Direct restorative materials use in Australia in 2002

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Abstract

Background: This study aimed to determine the reasons for dentists' choice of materials, in particular amalgam and resin composite, in Australia.

Method: A questionnaire was developed to elicit this information. The names and addresses of 1000 dentists in Australia were selected at random. The questionnaire was mailed to these dentists with an explanatory letter and reply-paid envelope.

Results: A total of 560 replies were received. Regarding choice of material, 99 per cent of respondents cited clinical indication as an influencing factor, although patients' aesthetic demands (99 per cent), patients' wish (96 per cent), patients' financial situation (82 per cent), and lecturers' suggestions (72 per cent) were also reported to influence respondents' choice of materials. Twelve per cent of respondents used composite 'always', 29 per cent 'often', 32 per cent 'sometimes', 23 per cent 'seldom' and 4 per cent 'never' in extensive load-bearing cavities in molar teeth. For composite restorations in posterior teeth, 84 per cent 'always', 'often' or 'sometimes' used the total etch technique, 84 per cent used a thick glass-ionomer layer and 36 per cent never used rubber dam. Fifty-nine per cent of respondents reported a decreased use of amalgam over the previous five years. Sixty-eight per cent of respondents agreed with the statement 'discontinuation of amalgam restricts a dentist's ability to adequately treat patients'. Seventy-five per cent considered that the growth in the use of composites increased the total cost of oral health care.

Conclusions: Of the respondents from Australia 73 per cent place large composite restorations in molar teeth and their choice of material is influenced greatly by clinical indications, and patients' aesthetic demands.

Key words: Amalgam, composite, usage, techniques, materials.

Abbreviations and acronyms: GDPs = general dental practitioners; RBC = resin-based composite.

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INTRODUCTION

At the start of a new century, dentists in the developed world are still commonly using amalgam for the restoration of posterior teeth, a material that has been in use for over 100 years.1 This may be considered surprising, given the considerable changes which have been made in other avenues of life during this time. However, there are indications of a shift away from the use of amalgam, principally because of patient concerns about the use of a mercury-containing filling material and partly because patients' assessment of dental aesthetics appears to indicate that a proportion of the population are unhappy with the colour of the restorations in their teeth.2 Accordingly, it may be considered that provision of tooth-coloured restorations will be increasingly demanded. Nevertheless, amalgam restorations may provide good longevity,3,4 and involve less technique sensitivity in their placement than the alternatives. Composite materials, in particular, have been considered demanding to place in posterior teeth, principally in respect of counteracting the problems of polymerization shrinkage5 and the achievement of a satisfactory contact point in Class II restorations, which has been considered problematical in the past.6 Difficulties relating to interproximal contour have, to some degree, been solved by the introduction of new matrix systems, but although some recently developed materials have been demonstrated to have reduced shrinkage on polymerization (3M ESPE, St Paul, M innesota, USA), this problem may not be solved until materials become available with zero net polymerization shrinkage.

Resin-based composite (RBC) materials offer some advantages over amalgam for restoration of posterior teeth, including a less destructive preparation and improved aesthetics. They appear to be well accepted by the dental profession, despite their technique sensitivity in use. In the USA use of RBC has been shown to be increasing; data sampled from a US dental plan organization showed a change in ratio of amalgam to RBC use from 3.2:1 in 1995 to 1:1 in 1999.7 This expansion in RBC use is being driven in part by patients' preference for tooth coloured restorations, and perhaps, by a fear of mercury-containing material.8 Even though the NHS fee structure precludes the use of...
RBC in load bearing cavities in posterior teeth, six dental schools in the UK were reported to be teaching repair of posterior RBC at undergraduate level in 2002. There are signs that amalgam use is diminishing in the USA and parts of Europe but it could be considered interesting to assess whether this trend is also apparent in a different continent, Australia, using methodology which had been utilized in other parts of the world. The information gained from such an assessment will be of value in the planning of dental services and in the planning of postgraduate education.

**Purpose of proposed investigation**

The aim of this study was to assess dentists' attitudes to, and behaviour concerning, the use of amalgam and RBCs in the restoration of cavities in posterior teeth, by means of a postal questionnaire distributed to a representative sample of dentists in Australia.

**MATERIALS AND METHODS**

A questionnaire was developed from that used by Widstrom and Fors, to determine UK dentists' attitudes to the use of amalgam and resin composite, the techniques used and side effects noticed. This questionnaire was further modified for use in the present survey. The questionnaire used both open and structured questions to elicit information regarding the treatment needs of patients, choice of restorative materials and the properties and usefulness of different materials. It was piloted among 20 general dental practitioners (GDPs) in the United Kingdom and amended following receipt of their comments.

