number of practitioners when placing both anterior and posterior restorations [1].

Dental restorations tend to have limited service life and be prone to failure. Biological, mechanical and or aesthetic factors might be involved in composite failure, generating the need for replacement. When defective composite restorations require intervention, clinicians are often challenged to whether replacement or repair should be undertaken. Based on traditional

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teaching approaches, complete removal is required if the restorations do not satisfy strict quality requirements [4]. However, in recent years there has been an increasing change in practice to perform repair of defective composites as an alternative to complete removal [5–9]. There are many financial and biological reasons to retain sound parts of the old restoration in place. These include reduction in costs, unnecessary removal of tooth structure and avoidance of repetitive trauma from restorative procedures [5,6,9].

The decision between replacing or repairing a defective composite restoration is more often than not at the discretion of the clinician. This decision tends to be based on what they have been taught, tempered by clinical experience and judgement. Trends in current dental practice are now shifting to more conservative approaches and consequently many dental schools throughout the world teach repair of restorations to undergraduate students either in preclinical and/or clinical years [4,10,11].

Despite increasing popularity and application among dentists, no practice guidelines are currently available on the indications and operative techniques for the repair of restorations. Past investigations performed in different regions such as UK and Ireland [10,12], Germany and Scandinavia [4,13,14], USA and Canada [11,15] have found no consensus in regards to operative techniques and the teaching of this concept as it applies to DCRs. This paper reports an investigation into the current status of teaching and operative techniques of repair and replacement of direct composite restorations in dental schools in Oceania.

2. Methods

A previously trialled and validated questionnaire [10] comprising 14 questions (see supplementary material) were mailed to the Heads of Operative/Restorative Dentistry in the 16 dental schools in Oceania (Table 1). Ethical approval for the study was obtained from the University of Otago Human Ethics Committee (D16/099).

In addition to the questionnaire, each respondent was sent a glossary of terms. The questionnaire included questions regarding whether the repair of DCRs was taught in the undergraduate programme; plans for the teaching repair of DCRs in the next five years; grounds behind the teaching; how they were taught (theoretical versus practical); the indications for repair; patients acceptability; operative techniques and materials used; expected longevity and monitoring of repaired restorations. Responded and returned questionnaires were de-identified and the data collected was collated and analysed anonymously using excel. Average percentages were calculated to all variables analysed.

Table 1
List of dental schools in Oceania.

Countries	Dental schools
New Zealand	Auckland University of Technology University of Otago
Australia	Melbourne University Griffith University University of Western Australia Curtin University Australia University of Newcastle Central Queensland University University of Adelaide Charles Sturt University University of Sydney La Trobe University University of Queensland James Cook University
Fiji	Fiji National University
Papua New Guinea	University of Papua New Guinea

3. Results

The response rate was 100%. All 16 respondents (100%) had performed repairs to DCRs themselves and considered the treatment to have been successful. Most of the dental schools in Oceania (81%, $n = 13$) taught repair of direct composite restorations as an alternative to replacement in their undergraduate programmes.

The three schools that did not teach students how to repair DCRs reported that this procedure was not intended to be introduced in the curriculum within the next five years. The main reasons for not teaching composite repair were its absence from the current recommended curriculum, perceived lack of evidence and its absence in recommended textbooks. Other reasons reported included perceptions about insufficient adhesion of new increments of composite to cured 'aged' composite.

The most common grounds for teaching composite repair were clinical experience (92%, $n = 12$) and existing evidence (62%, $n = 8$) (Fig. 1). Among other reasons reported were 'prosthodontic opinion' and the fact that 'this is a topic described and examined in several studies'.

Most schools taught both the theoretical and practical aspects of composite repair at a clinical level only (61 and 69% of the schools, respectively), while teaching at a preclinical level was not common (15%, $n = 2$). Among the main factors that were indicated as reasons for teaching repair of DCR were tooth substance preservation (100% of the respondents), promotion of minimal intervention dentistry (69%, $n = 9$), and a desire to minimise the adverse effects of the restorative cycle (46%, $n = 6$) (Fig. 2).

Concerning the restoration-related failures that were considered to justify the teaching DCR repairs, all respondents reported marginal defects (100%, $n = 13$) as the main reason, followed by secondary caries (69%, $n = 9$) and marginal discolouration, superficial colour correction and labial/buccal restoration discolouration (61%, $n = 8$) (Fig. 3).

Bulk fractures of restorations, considered to indicate repair were predominantly incisal (62%, $n = 8$) and proximal-incisal (38%, $n = 5$) fractures in anterior teeth; and marginal ridge (46%, $n = 6$), followed by isthmus and occlusal fractures (38%, $n = 5$) in posterior restorations. Other indications included repair in cases of fracture of tooth tissue adjacent to existing composites- incisal (46%, $n = 6$) and proximal-incisal (38%, $n = 5$) fractures in anterior teeth and cusp fractures (54%, $n = 7$) in posterior teeth.

With respect to patient acceptance, 100% of the respondents that teach repair of DCRs ($n = 13$) reported that patients are willing to accept this procedure as an alternative to replacement. Most schools (77%, $n = 10$) considered the repair of DCRs to be a definitive measure, with expected longevity varying between 1 and 10 years.

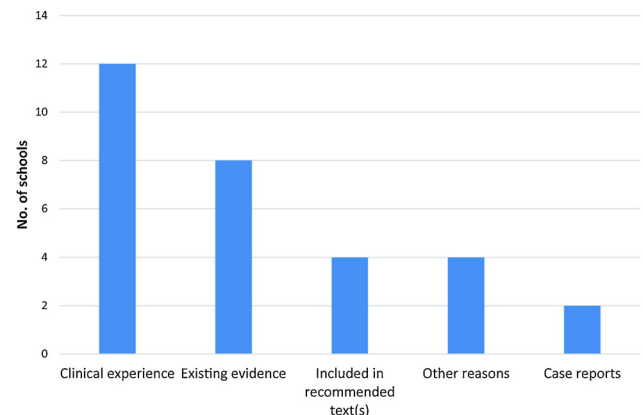


Fig. 1. Grounds for teaching the repair of composite restorations in Oceania.

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