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Dental educators' attitudes toward the teaching of dental amalgam.

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INTRODUCTION

This article aims, in the Australian context, to ascertain dental educators' attitudes toward the teaching of dental amalgam at under- and post-graduate levels, and identify preferred curricular approaches in a potentially 'amalgamless' profession.

In 2013 the Minamata Convention on Mercury[a] committed to a world-wide reduction and ultimate elimination in the anthropogenic production and use of mercury-containing products. The Australian Government signed the Convention in October 2013 and in 2016 released a Regulation Impact Statement for comment. It confirmed its intention to address the environmental and health risks posed by mercury by ratifying the Convention and implementing a national phase-out of mercury releases to the environment.[1] As at June 2018 Australia was yet to ratify the Convention. Australian dental organizations' pronouncements on Minamata and research of the implications of a phase-down are dated and few.

The Minamata Convention has provoked commentary stating that this will significantly and permanently change the future practice of dentistry.[2] Previous research by the present authors[3] confirmed previous findings[4] that the use of dental amalgam is declining. Resin composite is now well-established as the material of choice for the direct restoration of teeth.[5-10] A consensus appears to exist that any impact, including in Australia, would be minimal, as a decrease in the use of dental amalgam as a direct restorative material has evolved over many years, and further decreases are warranted.[11, 12] Bartold suggests that the Convention "may be less relevant for dentistry in Australia".[12 p.1]

A 'phase-out' of dental amalgam was first suggested by the Global Mercury Partnership, an organization formed by the United Nations Environment Programme (UNEP).[b] The terminology subsequently changed to 'phase-down' and recognized that the complete cessation of the use of dental amalgam may be inappropriate as much needed to be achieved before this material can be completely replaced by alternatives.

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[a] http://www.mercuryconvention.org/. Accessed May 2017.

[b] https://www.unenvironment.org/explore-topics/chemicals-waste/what-we-do/mercury/global-mercury-partnership. Accessed May 2017.

Previous findings of the present authors[3, 13, 14] identified concern that although a change may result in few consequences, due attention must be paid to the potential implications.[15] These implications and the many influencing factors have been summarized[9] and reviewed by the present authors,[16] who identified 'knowledge factors',[13] which included aspects of dental education, and which are the focus of this article. The key issues explored included: preclinical and clinical teachers and teaching, curriculum content at under- and post-graduate levels, including continuing professional development, and whether dental amalgam should still be available after a phase-down.

METHODS

Ethics approval was obtained from the Melbourne Dental School's Human Ethics Advisory Group, Reference 1545545.1.

The study employed a mixed methods analysis of responses to an open-ended survey followed by a closed-ended response questionnaire completed by selected experts at each of the nine dental schools in Australia. Selection was based on clinical or academic expertise in operative and restorative dentistry as indicated by publications and reputation (being known in a professional capacity by the present authors), as well as by recommendation from those initially approached. Each participant was required to be involved in design, implementation or delivery of curricula relating to direct restorative materials. Eighteen individuals were identified and invited by email to participate in the study. Included was direction to a Plain Language Statement describing detail of the study and information regarding consent. Each invitee was informed of the intended two-phase nature, commitment required and voluntary nature of the study, including the ability to withdraw at any stage. All responses from the participants were to be based on professional and personal opinion. There were no incentives offered. Both phases of the study took place over a three-month period of mid-2017.

The first phase consisted of statements ('prompts') requiring open-ended responses. The responses were received by email and addressed to the first-named author who undertook thematic analysis using the Qualitative Data Analysis software 'NVivo'.[c] Analysis included familiarisation with, creation of themes and sub-themes from, and synthesis of the data. This involved interpretation of that explicit and implicit in the data; thematic identification rather than mere 'counting' of specific words and phrases.

The second phase consisted of a questionnaire based on the themes identified in the first phase (Table 1). The questionnaire was pre-tested by two dentists who had not participated in the first phase and consisted of twelve statements presented in a Likert format (five options ranging from 'strongly agree' to 'strongly disagree'). Respondents could make comments. The specific statements are identified at Table 2. Those who had

[c] NVivo qualitative data analysis software; QSR International Pty Ltd, Doncaster, Australia. Version 10, 2012.

participated in the first phase were invited by email to again participate. The questionnaire was conducted online utilizing 'SurveyMonkey'[d]. Results were collated and interpreted using percentage based statistical analysis (Table 2).

