

# Dental technician education and training — a survey

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**As the Dental Auxiliaries Review Group report continues in the consultation stage, the dentist needs to keep up-to-date on all aspects of auxiliary career developments. Dental technician education and training has changed radically during the past 25 years as shown by three surveys — the latest carried out during 1998 and reported in this paper. As leader of the dental team, the dentist needs to be aware of these changes in order to make an informed contribution to the debate.**

In *The first five years*,<sup>1</sup> the role of the dentist as the leader of a team of auxiliaries which includes the dental technician is emphasised. This concept is not new and has been developed in detail in the Nuffield Foundation report, *Education and training of personnel auxiliary to dentistry*.<sup>2</sup> All dentists are aware of the importance of the dental technician in oral rehabilitation. But for the busy dentist, interest in his technician may be limited to the quality assessment of a piece of laboratory work for his patient carried out by that technician. Regardless of its importance, this is only one aspect of the technician's contribution to oral health.

In a review of prosthetic technology in the undergraduate curriculum, Murphy submitted evidence that the dentist was not carrying out duties expected of a leader and that the technician believed that the dentist had little interest in his education and training.<sup>3</sup> Recently, personal communication with dental technicians suggests that this situation has not changed.

However, dental technology has changed, and is continuing to change as can be seen in a comparison of three surveys, the first in 1973,<sup>4</sup> the second 11 years later,<sup>5</sup> and the third carried out in 1998 and reported in this paper. The methodology was the same in all three and this survey gives an indication of developments in education and training of dental technicians during a period of

25 years with particular emphasis on removable prosthodontics.

## Methods

A postal questionnaire with a total of 22 questions was formulated in two sections. The first section referred to staffing and courses offered, and the second to prosthodontic materials and equipment. The questions and format followed that of the previous two surveys. Where appropriate, questions were updated to take into account new materials and techniques.

The questionnaire was posted to heads of schools of dental technology in all 13 colleges of higher education in the UK which offered courses in dental technician education and training, the names and addresses being supplied by the Association of Teachers of Dental Technology (fig. 1). Replies were received from 12 colleges (92% response) and the baseline for

the results refers to these 12 respondents. Response to some questions varied from 100% because of multi-response or non-response. The material was sufficiently small to be hand-sorted.

## Results

All colleges which responded provided dental technician training. This was in contrast with previous surveys, particularly in 1984, when there was no up-to-date register and questionnaires were sent to colleges which had ceased to offer this course. All colleges employed full-time qualified dental technicians as lecturers in dental technology, 37 in total (Table 1). The numbers of full-time lecturers in each college varied from one to seven, and were distributed as follows: one college — seven lecturers, two colleges — six lecturers, two colleges — three lecturers, five colleges — two lecturers, and two colleges — one lecturer. All colleges employed part-time lecturers, 31 in total (6.8 whole-time equivalents) who taught from 2 to 11 sessions per week. A direct comparison between staffing in the three surveys is not possible because of differences in the number of colleges. However, there appears to be a trend toward full-time staffing since the first survey in 1973.

In all three surveys nearly 70% of colleges employed visiting lecturers to teach specialist subjects (not included in Table 1). Clinical subjects were normally taught by local NHS consultants or GDPs, and other subjects such as anatomy, physiology and statistics, were taught by university staff when available.

At the time of this survey (Spring 1998), a total of 991 dental trainees had registered for courses. This was a considerable change from 1973 (1,288 trainees) and 1984 (1,638 trainees). Full-time education and training was offered by 92% of colleges compared with 24% in 1973 and 37% in 1984. All colleges offered part-time and evening courses. Thirty-three per cent of colleges provided block courses compared with 22% in 1984. No colleges offered City and Guild courses — a major change from previous surveys (Table 2).

