

UK dental laboratory technicians' views on the efficacy and teaching of clinical-laboratory communication

A. S. Juszczuk,¹ R. K. F. Clark² and D. R. Radford³

IN BRIEF

- Dental laboratory technicians consider newly qualified dentists to have a poor understanding of dental technical procedures and techniques.
- Dental schools may not be fulfilling the GDC requirements of *The first five years* with regard to dentists' technical understanding and ability to communicate.
- This article suggests that newly qualified dentists are thought to communicate better than established ones.

Background The General Dental Council states that 'good dental care is delivered by a team' and restorative treatment is enhanced by communication between team members. Commercial dental laboratories are ideally placed to comment on effective communication. **Aims of the study** To investigate contemporary attitudes and communication between dentist and dental technician from the technician's perspective. **Materials and methods** Eight hundred and three dental laboratories were invited to take part in a postal survey covering dentist/laboratory communication and the dentist's understanding of technical procedures. **Results** Forty percent of laboratories responded. Only 9% scored communication as very good, 48% scored communication with newly qualified dentists better than with established dentists but only 26% considered that dental students were taught to communicate with dental laboratories effectively. The free comments that the respondents were invited to make identified three distinct themes, 'recognition within the dental team', 'effective communication between dentist and dental technician' and 'dentists lack of technical knowledge'. **Conclusions** Effective communication between dentist and dental technician is often poor. It was the view of the dental technicians who responded that newly qualified dentists do not have an appropriate understanding of technical techniques. Dental schools are still not preparing new graduates to communicate effectively with dental laboratories.

INTRODUCTION

In *The principles of dental team working*,¹ the General Dental Council (GDC) stated that 'good dental care is delivered by a dental team' which should communicate effectively and share its knowledge and skills with other team members. In the document *Developing the dental team*,² the GDC presented the requirements for dental care professionals' (DCP) education and training. The common curricula included behavioural science and communication skills, which require students to understand the importance of communication with other members of the dental team in the integrated provision of dental care.

Previously the GDC had published the second edition of *The first five years: a framework for undergraduate dental education*

where the requirements for the content and delivery of the undergraduate dental degree programme were laid out.³ The purpose was to provide a framework to produce a 'caring, knowledgeable and competent dentist, able to accept professional responsibility for the effective and safe care of patients'. The key principles included:

- That dental students have significant and appropriate opportunities to work and train together with those of professions complementary to dentistry
- That they understand the principles and techniques that allow them to act as the leader of the dental team
- That they communicate effectively with the dental technician so that indirect restorations and fixed and removable prostheses can be constructed
- That students should have a sufficient understanding of clinical preparation and laboratory processes so that they can appropriately evaluate their own clinical work and the work provided to and received from the dental technician.

However, Clark^{4,5} has suggested that the GDC have left it open to dental schools to reduce the time spent on technology to a level where competency cannot be achieved. Dental undergraduate education in most UK dental schools is delivered independently of the training programmes for DCPs, despite many of the programmes being taught in the same establishment, within close proximity of each other. That is often not the case with dental technical education, which is generally taught in specially equipped colleges not affiliated to the university dental schools. Student dental technicians take a foundation degree which covers the theoretical aspects and basic practical dental technology. Practical experience is gained in work placement laboratories where students produce appliances for patient treatments with minimal contact with clinics or dentists. There seems to be little provision to integrate education with dental undergraduates. Traditionally, teaching hospitals ran dental technical training programmes which could allow contact and sometimes an element of integrated learning for clinical

¹Chief Dental Technical Instructor, ²Professor/Honorary Consultant, ³Senior Lecturer/Honorary Consultant, King's College London Dental Institute, Floor 25, Guy's Tower, Guy's Hospital, St Thomas' Street, London, SE1 9RT