Phase One: Qualitative Analysis

Themes of interest were initially derived from the present authors' previous study of this topic in the context of implications of an 'amalgamless' profession for dentists in Australia[3, 13, 14, 16, 17] and as informed by their own experience and knowledge; all were actively involved in academia including curriculum design and teaching of restorative dentistry. The statements constituting the survey were based on the identified themes of: preclinical and clinical teaching of direct restorative materials with an emphasis on consistency of approach; the time and effort continued to be afforded to the teaching of dental amalgam; implications for postgraduate education including continuing professional development; and the need for continued availability of dental amalgam during a phase-down. The statements are shown below and selected responses (quotes) of the participants, identified by bracketed codes, are shown at Results and Discussion.

The four statements put to the participants were prefaced by, ''Minamata' may lead to a phase-down of the use of dental amalgam in Australia. With this in mind, please provide your thoughts on the following statements.' The statements were:

1. Preclinical and clinical teachers (demonstrators) are consistent in their teaching of dental amalgam/restorative dentistry. They are all 'on the same page.'

2. "*... dental schools [should] discontinue the teaching of dental amalgam placement to new enroll*ing dental *students ... the time and resources presently being spent on teaching amalgam placement could be put to better use, including enhanced diagnosis and management of early caries ... [and] the teaching of advanced* skills in composite placement and decision-making in relation to the application of refurbishment and repair *procedures ...*" (Lynch & Wilson 2013 (BDJ, 215 (3); 109-113 at 111).

3. There will be implications for postgraduate education and training (continuing professional development).

4. Dental amalgam should still be available for patient-care in Australia after a phase-down.

The themes and sub-themes derived from phase one are found at Table 1.

Phase Two: Quantitative Analysis

[d] SurveyMonkey Inc. Main website: www.surveymonkey.com: Palo Alto, California, USA.

The statements which constitute the questionnaire are found at Table 2. Responses of 'strongly agree', 'agree', 'strongly disagree' and 'disagree' are presented as combined data, worded as '(strongly) agree' and '(strongly) disagree'. Percentages are rounded to whole numbers.

RESULTS AND DISCUSSION

Of the eighteen individuals invited to participate in both phases of the study, fifteen agreed, and all provided complete responses to both phases without need for reminders. These fifteen represented seven of the nine dental schools in Australia. Attempts to recruit representatives from the remaining two dental schools proved unsuccessful, the effects of which are unknown, however the qualitative analysis is about ascertaining a deeper understanding of the 'few' rather than attempts at 'representativeness'.[18] It has been suggested that such an approach may be useful in areas of study that have been minimally researched, the potential value to this study is therefore recognised.[19, 20]

The following discussion combines an analysis of the open-ended responses of phase one and closed-ended responses of phase two under common themes.

Teaching of Dental Amalgam

The teaching of resin composite at undergraduate level has been extensively studied over the past two decades, especially in the United Kingdom and North America. Comparisons to dental amalgam contained in these studies have been minimal but consistent in their findings that the inclusion of dental amalgam as part of curricula has steadily decreased.[21] It is established that dental schools' teaching of dental amalgam varies,[22-25] with some planning its removal from,[26] and others not containing it in,[27] the curriculum.

Statements of the questionnaire relating to a need for continued teaching of amalgam for various treatment types received general consensus, with 80 per cent (strongly) agreeing there is a need to continue to teach the repair, polishing, maintenance and removal of dental amalgam, and associated mercury hygiene issues, and 73 per cent (strongly) agreeing that there is a need to continue to teach the placement of dental amalgam in specific situations such as cores for crowns, cusp overlays and complex restorations. There was also broad consensus that the majority of teaching should focus on adhesive and tooth-colored restorations, not dental amalgams (80 per cent (strongly) agreeing). This reinforced previous findings of the present authors that the majority of dentists in Australia believed that dental amalgam should continue to be taught at undergraduate level subsequent to a phase-down.[3, 13] Research of this issue has been identified as important by many commentators and by the World Health Organisation (WHO).[9]

The statement from phase one relating to the discontinuation of the teaching of dental amalgam placement prompted the greatest depth of response. There was a broad consensus, in line with the quantitative findings, that

the teaching of dental amalgam would remain relevant for many reasons, including skill development.