One thousand dentists' names and addresses were selected at random from a list of general dental practitioners supplied by the Australian Dental Association Inc. Each of the selected dentists was sent the questionnaire by post, along with a stamped addressed envelope and an explanatory letter designed in accordance with the principles of Dillman's Total Design Method. Recipients of the questionnaire were asked to complete and return the questionnaire within one month. Another questionnaire and letter was sent to dentists who did not reply to the first mailing after a one month. Another questionnaire and letter was sent to dentists who did not reply to the first mailing after a two-month period. The data contained in the returned questionnaires were analyzed using Minitab (version 12). Data analysis involved descriptive statistics and cross-tabulations, with potential associations tested for significance using chi-square tests and appropriate follow-up multiple comparisons as necessary.

**RESULTS**

**General and demographic data**

Replies were received from a total of 560 dentists, a response rate of 56 per cent. Seventy-six per cent (n=426) of the respondents were male. Regarding years since graduation, 28 per cent (n=154) had graduated between 11 and 20 years, 40 per cent (n=224) for 21 years or more, and the remaining 32 per cent (n=182) for 10 years or fewer. A large majority (60 per cent: n=335) were practice-owners, 14 per cent (n=77) were associates, 14 per cent (n=78) were assistants and 12 per cent (n=67) were salaried. Sixty-four per cent (n=353) practised in a group or partnership, the remaining 36 per cent (n=202) practising single-handed. Five per cent (n=27) were in a specialist practice.

Regarding practice location, 61 per cent (n=338) were in a suburban location, 28 per cent (n=155) were in a city or town centre, and 11 per cent (n=64) in a rural location.

**Changes in treatment need and choice of materials**

![Fig 1. Changes in need for restorations.](image)

Figure 1 gives the distribution of opinions on the change in need for restorations among patients; 71 per cent (n=381) indicated that the need for restorations among their patients had remained stable during the five years preceding the survey. Fifty-nine per cent (n=327) of respondents recorded a decreased use of amalgam over the previous five years, while 22 per cent (n=121) reported that their use of amalgam had remained stable. The use of resin composite increased in 74 per cent (n=412) of respondents' practices and glass-ionomer and RMGI use were reported to have increased in 42 per cent (n=229) and 40 per cent (229) of respondents' practices respectively.

Although outside the basic remit of this paper, information was obtained on indirect restoration, with the utilization of ceramic inlays, metal-ceramic crowns and implants effectively remaining stable. The use of dentine-bonded crowns was reported to have a strongly increased, with 36 per cent (n=196) of respondents indicating increased use and 31 per cent (n=172) stating that their use of these restorations had remained stable. Prescription of gold restorations was found to have decreased and the use of bridges was stable. Forty-four per cent (n=242) of respondents did not place implants, 42 per cent (n=232) did not prescribe gold inlays and 52 per cent (n=289) did not prescribe ceramic inlays. The complete data are presented in Table 1.

Regarding choice of material, 99 per cent of respondents cited clinical indication as an influencing factor, although patients' aesthetic demands (99 per cent of respondents: n=536), patients' wishes (96 per
cent: n=524), patients’ financial situation (82 per cent: n=452), and lecturers’ suggestions (72%: n=385) were also influential in respondents’ choice of materials. The complete data are presented in Table 2.

Reasons for replacement of restorations

Respondents were asked to indicate reasons for replacement of amalgam and composite restorations (see Table 3). The most frequently reported reasons for replacement of amalgam restorations were ‘fractured restoration’ and ‘lost filling’, whilst for composite the most frequently reported reason was ‘secondary caries’. The reasons ‘fractured restoration’, ‘lost filling’ and ‘patient’s wish’ were reported by a significantly greater proportion of respondents for the replacement of amalgam than composite restorations (all p<0.001).

The replacement of restorations due to ‘sensitivity/pain’ or ‘wear’ was more likely for composite than amalgam restorations (both p<0.001).

Use of composite and techniques employed

The frequency of placement of extensive, occlusion-bearing composite restorations in molar teeth is given in Fig 2.

The most commonly used techniques for placement of an extensive composite were total etch/dentine bonding, used ‘always’, ‘often’ or ‘sometimes’ by 84 per cent (n=463) of respondents; a thick glass-ionomer layer (‘sandwich restoration’) by 84 per cent (n=463) of respondents; a thin glass ionomer layer by 77 per cent (n=422) of respondents; a flowable composite ‘base’ by 60 per cent (n=328) of respondents; and calcium hydroxide in combination with another base by 40 per cent (n=215) of respondents.