Laboratory-Clinical communication	
Please complete the questionnaire by ticking the appropriate boxes	
Your details: Registered dental technician <input type="checkbox"/> (52%) Lab owner <input type="checkbox"/> (84%) Employed technician <input type="checkbox"/> (13%) NHS <input type="checkbox"/> (6%) Private <input type="checkbox"/> (21%) Mixed <input type="checkbox"/> (61%)	
What year and where did you qualify as a dental technician?	***
Is yours: A specialist crown and bridge dental laboratory?	<input type="checkbox"/> (42%)
A specialist removable prosthodontic laboratory?	<input type="checkbox"/> (31%)
A general dental laboratory?	<input type="checkbox"/> (37%)
Other?	<input type="checkbox"/> (9%)
1. Is your laboratory attached to a dental practice? OR are you a distant commercial laboratory?	<input type="checkbox"/> (16%) <input type="checkbox"/> (82%)
2. Most commonly, do you communicate directly with your clinician? OR do you communicate via a laboratory manager? OR do you communicate via a practice manager?	<input type="checkbox"/> (87%) <input type="checkbox"/> (6%) <input type="checkbox"/> (9%)
3. Most commonly, how do you communicate with your dentists? By phone? OR laboratory prescription card? OR personal visit? OR email? OR other? (please give details below)	<input type="checkbox"/> (79%) <input type="checkbox"/> (46%) <input type="checkbox"/> (35%) <input type="checkbox"/> (10%) <input type="checkbox"/> (1%)
4. Is your communication welcomed? Is your communication encouraged? Do you find that the clinician acts on your suggestions? Are you expected to 'just get on with it'?	Yes <input type="checkbox"/> (92%) No <input type="checkbox"/> (8%) Yes <input type="checkbox"/> (78%) No <input type="checkbox"/> (15%) Yes <input type="checkbox"/> (87%) No <input type="checkbox"/> (11%) Yes <input type="checkbox"/> (39%) No <input type="checkbox"/> (54%)
5. Do you ever receive blank patient work prescriptions? Do you then: Accept the work offered producing what you think is appropriate? OR request guidance from the clinician concerned? OR reject the work offered?	Yes <input type="checkbox"/> (62%) No <input type="checkbox"/> (35%) <input type="checkbox"/> (10%) <input type="checkbox"/> (64%) <input type="checkbox"/> (3%)
6. Do you have a preferred protocol that you and your client follow? Please briefly outline this protocol below	Yes <input type="checkbox"/> (36%) No <input type="checkbox"/> (49%)
Please complete the second part of this questionnaire by ticking the appropriate box on the scale, with 0 equating to poor (worse) and 5 equating to very good (better)	
1. How well do newly qualified dentists communicate with you (1-3 years qualified)? poor 0 <input type="checkbox"/> (12%) 1 <input type="checkbox"/> (15%) 2 <input type="checkbox"/> (16%) 3 <input type="checkbox"/> (27%) 4 <input type="checkbox"/> (41%) 5 very good <input type="checkbox"/> (42%)	
2. Is communication with newly qualified dentists (1-3 years qualified) worse or better than with established dental practitioners (over 5 years qualified)? worse 0 <input type="checkbox"/> (16%) 1 <input type="checkbox"/> (27%) 2 <input type="checkbox"/> (17%) 3 <input type="checkbox"/> (24%) 4 <input type="checkbox"/> (18%) 5 better <input type="checkbox"/> (5%)	
3. Do newly qualified dentists (1-3 years qualified) demonstrate a good understanding of dental technical techniques and procedures when requesting the production of restorative dental services? poor 0 <input type="checkbox"/> (29%) 1 <input type="checkbox"/> (23%) 2 <input type="checkbox"/> (21%) 3 <input type="checkbox"/> (17%) 4 <input type="checkbox"/> (6%) 5 very good <input type="checkbox"/> (2%)	
4. In your opinion, how well do dental schools currently prepare undergraduate students to communicate their understanding of technical procedures with distant technical laboratories? poorly 0 <input type="checkbox"/> (27%) 1 <input type="checkbox"/> (24%) 2 <input type="checkbox"/> (20%) 3 <input type="checkbox"/> (18%) 4 <input type="checkbox"/> (6%) 5 very well <input type="checkbox"/> (1%)	
5. In 2002 the GDC published 'The first five years, a framework for undergraduate dental education' in which they require that the dental graduate, as the leader of the dental team, must be able to communicate effectively with a dental technician. In your opinion has this aim been fulfilled? Do you feel an integral part of the dental team? Please comment on your answers and if appropriate suggest changes	Yes <input type="checkbox"/> (27%) No <input type="checkbox"/> (69%) Yes <input type="checkbox"/> (54%) No <input type="checkbox"/> (42%)
Thank you for taking part in this survey	
***Date and place of qualification	