> Teaching of amalgam is still relevant … at this stage it is still necessary that students receive adequate coverage of this restorative technique. Consideration should be given to the skills that students develop whilst learning placement techniques as these skills are transferable to other facets of dentistry. (4/7-8)

The impact of the Convention on aspects of minimum intervention dentistry has been increasingly studied and commented on, with recommendations focusing on approaches to maintenance of existing dental amalgam restorations.[28, 29] Responses relating to minimal intervention dentistry were many.

> Refurbishment and repair procedures are key to the practice of minimum intervention dentistry especially in an era where many patients will present with amalgam restorations. (4/7-7)

> Teaching in dental schools should aim to empower students to repair restorations following minimum intervention principles to help prolong longevity of current restorations. (1/8-12)

> Future dentists will still need to deal with patients who have existing amalgam restorations for a long period ahead, and should certainly be made aware of safe amalgam removal techniques and repair options, whether or not they routinely use the material themselves. (4/7-15)

While there was support for statement two, provisos included the need for improvements in physical properties of materials alternative to dental amalgam and attention to those practitioners who graduated 'earlier', a finding and recommendation of previous studies of the present authors[3, 13] and a necessary focus identified by the WHO.[9]

> *This 'common sense statement' will only be fully relevant at some stage in the future when 'non-amalgam' restorative* materials improve even further in their physical properties and when older practitioners who are reliant on amalgam leave the *profession. That is, it will not happen overnight and a 'blunt statement' indicating that* the teaching of dental amalgam placement should be discontinued currently overlooks a number of issues. (2/7-10)

It may be stated that there is a need for the continued teaching of dental amalgam but this should constitute a small proportion of any curriculum. An emphasis should be on undergraduate curricula that enable dental graduates to restore teeth with respect for principles of minimum intervention and utilization of materials most

appropriate in the circumstance. It is recommended that such an approach has implications for continuing professional development, echoing the call of prominent commentators.[2, 21, 30]

Implications for Postgraduate Education

In a previous study the present authors found that the highest ranked influence on restorative decision-making post-graduation was continuing professional development.[17] The authors surmised that this reflected a reliance by dentists on continuing education rather than other sources of information such as that from suppliers or colleagues. Warnings exist that reliance alone on professional development events should be avoided as many of these contain inappropriate content.[17, 31]

Eighty-six per cent of respondents to the questionnaire (strongly) agreed that there will be an increased need for postgraduate education and training (continuing professional development) in the use of adhesive restorative materials. This result was supported by responses to statement three. The themes which emerged related to the need for emphasis on materials alternative to dental amalgam and on minimum intervention,

> Training should aim to inform practitioners of minimum intervention dentistry philosophy and its application with new restorative materials. (4/8-1)

and treatments that traditionally employed dental amalgam but may no longer be desirable.

> *... professional development should aim to train the practitioner to prod*uce restorations comparable with amalgam for longevity and wear in a changing demographic of patients who are retaining teeth longer and having higher expectations for function and aesthetics. (4/8-2)

Where the properties of all direct restorative materials may be inadequate, the need for an understanding of indirect approaches was emphasized.