The reported frequency of use of rubber dam for isolation is given in Fig 3.

The results were broadly similar for respondents’ techniques for smaller composite restorations except that they were significantly less likely (p<0.001) to use a thick glass-ionomer layer in such situations.

Influence of demographic factors on use of composite in extensive restorations in molar teeth

There was evidence of a statistically significant association between opinion on whether composite use had increased, and years since graduation (p<0.01). A significantly greater percentage of dentists who had graduated for <5 years thought that composite use had increased, compared with respondents who had graduated 5-10 years. There was also a significant association between the use of composite in extensive restorations in posterior teeth and years since graduation, the (p <0.01). Bonferroni-adjusted multiple

Table 1. Changes in the respondents’ use of dental materials in the last five years

<table>
<thead>
<tr>
<th>Material</th>
<th>Increased</th>
<th>Remained stable</th>
<th>Decreased</th>
<th>Do not know</th>
<th>Do not use at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amalgam</td>
<td>2% (12)</td>
<td>22% (121)</td>
<td>59% (327)</td>
<td>1% (4)</td>
<td>16% (88)</td>
</tr>
<tr>
<td>Glass ionomer</td>
<td>42% (229)</td>
<td>36% (201)</td>
<td>18% (97)</td>
<td>1% (3)</td>
<td>4% (21)</td>
</tr>
<tr>
<td>Resin Modified GI</td>
<td>40% (215)</td>
<td>29% (156)</td>
<td>8% (45)</td>
<td>6% (32)</td>
<td>18% (96)</td>
</tr>
<tr>
<td>Composite</td>
<td>74% (412)</td>
<td>22% (120)</td>
<td>3% (17)</td>
<td>0% (0)</td>
<td>1% (7)</td>
</tr>
<tr>
<td>Gold (inlays/fillings)</td>
<td>5% (26)</td>
<td>25% (138)</td>
<td>27% (152)</td>
<td>1% (7)</td>
<td>42% (232)</td>
</tr>
<tr>
<td>Ceramic inlays</td>
<td>14% (79)</td>
<td>19% (105)</td>
<td>14% (75)</td>
<td>1% (4)</td>
<td>52% (289)</td>
</tr>
<tr>
<td>Metal-ceramic crowns</td>
<td>30% (165)</td>
<td>51% (284)</td>
<td>8% (45)</td>
<td>3% (16)</td>
<td>8% (46)</td>
</tr>
<tr>
<td>Dentine-bonded crowns</td>
<td>36% (196)</td>
<td>31% (172)</td>
<td>2% (13)</td>
<td>7% (40)</td>
<td>23% (126)</td>
</tr>
<tr>
<td>Bridges</td>
<td>11% (63)</td>
<td>66% (365)</td>
<td>10% (54)</td>
<td>3% (15)</td>
<td>11% (59)</td>
</tr>
<tr>
<td>Implants</td>
<td>37% (202)</td>
<td>14% (79)</td>
<td>3% (15)</td>
<td>2% (13)</td>
<td>44% (242)</td>
</tr>
</tbody>
</table>

Table 2. Factors influencing choice of restorative materials in respondents’ practices

<table>
<thead>
<tr>
<th>Factor</th>
<th>Very much</th>
<th>Somewhat</th>
<th>Only slightly</th>
<th>Not at all</th>
<th>Do not know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical indications</td>
<td>93% (510)</td>
<td>5% (26)</td>
<td>1% (8)</td>
<td>1% (3)</td>
<td>0% (0)</td>
</tr>
<tr>
<td>Advertising in dental press</td>
<td>3% (15)</td>
<td>9% (50)</td>
<td>44% (235)</td>
<td>44% (235)</td>
<td>1% (4)</td>
</tr>
<tr>
<td>Information in dental press</td>
<td>20% (109)</td>
<td>42% (223)</td>
<td>28% (148)</td>
<td>10% (52)</td>
<td>1% (4)</td>
</tr>
<tr>
<td>Patient’s aesthetic demands</td>
<td>55% (299)</td>
<td>41% (220)</td>
<td>3% (17)</td>
<td>1% (3)</td>
<td>1% (4)</td>
</tr>
<tr>
<td>Patient’s wish for a certain material</td>
<td>30% (163)</td>
<td>42% (231)</td>
<td>24% (130)</td>
<td>4% (19)</td>
<td>1% (4)</td>
</tr>
<tr>
<td>Patient’s financial situation</td>
<td>23% (125)</td>
<td>39% (209)</td>
<td>20% (108)</td>
<td>17% (90)</td>
<td>1% (8)</td>
</tr>
<tr>
<td>Lecturer’s suggestions</td>
<td>9% (48)</td>
<td>39% (210)</td>
<td>24% (127)</td>
<td>21% (110)</td>
<td>7% (36)</td>
</tr>
</tbody>
</table>