Fig. 1 Questionnaire, with results for each question option expressed as a percentage in parentheses

and technical students. However, recently in London these dental hospital-based courses have closed due to a lack of funding. Some of those schools now offer work experience to college-based student technicians, which may involve contact with dental students as well as the opportunity for joint education.

Up until quite recently undergraduate dental students produced the technical work for a number of their own patient treatments. However, the requirement of The Medical Devices Directive⁶ (MDD) for custom-made dental devices to be manufactured by suitably qualified personnel registered with the competent authority, has been interpreted in a way which prevents this. Therefore, dental students send their technical work to in-house or remote dental laboratories, mirroring the practice followed by qualified dentists and this process is therefore a necessary part of their learning experience. One of the requirements of the MDD is that the custom dental device is manufactured to a prescription from the clinician. Davenport *et al.*⁷ stated that 'It is essential that the dentist and the dental technician work together effectively as a team. Each should have a sound understanding of the role of the other so that they can collaborate in an effective fashion'.

Communication between clinician and dental technician in prescribing removable partial dentures and fixed prostheses has been investigated and described by Lynch and co-workers.⁸⁻¹⁵ They reported specifically on the quality of written prescriptions in the construction of both fixed and removable partial prostheses. Lynch and Allen⁸ stated that the 'literature has highlighted the poor quality of written prescription for removable partial dentures (RPD) and that the problem still exists'. However, the British Society for the Study of Prosthetic Dentistry guidelines¹⁶ state that 'restorative work involving technical procedures require a close relationship between clinician and dental technician and discussion of the proposed design'. For this to happen, both clinician and dental technician must be proactive and prepared for effective communication to take place.

Afsharzand *et al.*¹⁷ stated that 'laboratory work authorisation forms have been called the most frequently used and abused form

of communication between the dentist and the laboratory'. Their investigation showed that only 26% of the laboratories surveyed indicated that their work authorisations were complete enough to perform their best service, with 46% reporting that they received only the minimum information to complete the task. They cited a lack of communication as being a major problem in providing optimum patient services.

Developments in dental undergraduate education in the UK have seen a significant decrease in the amount of hands-on dental technology and an increase in alternative teaching methods.¹⁴ Students spend less time carrying out technical tasks and more time being told how to carry them out. McGarry and Jacobson¹⁹ felt that if future dental education provides a reduced laboratory element for dentists then it is critical for the dental profession to create and maintain relations with dental technologists. The views and attitudes of dental technicians are directly relevant, as they are stakeholders in the provision of dental care.

AIMS OF THE STUDY

To investigate contemporary attitudes and communication between dentist and dental technician from the dental technician's perspective.

MATERIALS AND METHODS

A postal questionnaire (Fig. 1) was compiled covering areas including registration of dental technicians and type of laboratory. Respondents were asked to gauge the effectiveness of communication and the understanding that their clients had of technical procedures. The questionnaire was piloted among the dental technicians at King's College London Dental Institute. An introductory covering letter together with the questionnaire was sent to the 803 commercial dental laboratories that make up the UK Dental Laboratories Association database. The results were expressed as the percentage responses to each option in a question. The final percentages were taken to the nearest whole number for ease of description.