> *... it is both essential and appropriate that consideration be given as to which dental* materials and placement technique is the substitute practice for those restorations where *dental amalgam previously was the preferred option ... as example, in posterior areas of* high loading indirect restorations are likely to be the desired alternative to use of dental amalgam. Dependent on the extent and level of undergraduate teaching as such relates to indirect restorations, there may be a need for postgraduate education (Continuing *Professional Development) ... particularly for those practitioners, both recent and long-*standing graduates, who have not placed a significant amount of indirect work. (9/7-5)

Reference was made to the need for a focus on continuing professional development for 'older' dentists, reflecting the findings and recommendations from previous studies of the present authors.[3]

> *The aim here is to educate the 'older' practitioner who is slower to change, while dental* schools should be training the new practitioner. (21/7-7)

The present authors previously identified significant concern from those who obtained their primary dental qualification before 1980. They concluded that it is "*those 'older' dentists, who adopt more traditional direct* restorative approaches, which policy-makers should engage with".[3 p.512] This will necessitate the delivery of relevant continuing professional development, a recommendation of key organisations [9, 32] and commentators such as Lynch and Wilson who have identified considerable issues with the delivery of such education, including the limited number of practitioners qualified and available to deliver it. They suggest that it is incumbent on practitioners to "obtain the necessary skills, knowledge and understanding",[2 p.112] and postulate the need for compulsory credentialing.

Consistency and Relevance of Teaching

There is a perception that a disconnect exists between the teaching at dental schools and the 'real world'.[33, 34] Ben-Gal and Weiss identified clinical teachers who employ "convenience and long experience in using amalgam [which] biases the choice",[34 p.1594] and found that the majority of teaching of direct restorative materials was based on a 'prevailing trend' and not the evidence-base. These findings were confirmed by research of the present authors[13, 17] and led to a call for greater attention to curricula and the approaches of clinical teachers. Lynch et al. described a "disconnect between clinical practice and expert opinion . . . custom and practice being perpetuated" and the "long lag time between changes in teaching and impact on clinical practice".[26 p.130] These comments were reflected by most respondents, a typical comment being ...

> *Many lecturers … want to retain the* status quo rather than move into uncharted and threatening waters. This, to me, is the antithesis of what undergraduate training is about. Nothing is stronger as an obstacle to new learning as old learning. (5/7-3)

Reasons for the inconsistency of approach of teachers were offered by respondents and included the casual and transient nature of employment of clinical teachers,

> *Clinical tutors that teach students directly … are often casually employed tutors who are not necessarily consistent in the school's approach to teaching restorative dentistr*y including use of dental amalgam. (18/7-4)

personal and professional bias,

> Clinical tutors bring bias in their approach based on their own experiences, time since graduation, employment private/public and demographic of patients they treat. (18/7-3)

lack of understanding of the evidence-base,

> *... the difficulty in having staff (in particular external tutors) that understand and practice current concepts ...* (11/8-11)

and failure of attempts at 'calibration'.

> Tutor training provided to standardize teaching approaches is not very successful. The high turn-around of tutors and the non-compulsory nature of the training means we only train the converted. (9/7-2)

Responses to the statement of the questionnaire, 'Preclinical and clinical teachers (demonstrators) are consistent in their teaching of restorative dentistry; they are all 'on the same page'', resulted in 40 per cent (strongly) agreeing and 40 per cent (strongly) disagreeing. This dichotomy of opinion reflects previous findings of the present authors when the same question was asked of dentists in Australia. They surmised that "those graduating more *recently experience greater inconsistency of 'message', perhaps reflecting the increased range of materials and* techniques available and hence increased and varied philosophical approaches".[17 p.450]

Previous findings of the present authors [3, 13, 17] found that 60 per cent of dentists (strongly) agreed that there is a disconnect. Responses to statement one showed a general consensus, best represented by this view:

> *It is essential that ... teachers are aligned in their teaching of restorative dentistry to* avoid student confusion occurring should inconsistency in philosophy or technique arise. This issue due to teacher variance in knowledge, application or practice has implication in relation to the recruitment of [teachers] and the preparation and training provided as foundation for the teaching role. (2/7-9)

A variation of approach to the teaching of direct restorative materials may be evident, but also seen as a reflection of an increasingly complex clinical environment; there rarely being 'right' or 'wrong' ways and that a case-by-case approach is best.[31] A calibration of teachers is desirable and best instituted as part of curricula that embrace broader philosophical approaches, conveyed to undergraduate students in a manner that suggests things are "not *necessarily 'wrong' but merely a reflection that many potential appro*aches to direct restorative treatment exist".[17 p.450]

A series of studies from 2004 to 2007 from Lynch, McConnell and Wilson [23, 30, 35-38] identified that curricula of dental schools in the United Kingdom, Ireland and North America were not incorporating modern techniques and

therefore a certain 'incompetence' existed with graduating dentists inappropriately restoring posterior teeth. Rey et al.[39] similarly described the need for an alignment of curricula reflecting the ever-changing evidence-base relating to direct restorative materials.