Table 3. Reasons for replacement of restorations

<table>
<thead>
<tr>
<th>Reason</th>
<th>Amalgam</th>
<th>Composite</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fractured restoration</td>
<td>90% (493/551)</td>
<td>80% (444/551)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Lost filling</td>
<td>90% (491/547)</td>
<td>64% (351/546)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Secondary caries</td>
<td>83% (447/537)</td>
<td>88% (479/548)</td>
<td>0.052</td>
</tr>
<tr>
<td>Sensitivity/Pain</td>
<td>46% (247/540)</td>
<td>62% (340/547)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Wear</td>
<td>29% (160/551)</td>
<td>66% (359/546)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Pulpal symptoms/Pain</td>
<td>61% (334/551)</td>
<td>64% (351/551)</td>
<td>0.291</td>
</tr>
<tr>
<td>Patient’s wish</td>
<td>75% (405/545)</td>
<td>44% (242/543)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>
comparisons suggested that a greater percentage of respondents who had graduated 11-20 years ago ‘always’ used composite compared with respondents who had graduated 5-10 years ago. Similar statistical testing also demonstrated that a significantly greater percentage of males than females ‘always’ used composite (p=0.04).

There was a significantly greater percentage of respondents in single-handed practices who ‘always’ used composite compared with respondents in group practices (p<0.01).

Influence of gender on the placement of amalgam restorations and pregnancy

Respondents gave opinions on whether amalgam restorations should be provided for pregnant women, and whether amalgam restorations should be placed by pregnant dentists. There was evidence of a significant association between gender and opinion given on the statement ‘amalgam restorations should not be provided for pregnant women’ (p<0.01). A significantly greater percentage of female respondents stated that they had ‘no opinion’ on this (F 28 per cent vs M 17 per cent), while a significantly greater percentage of male than female respondents ‘agreed strongly’ with this statement (F 8 per cent vs M 19 per cent). There was also a significant association between gender and opinion on the statement ‘pregnant dentists should not provide amalgam restorations’ (p<0.01). A significantly greater percentage of female respondents ‘disagreed’ (F 40 per cent vs M 28 per cent) whilst a significantly greater percentage of male respondents ‘agreed’ (F 9 per cent vs M 19 per cent) or ‘agreed strongly’ (F 4 per cent vs M 10 per cent) with this statement.

Properties of restorative materials

Respondents were asked to rank the materials amalgam, composite, glass ionomer, RMGI and compomer on a scale of 1=ineffective to 10=ideal for five properties, namely, wear resistance, ease of manipulation, value for money for the patient, long term aesthetics and lack of symptoms. The results are presented as mode scores (the number of respondents making the most frequent response) in Table 4.

Table 4. Mode scores for properties of restorative materials

<table>
<thead>
<tr>
<th></th>
<th>Amalgam</th>
<th>Composite</th>
<th>RMGI</th>
<th>Compomer</th>
<th>GI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wear resistance</td>
<td>8</td>
<td>7</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Ease of</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>manipulation</td>
<td>9</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Value for money</td>
<td>10</td>
<td>8</td>
<td>7</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>Long term</td>
<td>1</td>
<td>8</td>
<td>6</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>aesthetics</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of symptoms</td>
<td>8</td>
<td>7</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
</tbody>
</table>

Scale: 1=ineffective, 10=ideal.

Changes following a decreased use of amalgam

Respondents were asked to indicate the changes that they had noted in their practices following the decrease in use of amalgam during the 1990s in terms of changes in secondary caries, need for root fillings, loss of fillings or other reasons for re-restorations, patients’ satisfaction with aesthetics, technical challenges in restorative therapy, and allergic problems of both dental personnel and patients. The full results are presented in Fig 4(a) and 4(b).