In contrast (Table 3), all colleges provided Business and Technology Education

## In brief

- Within the past 6 years, three reports<sup>1,2,9</sup> have identified the most cost-effective way of improving and delivering oral healthcare
- All reports agree that in the future, high quality dentistry will be delivered by a team of dental auxiliaries led by the dentist
- The dentist must be conversant with all reports and developments in the education and training of all auxiliaries
- Dentists should make a constructive contribution to the current debate on the consultation paper *Professionals complementary to dentistry*<sup>9</sup>

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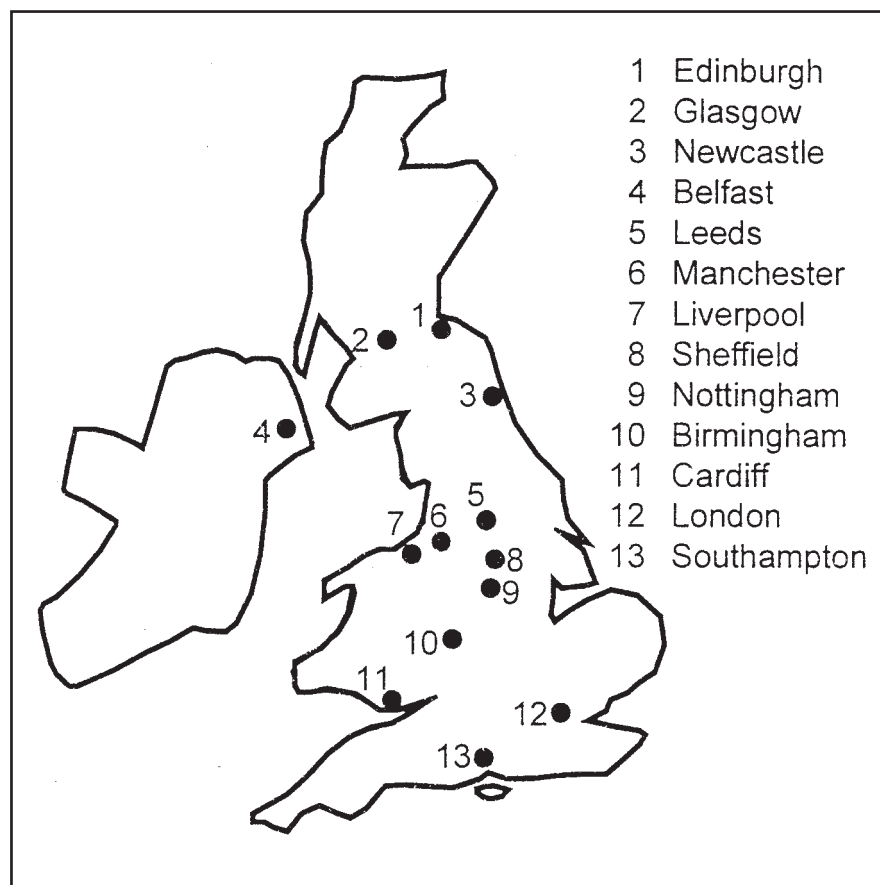
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Council (BTEC) courses at Ordinary National Certificate and Diploma levels (ONC/OND). In addition, six colleges offered Higher National Certificate and Diploma levels (HNC/HND). Scottish Vocational Education Council courses (SCOTVEC) are included under the heading BTEC. The educational requirements for entry to BTEC courses were broadly the same as in the 1984 report apart from two colleges which asked for five GCSE subjects at grade C minimum. Eleven colleges indicated that either ONC or OND were mandatory for entry to HNC or HND courses. Only one college accepted City and Guilds qualifications as an alternative.

Two colleges offered degree courses with entrance requirements of two A-level subjects at grades C/C in one college and grades C/D in another.

All respondents emphasised that dental technician training was incomplete without exposure of the trainee to clinical dentistry. This exposure was provided by placements in various clinical environments. Some trainees gained a wide range of experiences in more than one clinical institution. Eleven colleges had placements in undergraduate dental schools, ten in NHS or commercial dental laboratories and one in a general dental practitioner laboratory. These placements took a wide range of formats, the commonest being either 1 day per week or 16/17 week blocks. One respondent reported a 1-year industrial place-



**Fig. 1** Distribution of colleges of higher education offering courses in dental technician education and training in the UK. The uneven distribution of colleges is evident, particularly the scarcity in the south of England

ment, splitting the second and third year of a full-time course. Colleges appear to have adapted their placements to avail of local resources.