Understanding of the Evidence-Base

There is a perception that the evidence-base relating to direct restorative materials is often conflicting and contradictory.[3, 13] Responses to the statement of the questionnaire relating to this produced the largest 'neutral or undecided' result of 40 per cent. Response to the associated statement regarding understandability of the literature resulted in a similarly large neutral or undecided response of 27 per cent. Previous research of the present authors found that while most practitioners agree they 'should' possess an understanding of the evidence base, they are uncertain as to whether they employ it. They concluded that this may be "a reflection of a lack of understanding of what the evidence-base actually is or merely a lack of its implementation".[17 p.448] The same study found that 75 per cent of dentists in Australia feel the evidence conflicted or contradictory and 61 per cent the literature to be 'too scientific and not readily understood'.[17] Differences of response between dentists of previous studies and dental educators of the current study may reflect a greater understanding of, and access to, the evidence-base of those in academia compared to those in the broader profession. This finding is to be expected with participants in this study being expert in the field.

The decision-making processes of dentists should be evidence-based. It is known that dentists access the evidence[40] but often the evidence is not relied upon, decision-making being based on 'opinion' and 'observations'.[41, 42] Fox et al., suggested that promotion of evidence-based practice requires "evaluation and synthesis of evidence skills [that] are comprehensively embedded in dental training", this providing dentists with the "*capability … to understand and apply research evidence* to day to day practice".[43 p.193] In this context, and as discussed further below, Carrasco-Labra et al.,[31] stress the need for evidence-based guidelines that are readily accessible.

Continued Availability and Use: A Need for Consensus

Seventy-three per cent of respondents to the questionnaire (strongly) agreed that dental amalgam should still be available for patient-care in Australia after a phase-down, supporting the findings of the similarly-worded statement of phase one. The predominant theme was of the appropriateness of alternatives to dental amalgam in terms of physical and mechanical properties, summarized by this response:

> *Once 'non-amalgam' direct restoratives improve further in their physical properties,* amalgam will become obsolete. The point at which amalgam will not become available will depend on the business model of supply companies – whether or not it is economical to stock. (13/7-5)

Comment was made regarding a need for continued availability to enable repair and maintenance of pre-existing dental amalgam restorations.

> Dental amalgam should still *be available … for use in the maintenance of those* amalgam restorations placed prior to the designation date of the phase-*down …* [because] at times simple repair or extension of a restoration is the preferred alternative to the total removal of an extensive restoration. (1/8-2)

The minority view opposed that above and suggested …

> … there are reliable enough alternatives available, and use of amalgam could be discontinued without detriment. (17/7-3)

These findings reflect those of previous studies of the present authors[3, 13, 14] and heighten the sense that although few practitioners continue to use dental amalgam as a material of choice, there is a desire that the material continues to be available. This is especially so in terms of the ability to maintain existing dental amalgam restorations, rather than placement of new restorations.

Given the environmental tenet of the Minamata Convention, a dearth of response relating to this is somewhat surprising. This echoes previous findings of the present authors who surveyed dentists in Australia, the assumption made that this is due to a "*general acceptance of the environmental issue … [a] focus on its* implications rather than its rationale".[13 p.428] There was, however, recognition of issues regarding disposal of dental amalgam and the environmental imperative.