RESULTS

The results are shown in parentheses against the appropriate question option in Figure 1. The initial part of the survey

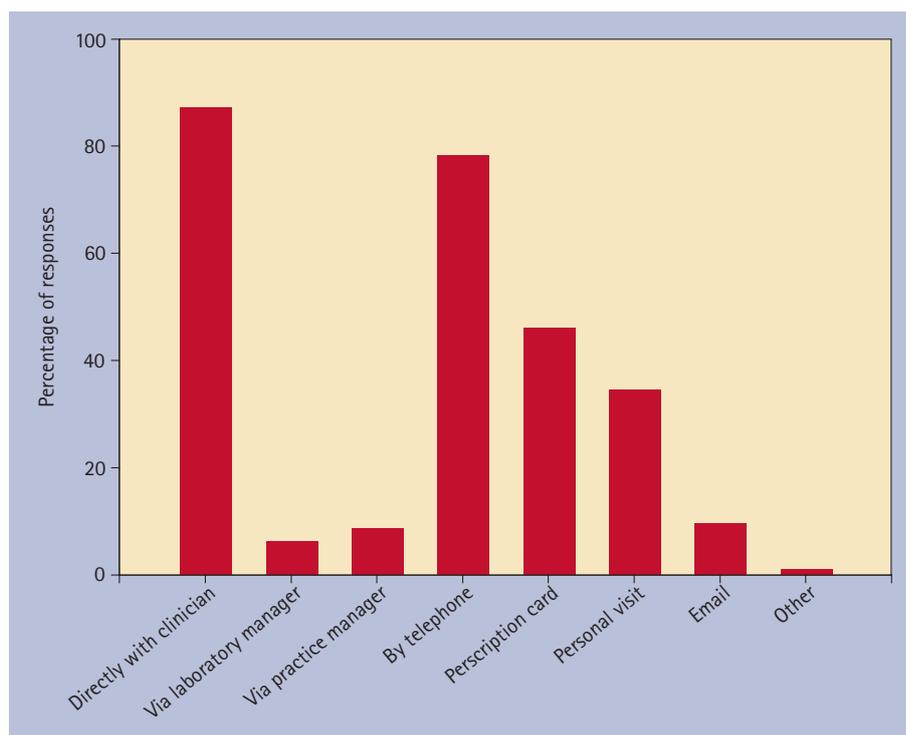


Fig. 2 Histogram of results to Question 3, showing the percentage of respondents using different methods of communication

showed that as of the end of January 2008, 52% of respondents were registered with the GDC, the remaining 48% being required to register before July 2008 in order to enable them to practice dental technology legally within the UK. Eighty-four percent were laboratory owners and 13% were employed technicians.

The laboratories divided themselves into 42% specialist crown and bridge laboratories, 31% specialist removable prosthesis laboratories and 37% general dental laboratories. Nine percent replied as 'other', and as there was no dedicated box, they identified themselves as orthodontic labs. Sixteen percent of technicians were attached to dental practices and 82% were working in remote dental laboratories. In some instances results do not equal 100%, either because not all respondents answered all questions or because there was more than one option per question. Six percent acknowledged doing solely National Health Service (NHS) work, 21% solely private work and 61%, the much larger percentage, a mixture of NHS and private work.

Most commonly, (Fig. 2) 87% of technicians communicated directly with the clinician conducting the treatment, 6% communicated via the laboratory manager and 9% with a practice manager. Seventy-nine

percent communicated by telephone, 46% by laboratory prescription card and 35% by personal visit. Ten percent of technicians used email, and other methods included fax and text messages. In response to Question 4 of the survey (Fig. 3), 92% said their communication was welcomed, 78% stated it was encouraged and 87% confirmed that their suggestions were acted on. However, there was a degree of contradiction, with a significant minority (39%) saying that they were expected to 'just get on with it'. Sixty-two percent had received blank prescriptions but the majority (64%) would seek guidance from the dentist before producing any appliance.

The evaluation of how well newly qualified dentists communicate (Fig. 4) showed over 50% with a score of 3 and above. However, only 8% had very good communication. Forty-four percent had scores of 2 and below. The comparison between newly qualified and established dentists (Fig. 4) gave 50% with a score of 3 and above and 50% with a score of 2 and below, but only 5% gave a maximum score. Only 2% of newly qualified dentists were scored as having a very good understanding of dental technical procedures (Fig. 5).