**Prosthodontic education and training**

The three most recommended textbooks were: *Notes on dental materials* by E. C. Combe, *Dental technology and materials* by H. J. Wilson, and *Anderson's Applied dental materials* by J. F. McCabe. A further 29 titles, covering all aspects of dentistry, were also reported.

All colleges taught the use of the simple hinge articulator and only one did not teach the use of either the average value or the semi-adjustable articulator. Forty-two per cent gave instruction in the functioning of the fully-adjustable articulator.

Acrylic resin teeth were used by all colleges, the same usage as in 1984. In contrast, only 8% used porcelain compared with 17% in 1984 and 50% in 1973. Eleven brands of acrylic teeth and five brands of acrylic denture base materials were used.

**Table 1** Numbers of lecturers of dental technology in UK colleges of higher education 1973, 1984, 1998

Year	Full-time			Part-time		
	1973	1984	1998	1973	1984	1998
Number of colleges	21	18	12	21	18	12
Total number of lecturers in all colleges	23	51	37	63	35	31
Variation in numbers of lecturers between colleges	from 0 to 8	from 0 to 11	from 1 to 7	from 0 to 9	from 0 to 8	from 1 to 8

**Table 2 Percentage of UK colleges of higher education which offered City and Guilds courses at three levels, intermediate, final and advanced. Advanced courses were divided into general, maxillofacial, orthodontics, and crown and bridge. None of the colleges offered City and Guilds courses in 1998.**

Year	Intermediate	Final	Advanced general	Advanced maxillofacial	Advanced orthodontics	Advanced crown and bridge
1973	95	95	52	24	29	48
1984	50	78	50	11	56	56
1998	—	—	—	—	—	—

**Table 3 Percentage of UK colleges of higher education which offered Business and Technology Education Council (BTEC) and degree courses 1973, 1984, 1998. In 1998, all colleges offered BTEC courses at Ordinary National Certificate (ONC) and Ordinary National Diploma (OND) levels, six colleges at Higher National Certificate (HNC) and Higher National Diploma (HND) levels and two at degree level**

Year	BTEC courses				Degree courses
	ONC	OND	HNC	HND	
1973	—	—	—	—	—
1984	39	83	—	—	—
1998	100	100	50	50	17 (2 colleges)

Not surprisingly, the construction of customised impression trays in metal alloy was no longer taught even as a technique exercise. The use of light cured materials had overtaken all except cold cured acrylic resin (Table 4). The use of alloys for cast partial dentures showed a clear trend over the three surveys (Table 5) in that all colleges used cobalt-chromium alloy and one college used both this and student's alloy. Developments in dentistry since the previous survey necessitated the inclusion of two additional questions, one on implantology and the other on veneers. Fifty per cent of colleges provided a course on implantology, half of these having both theoretical and practical components. The syllabus in 58% of colleges included modules on veneers and more than three-quarters of these were practical in content.

The final question was on inter-professional communication skills. All colleges taught this subject with nearly half favouring a case study format and two colleges had a special modular unit of study. A common approach was to analyse laboratory cards provided by trainees and to design new cards with

improved format based on European Union Regulations and Medical Device Directives.

**General comments by respondents**

Funding of courses was considered to be a major issue and the majority believed that other sectors of education were better resourced. Respondents were aware that recent graduate technicians were criticised by the dental technology industry for having a great deal of theoretical knowledge and inadequate practical skills. This criticism is well known to clinical dental teachers in relation to recent graduates from dental schools, and the introduction of vocational training during the 2 years after graduation has gone a

long way toward resolving this criticism. A number of respondents recommended a similar system for technicians, that is, the registrable qualification for all technicians should be BTEC at OND level, followed by a technician vocational training programme which would be organised on a UK basis and would be mandatory for all technicians before being allowed to offer their services independently.