![Fig 3. Use of rubber dam for isolation in extensive, occlusion-bearing restorations.](image)

![Fig 4(a). Changes following a decreased use of amalgam: Secondary caries, root fillings and lost fillings.](image)

![Fig 4(b). Patient satisfaction, technical challenges, allergic problems – Staff, allergic problems – patients.](image)
It is possible to provide composite restorations with a life-span equal to amalgam
Discontinuation of the use of amalgam would restrict a dentist’s ability to adequately treat patients’ oral health
Providing composites in posterior teeth was more time-consuming than placing a corresponding amalgam restoration
I would provide more amalgam restorations if patients would allow it
The growth in use of composite materials was increasing the total cost of oral health care
Due to environmental reasons one should stop using amalgam
Registration of possible side effects of dental materials in unsatisfactory in Australia
The use of amalgam will be discontinued by the year 2005

Provision of composite restorations
Respondents were asked whether they felt that a low-shrink composite would offer any clinical advantage; all but 3 per cent (n=19) agreed with this statement. With 62 per cent (n=340) of respondents offering strong agreement with it.
Opinions on further statements are summarized in Table 5. For example, with regard to the respondents’ clinical experience, 32 per cent (n=181) agreed with the statement ‘It is possible to provide composite restorations with a life span equal to amalgam’, while 49 per cent (n=275) disagreed.
Finally, 70 per cent (n=384) of respondents reported that they had treated patients who had requested replacement of dental restorations due to fear, or firm belief, of having symptoms caused by them.

DISCUSSION
It is of interest to note that, whilst so much else has changed in the past century, such as medical treatments, health practices, agriculture and food, dentists are still using a version of a material that they used over 100 years ago. With the arrival of a new millennium it seemed appropriate to investigate the reasons for the continued use of amalgam, or failure of alternative materials to become predominant, and, at the same time, to evaluate trends in the use of resin-based materials.

The use of questionnaire responses to determine dentists’ attitudes and behaviour is common, although not without difficulties such as non-response bias and the inability to check the validity of the respondents’ replies. Nevertheless, mailed questionnaires remain a useful method of obtaining data. The response rate (56 per cent) to this questionnaire was below the mean response rate (64 per cent) reported by Tan and Burke for mailed questionnaires to dentists, and no information is available on the non-respondents. The dentists’ names and addresses were kindly provided by the Australian Dental Association Inc. when they were asked for a sample of general dental practitioners. It is reassuring to note that all but 5 per cent indicated that they were indeed GDPs, an indication of the validity of the sample.

The demographic results from this questionnaire indicated that two-thirds of dental practitioners in Australia are now practising in a partnership/group arrangement, that 61 per cent practise in a suburban location, 40 per cent graduated more than 20 years ago, and 76 per cent are male. The need for restorations was considered to have decreased by 14 per cent of respondents, while a large majority (71 per cent) considered that the need for restorations had remained stable. This could be considered in line with current trends in Australia.

The results of the present survey indicate fairly widespread provision of resin composite restorations in posterior teeth in Australia, with the use of resin composite materials being reported to have increased in 74 per cent of respondents’ practices. This may be considered appropriate since current evidence for the use of composite in posterior teeth is positive, with the American Dental Association suggesting that composite is now indicated for moderate-sized class I and II restorations, as well as smaller cavities. More dentists in single-handed practices than group practices provided extensive resin composite restorations. This may be considered surprising, since it could be expected that partners within a group might readily disseminate new techniques between each other, an advantage which single-handed practitioners were not found to have, albeit 20 years ago. However, the results of the present study do not support this notion, possibly because information on new materials and techniques is so readily available today.

A majority of respondents (74 per cent) indicated that their use of composite as a restorative material had increased, while 42 and 40 per cent scored increased use of glass-ionomer and resin-modified glass ionomer materials respectively. Thirty-six per cent of respondents indicated increased use of dentine-bonded crowns. The results (Table 1) show a decrease in metal-containing restorations, with amalgam use decreasing by 59 per cent of respondents over the past five years and an increase in the use of metal-ceramic crowns by 30 per cent being indicated over the past five years. Seventy-three per cent of respondents used RBC sometimes, often or always. These data appear to support a strong adoption of adhesive techniques by dentists in Australia, with all the advantages of a less invasive preparation, the potential sealing of dentine by