The question on commercial laboratory dental technicians' perceptions of how well dental schools prepare dentists to interact

with commercial dental laboratories (Fig. 6) showed just 1% considering this was very well done. Sixty-six percent considered that the GDC's aim of the dentist being able to communicate effectively with the dental technician had not been fulfilled, with only 27% considering that it had. Fifty-four percent of dental technicians working in a commercial laboratory did feel an integral part of the dental team. These percentage figures were supplemented by free text comments and a balanced selection of these is presented.

On analysis of the free text comments, three distinct themes were identified. These were comments on recognition within the dental team, comments on effective communication between dentist and technician and comments on dentist's lack of technical knowledge. It was rare for one of these themes to be a stand alone comment and often there were combinations of all three.

Positive comments on the dental team included:

- 'As time moves on, I feel that dentists value dental technicians more and as the range of available products expands we need to know more to be able to give advice. Newly qualified surgeons are far more aware of newer products for them and the patients'
- 'I feel it incumbent upon the dental technicians to make themselves a useful and an important part of the team by contributing to treatment plans. We cannot hide from responsibility and expect elevation of our role'
- 'Things are improving. I feel like the status of the dental technician has risen but still has some way to go. All surgeries carry out staff training meetings now. Maybe the dental lab should be invited bi-monthly'
- 'The leader of the team really doesn't exist in the real world, every team member has their own specialist skills and everybody works as a team for the benefit of the individual patient.'

Negative comments on the dental team included:

- 'A great deal of lip service has been paid to the dental team but I see little evidence of it in practice'
- 'Team? Team suggests some sort of

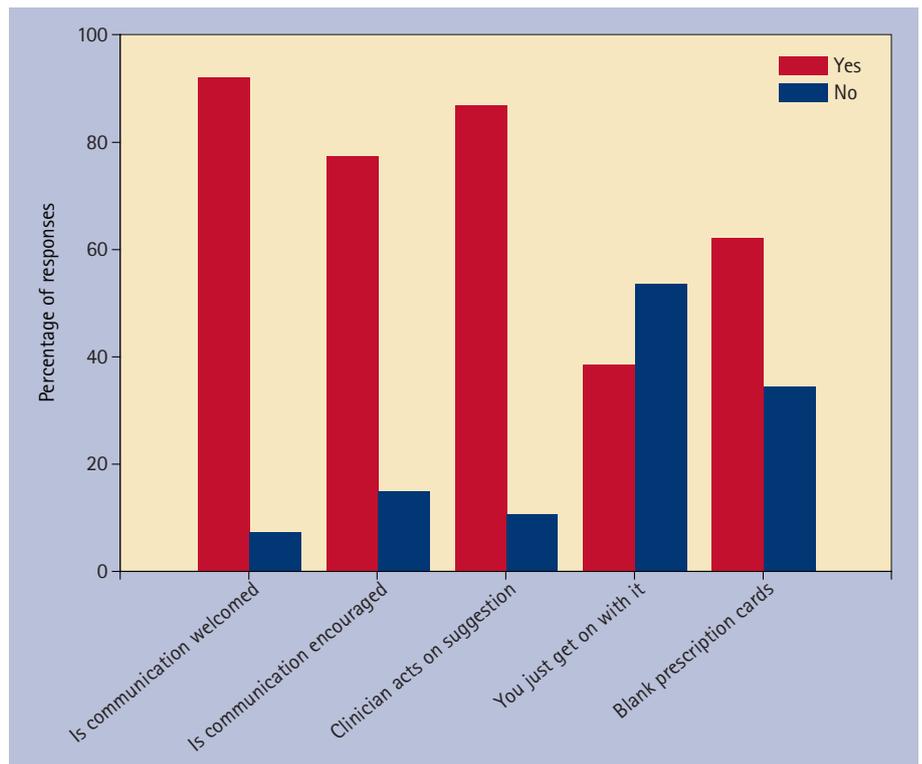


Fig. 3 Histogram showing status of and response to communication. A large majority of correspondents stated that communication was welcomed, encouraged and that their suggestions were acted on