> … it will still be many years before the disposal problems posed by the material cease, even if placement of new restorations did not occur. (24/7-15)

> The environmental concerns must take precedent … (15/7-11)

Irrespective of the availability of dental amalgam it would seem useful to reach some form of consensus as to what clinical applications should entail. Seventy-four per cent of respondents (strongly) agreed with this statement. This aligns with pronouncements of the WHO, which advised that a phase-down should be accompanied by research on "criteria for use of restoration materials alternative to dental amalgam, development of standardized and reliable criteria for assessment of quality of restorations . . . and development and dissemination of clinical guidelines for making dental restorations".[9 p.30]

Clinical guidelines relating to the use of direct restorative materials are few. Policy statements from various expert groups and organisations exist[44, 45] but rarely constitute that which may guide restorative decision-making. Where guidelines do exist, their consistency, appropriate use of the evidence-base and dentists' ability to interpret and apply them, has been questioned.[31] There is a need for the creation and targeted dissemination of evidence-

based clinical guidelines on this topic. Examples of that constituting useful clinical guidelines relating to the use of resin composite have been created by the British Association of the Teachers of Conservative Dentistry[24] and the European Section of the Academy of Operative Dentistry.[28] As there are concerns regarding dentists' interpretation and use of such guidelines, coupled with doubts as to the quality of the current evidence base,[41, 42] production of such material should be carefully managed.

The Need to be Heard

The present authors, in a study of dentists published in 2016, identified a lack of trust of policy-makers to make the 'right' decisions regarding the continued use of dental amalgam. They postulated that this may be due to a lack of "understanding of and engagement with the issue" or merely a "sense of apathy and resignation".[3 p.511] This presents a challenge to key stakeholders; dental educators and educational institutions should be meeting this challenge. In this respect, the finding of the current study that 74 per cent of respondents (strongly) disagreed that the view of Australian dental schools is being appropriately heard in this issue/debate, is of concern. Responses to the survey suggest that some of the Schools involved in the current study have engaged in internal debate, apparently in terms of curriculum review, but to these authors' knowledge none of this has been made public. There may be a need for an 'open' forum, beyond that provided by the Australian Government's 'comment by submission' processes,[e] for dental educators and schools to make their opinions known.

Despite comments suggesting that the Convention may be of little relevance as the use of dental amalgam has steadily declined over decades,[2, 11, 12] the above-mentioned study of 2016 identified that 60 per cent of dentists 'cared' about a potential phase-down and this suggests that the issue still is of importance.[3] This is reinforced by the finding of the current study that 100 per cent of respondents (strongly) agreed that this issue/debate is topical and important for Australia.

LIMITATIONS

Researcher Bias Versus Researcher as 'Insider'

Bias may exist where a researcher, expert in the discipline being studied, influences the process and conduct of the study. This may be balanced by the researcher's ability to contribute to the study an 'insider' level of knowledge or expertise. This may be said of the current authors' experience as both dentists and teachers in the restorative disciplines. The challenge is remaining aware of introducing bias to the method, especially where it involves qualitative analysis.[46] Although it may be stated that a single researcher conducting thematic analysis is sufficient, given s/he is most familiar with the data and analysis, it may be argued that analysis by multiple

[e] http://www.environment.gov.au/protection/chemicals-management/mercury/consultation-ris-2016. Accessed February 2017.

researchers is better.[47]

Convenience and Purposive Sampling

Convenience and purposive sampling are not free of bias. They are considered valuable for qualitative analysis where the aim is to determine 'meaning'.[18] The effect of such sampling on this study is unknown.

Self-Selection

The use of 'volunteer' sampling for the survey and questionnaire is relatively quick and easy to manage, however, the invitees who agree to participate may not be representative of the target population. Volunteers may be more motivated to participate in the study or 'willing to please',[18] leading to potential self-selection bias.

Questionnaire Design and Measurement Error

The use of 'closed' questions may lead to participants confining their responses answers to the options offered, even if accompanied by the option of open-ended responses. If the list of options is inappropriate or incomplete, the choices made may be different from those achievable by open-ended questions. Likert-type questions pose problems because of issues of participant interpretation or response selection.

Generalizability and Representativeness

There will be differences between nations on this topic, hence transferability or generalizability of results is problematic[48] and results may only be applicable to dentists practicing in Australia. The effect of participation of seven of the nine dental schools in Australia, in terms of representativeness, is unknown.