Table 5. Further opinions on statements

<table>
<thead>
<tr>
<th>Statement</th>
<th>Total responses</th>
<th>Agreed</th>
<th>Disagreed</th>
<th>‘No opinion’</th>
</tr>
</thead>
<tbody>
<tr>
<td>It is possible to provide composite restorations with a life-span equal to amalgam</td>
<td>(n=556)</td>
<td>32% (181)</td>
<td>49% (275)</td>
<td>18% (100)</td>
</tr>
<tr>
<td>Discontinuation of the use of amalgam would restrict a dentist’s ability to adequately treat patients’ oral health</td>
<td>(n=556)</td>
<td>68% (375)</td>
<td>25% (140)</td>
<td>7% (41)</td>
</tr>
<tr>
<td>Providing composites in posterior teeth was more time-consuming than placing a corresponding amalgam restoration</td>
<td>(n=551)</td>
<td>87% (476)</td>
<td>8% (44)</td>
<td>5% (31)</td>
</tr>
<tr>
<td>I would provide more amalgam restorations if patients would allow it</td>
<td>(n=556)</td>
<td>30% (168)</td>
<td>53% (292)</td>
<td>17% (96)</td>
</tr>
<tr>
<td>The growth in use of composite materials was increasing the total cost of oral health care</td>
<td>(n=560)</td>
<td>75% (415)</td>
<td>11% (65)</td>
<td>14% (80)</td>
</tr>
<tr>
<td>Due to environmental reasons one should stop using amalgam</td>
<td>(n=553)</td>
<td>28% (156)</td>
<td>52% (288)</td>
<td>20% (109)</td>
</tr>
<tr>
<td>Registration of possible side effects of dental materials in unsatisfactory in Australia</td>
<td>(n=559)</td>
<td>45% (252)</td>
<td>16% (89)</td>
<td>39% (218)</td>
</tr>
<tr>
<td>The use of amalgam will be discontinued by the year 2005</td>
<td>(n=556)</td>
<td>24% (133)</td>
<td>60% (333)</td>
<td>16% (90)</td>
</tr>
</tbody>
</table>
dentine-bonding agents and the opportunity for good aesthetics.

Regarding techniques used during placement of composite restorations in posterior teeth, respondents used total etch/dentine bonding 'sometimes' (22 per cent), 'often' (15 per cent), or 'always' (47 per cent). A large proportion of respondents reported the use of glass-ionomer as either a thick or thin layer. Since these techniques have been considered appropriate, respondents appear to have embraced contemporary concepts. Conversely, 36 per cent of respondents never used rubber dam.

Composite was reported to be slightly less adequate than amalgam in terms of wear resistance, and was considered by a majority of respondents to be not as good as amalgam regarding value for money for the patient and lack of post-operative symptoms. Eighty-six per cent of respondents reported that technical challenges increased as amalgam use decreased and 64 per cent of respondents 'agreed strongly' that posterior composites were more time consuming to place than a corresponding amalgam restoration. Seventy-five per cent of respondents agreed with the statement that increased use of composites increased the cost of oral health care. Despite these reported views, if typical of the dental profession throughout Australia, there appears to be a fairly enthusiastic adoption of tooth-coloured restorative materials for posterior teeth.

Polymerization contraction of resin-based materials on curing is a central aspect of their 'technique sensitivity'. It was therefore not surprising that 97 per cent of respondents agreed with the statement that a low-shrink composite would be an advantage. The development of such materials appears to be under way, but to date full scientific evaluation has not been published.

Lastly, when the data were compared with the recent publication of amalgam and composite use by dentists in the UK,29 which used a similar questionnaire to that utilized in the present study, differences were apparent in the reported use of materials and techniques between UK and Australian dentists. For example, 44 per cent per cent of respondents from Australia scored 'patient’s wish' as a reason for replacement of composite restorations, compared with 75 per cent reporting this 'reason' for amalgam restorations. In the UK survey,24 there was no difference in these figures, possibly suggesting an increased demand by patients in Australia to have their amalgam restorations removed. In this respect, greater proportions of respondents from Australia indicated that they placed extensive, occlusion-bearing composite restorations in molar teeth. These differences may, in part, be due to the guidance issued by the General Dental Services of the Department of Health in the UK, which does not allow provision of RBC restrictions in loadbearing surfaces of posterior teeth, while no such restrictions apply in Australia.

SECTION

With regard to the techniques used by respondents during placement of large mesial-occlusal-distal composite restorations, respondents from Australia used more glass ionomer in thick and thin layers than respondents from the UK, and much less Ca(OH)₂ than their UK counterparts. Rubber dam was more frequently used by dentists in Australia.

CONCLUSIONS

It is concluded that three-quarters of the respondents from Australia place large composite restorations in posterior teeth. Their choice of material is greatly influenced by clinical indications and patient's demands.

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