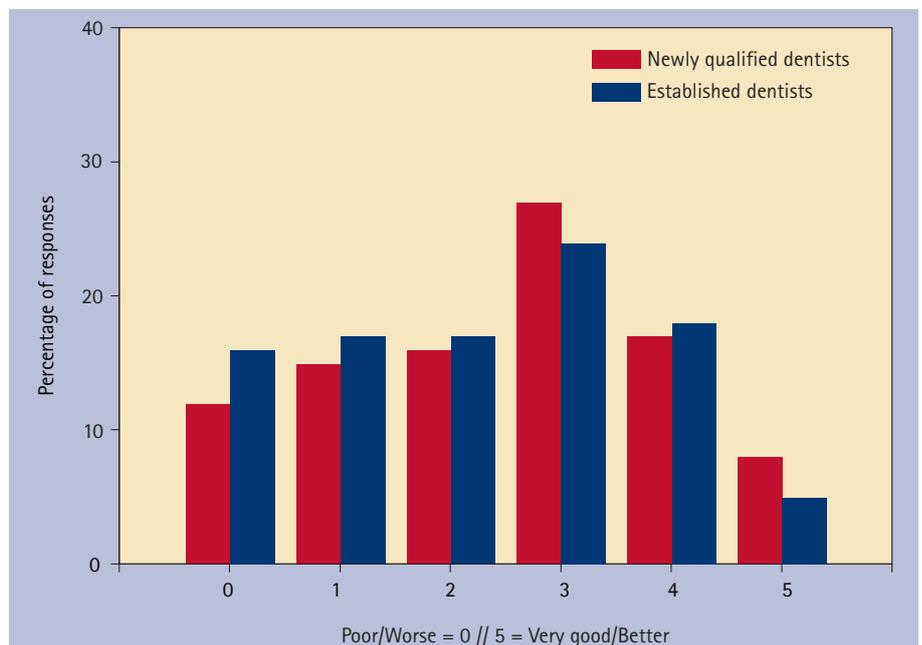


Fig. 4 Histogram of responses to the question on how well newly qualified dentists communicate with technicians. Newly qualified dentists were thought to communicate better than established ones

helpfulness as in a football team. But the dental team has a premier player and the rest of us are Sunday "pub" players.'

Positive comments on communication included:

- 'All of my clients welcome

communication and try to include me. This has improved over the years'

- 'Good communication between clinician and dental technician is VITAL if a good end result is to be achieved. This must continue to be taught and reinforced to undergraduate dentists.'

Negative comments on communication included:

- *'The newly qualified dental graduates appear to have little or no knowledge of even the most basic laboratory procedures. The last five years have seen a noticeable decline. They are happy and willing to communicate, but that is often because they want guidance'*
- *'Even though technicians are an integral part of the process in making restorations/appliances we are generally treated like moles. On the whole there is not enough communication.'*

Some responding dental technicians commented on the lack of dentists' technical knowledge as well as putting their views on the future dental team leader:

- *'Much of technical dentistry is too complex for newly qualified practitioners to effectively "team lead". VT is often poorly delivered and badly supported'*
- *'It is always a surprise when dentists know enough to direct me'*
- *'Do any newly qualified dentists visit a commercial laboratory as part of the year of VT? Perhaps they should'*
- *'In the future the so-called "team leaders" will probably be clinical dental technicians as they will be the only members of the dental team with educational backgrounds in all facets of both clinical and technical skills.'*

DISCUSSION

A total of 323 laboratories replied to this survey following two mailings, giving a response rate of 40%. The response rate corresponded closely to that stated by Oppenheim¹⁹ as being the expected rate for unsolicited postal surveys. Most surveys are carried out on a sample of a population with the results being extrapolated to give a representative view of the opinions as a whole. When the representative sample is a small percentage of the population the result may show bias. The sample surveyed for this investigation consisted of 100% of the population, so therefore the 40% response is 40% of the entire population. However, it could be argued that those who responded were motivated by strong views on the subject which may not be reflective