CONCLUSION

An 'amalgamless' profession presents a range of potential implications and these are identified, and several issues of concern raised, by dental educators at dental schools in Australia.

There is a broad consensus that desired approaches to management of these issues include: the need to continue to teach theoretical aspects and clinical use of amalgam at undergraduate level but that this should be a minor component of the syllabus; a focus on the teaching of adhesive and tooth-colored restorations at both under- and post-graduate levels including continuing professional development; a continued availability of dental amalgam; and the need for a formal understanding on the clinical application of dental amalgam. This final point confirms previous findings by the present authors and reinforces a recommendation for "clinical guidelines by educational and professional organizations relating to direct restorative materials which are accessible, where possible unequivocal, and understandable".[17 p.451]

It is recommended that a phase-down of dental amalgam be supported by an evidence-based approach to under- and post-graduate curriculum design and teaching. This should include attention to educators' understanding and approach to the teaching of direct restorative materials. Combined with a calibration of preclinical and clinical teachers, this may alter perceptions of a disconnect between the undergraduate and 'real' worlds.

Of note was unanimity that this issue is topical and of importance for dental schools in Australia. This, combined with a general consensus that dental schools are not being appropriately heard on this issue, suggests that it is incumbent on dental educators in Australia to be proactive on this matter.

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Table 1: Survey themes

Theme	Sub-themes
Teachers and teaching	Consistency of approach
	Preclinical and clinical
Curriculum	Vocational
	Interschool variation
Syllabus	Theory and practice
	Minimal intervention
	Complex restorative
	Amount
Evidence-base	Literature
	Guidelines
Postgraduate education	Continuing professional development
Availability	
Consensus	Guidelines
Politics	Academia’s role
	Topicality

Table 2: Participant responses: ‘Minamata’ may lead to a phase-down of the use of dental amalgam in Australia. With this in mind, please provide a rating for the following statements …

	Response % (n)					
Statement	Strongly Agree	Agree	Neutral or Undecided	Disagree	Strongly Disagree	Total
Preclinical and clinical teachers (demonstrators) are consistent in their teaching of restorative dentistry; they are all ‘on the same page’	40 (6)	0 (0)	20 (3)	20 (3)	20 (3)	100 (15)
There is a real difference, a ‘disconnect’, between that taught at university, and that which is experienced in the ‘real world’	47 (7)	13 (2)	20 (3)	20 (3)	0 (0)	100 (15)
We need to continue to teach the repair, polishing, maintenance and removal of amalgams, and associated mercury hygiene issues at undergraduate level	53 (8)	27 (4)	13 (2)	0 (0)	7 (1)	100 (15)

We need to continue to teach placement of amalgams linked to specific situations such as cores for crowns, cusp overlays and complex restorations at undergraduate level	40 (6)	33 (5)	13 (2)	0 (0)	13 (2)	100 (15)
The majority of teaching should focus on adhesive and tooth coloured restorations, not amalgams which are a minor part of the syllabus in this area	33 (5)	47 (7)	7 (1)	13 (2)	0 (0)	100 (15)
The evidence base relating to direct restorative materials is often conflicting and contradictory	13 (2)	20 (3)	40 (6)	27 (4)	0 (0)	100 (15)
The literature relating to direct restorative materials is too scientific, and not readily understood by the general clinician	0 (0)	13 (2)	27 (4)	53 (8)	7 (1)	100 (15)
There will be an increased need for postgraduate education and training (continuing professional development) in the use of adhesive restorative materials	13 (2)	73 (11)	7 (1)	7 (1)	0 (0)	100 (15)
Dental amalgam should still be available for patient-care in Australia after a phase-down	20 (3)	53 (8)	13 (2)	7 (1)	7 (1)	100 (15)
As a profession we should be aiming to produce a formal understanding/agreement of what the (limited) clinical application of amalgam should entail	27 (4)	47 (7)	13 (2)	7 (1)	7 (1)	100 (15)
The view of Australian Dental Schools is being appropriately heard in this issue/debate	0 (0)	13 (2)	13 (2)	47 (7)	27 (4)	100 (15)