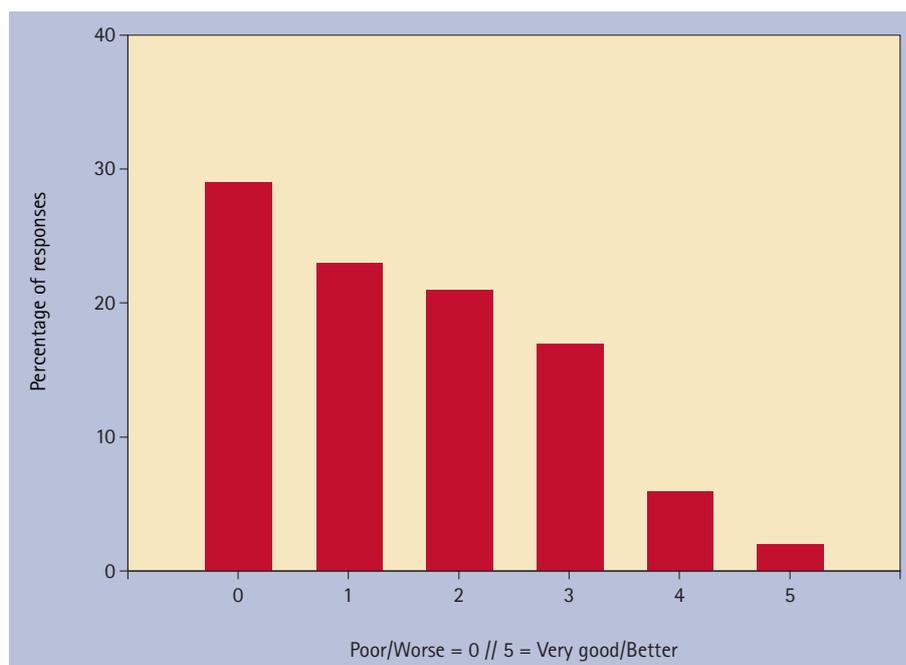


Fig. 5 Histogram of responses to the question on newly qualified dentists' understanding of technical techniques and procedures. The trend is unmistakable, that in the opinion of dental technicians newly qualified dentists have a poor understanding of dental technical techniques and procedures

of the views of all dental technicians. A limitation of postal surveys is the difficulty of achieving an adequate response, with strenuous efforts needed to raise the response above 30 or 40%.²⁰ Strategies used by previous authors²¹ included an initial letter informing the target population that a survey was about to take place, followed by the questionnaire a week later. Non-respondents were further contacted after two and four weeks with follow-up letters and additional questionnaire forms. This work used an unsolicited questionnaire followed by a second mail shot to non-respondents one month after the initial mailing. No incentives were offered to increase the response rate. Asch *et al.*²² suggest that repeated reminders are associated with a 13% higher response. They continue by stating that investigators, journal editors and readers should devote more attention to assessments of bias and less to specific response rate thresholds.

The need for effective communication between dentist and dental technician seems unquestionable. This is made even more important by the development of new and exciting techniques and materials for patient treatment and appliance construction. Halley²³ argued that developments in cosmetic dentistry require that communication from the dentist to the laboratory needs to be clearly understood and

interpreted to achieve the best results. The communication referred to in this questionnaire is when further information is required by the dental technician, after the initial use of a patient prescription form. The use of prescription cards to record what has been agreed offers a permanent, signed and traceable record of the dentist's prescription as well as a method of auditing work being carried out. The use of a telephone in isolation without laboratory cards may lead to a breakdown in communication or even a degree of abuse. Question 3 showed that the use of email or other electronic means of communication was limited to 10% and 1% respectively. Parts of the survey were very positive, with a large majority saying that their communication was welcomed, encouraged and that their suggestions were acted on. However, when assessing how effective dentists were at communicating technical instructions, the dental technicians' opinions changed markedly.

Figure 4 shows how well newly qualified dentists communicate with the laboratory and gives an assessment of whether communication with newly qualified dentists is better or worse than with established dentists. There is little difference between the two plots, but it is most disappointing to see the low scores for very good communication (8%) and better communication

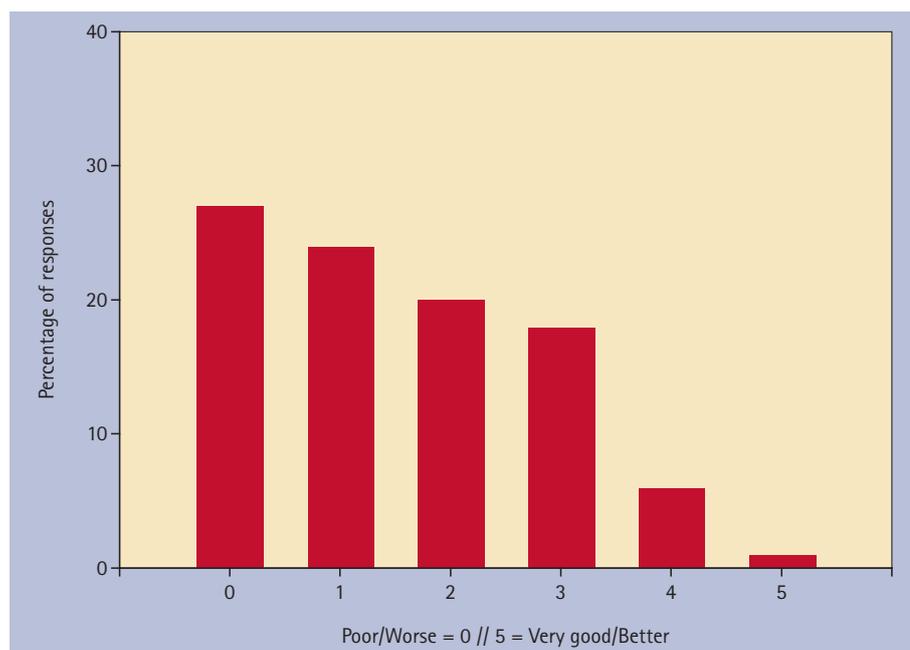


Fig. 6 Histogram of responses to the question on how well dental schools prepare undergraduates. A similar trend to that in Figure 5 can be seen, illustrating that commercial dental laboratory technicians consider that dental schools prepare undergraduates poorly to communicate their understanding of dental technical techniques and procedures

(5%) for newly qualified dentists *versus* established dentists.

Figures 5 and 6 show the scoring for the levels of understanding of dental technical techniques for newly qualified dentists and how well dental technicians consider that dental schools prepare undergraduate dentists to interact with technical laboratories. Again the two plots are similar but this time there is no difficulty in interpreting the disappointing trend illustrated, with the most positive scores being only 2% and 1% respectively and over 50% choosing the poor 0 or 1 scores in both instances, indicating that possibly dental schools are failing badly in this area. It seems the fears expressed by Clark^{4,5} have become a reality.

The final part of this survey was an invitation for comments with regard to the questionnaire itself and the topics covered. Not all of the returned questionnaires carried comments. However, there were in excess of 156 that did and a selection of both positive and negative comments is given in the results. The comments ranged from very laconic, with less than 10 words, to an expansive 500 words, and from enthusiastic and positive to depressingly negative and even paranoid. The majority gave a negative view of the dentist-laboratory

interaction, with the most common theme being that the laboratory is undervalued and there is a lack of dentist recognition of the laboratory's knowledge, experience and skill. Eldred²⁴ in his recent paper asks 'why are some dentists not asking for, or willing to take advice or help from people in dentistry who are just as competent, as experienced and in some instances more qualified than they are?'

CONCLUSIONS

Within the limits of this investigation, based on the views of responding dental technicians, it can be concluded that the aims of the GDC as expressed in the second edition of *The first five years* have not been met with regards to the following:

1. Effective communication between dentist and dental technician
2. Newly qualified dentists do not have an appropriate understanding of dental technical techniques
3. Dental schools do not sufficiently prepare dental undergraduate students to communicate with the dental laboratory.

The authors acknowledge the Dental Laboratories Association for their assistance in carrying out this survey.

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