There was widespread approval of degree courses and the hope was expressed that at some time in the future, the degree would be the registrable qualification. The expansion of postgraduate courses in more complex aspects of dental technology was also supported.

Respondents were concerned about alternative systems of training such as General National Vocational Qualifications (GNVQs) and occupational standard groups which might have a divisive effect and lead to two classes of dental technician.

Statutory registration was given whole-hearted approval but there was some anxiety about the body under whose aegis it would take place. Technicians recognised the role of the dentist as leader of the dental team but they wanted some degree of autonomy. The eventual resolution to this matter would influence recruitment and career structures.

All respondents regretted the poor standard of communication between the dentist and technician. They emphasised the importance of this subject and most devoted a clearly defined part of the syllabus to inter-professional communication skills. The development of multi-disciplinary teaching was strongly

**Table 4 Materials generally used for customised impression trays (%). Metallic trays were no longer used in 1998, light-cured materials had superseded all except cold cured acrylic resin**

	1973	1984	1998
Acrylic cold cured	67	72	92
Light cured	—	—	83
Shellac	81	67	67
Acrylic heat cured	48	42	67
Thermo-forming	15	40	50
Metallic	26	6	0

**Table 5 Materials generally used for metallic removable partial dentures (%) in 1998, all colleges had changed to Co-Cr alloy, and one (8%) also used student's technique alloy**

Materials	Year		
	1973	1984	1998
Student's alloy	86	39	8
Co-Cr	10	72	100

supported, with a preference for closer links with undergraduate dental schools and, ideally, some form of integration into the curriculum, a system already being implemented in the School of Clinical Dentistry, Sheffield. This was seen as an essential way forward toward a better understanding between the dentist and technician.

**Discussion**

A comparison between the three surveys showed the profound changes that have taken place in dental technician education and training during the past 25 years. The number of centres which provided training increased between the first and second surveys and decreased to the present number of 13. The cause for this reduction may be because of rationalisation, as financial viability is a major factor in maintaining courses. Dental technician courses are expensive to run as they require a large capital investment in equipment and materials and staff/student ratios must be high to maintain close supervision.

If this is the explanation for the reduction in the number of centres, it is not surprising that there is not an even distribution of training centres particularly as there is no UK strategy on dental technician education. The paucity of centres in the south of England is particularly noticeable (fig. 1).

Although the number of trainee technicians has dropped during the 25 years of these surveys, there does not appear to be undue concern about a shortage of trained technicians in the industry. This may be explained by the high level of wastage in

technician training, so that the decrease in trainees may not have been accompanied by an equivalent decrease in qualified technicians.<sup>3</sup> This is being closely monitored by The Dental Technician Education and Training Advisory Board (DTETAB), whose own survey between 1982 and 1987 showed a similar trend of decreasing numbers with a shift from part-time to full-time education. It is interesting to compare developments in technician education in Poland<sup>6</sup> and The Netherlands.<sup>7</sup>

At the present time, two colleges offer degree courses in dental technology and most of the other respondents in this survey indicated that they were actively engaged in developing similar courses. There was also widespread interest in developing additional postgraduate courses in specialised subjects. One undergraduate dental school recently started a degree course in dental technology, independent of a college of further education. The contentious question of finding a balance between theoretical and practical aspects of the course might be resolved by a vocational training period after graduation.

A common theme running through the three surveys was the lack of communication between the dentist and technician. As described in the Nuffield report, this was mainly because of the switch by the dentist from on-the-premises technical support to large commercial laboratories. A serious commitment to improving technician communication was evident in the latest survey but doubt was expressed by respondents about the dentists' willingness to change. The view was put forward that the best hope for better communication was the development of closer links with undergraduate dental schools with common core programmes for dental undergraduates and trainee technicians — a similar view expressed in the USA.<sup>8</sup>

A more powerful impetus for change is at the discussion stage in the form of European Union Medical Devices Directives. These are being developed at the present time by the Medical Devices Agency of the Department of Health. Part of these directives will make it a legal requirement to follow defined guidelines in prescribing

devices for patients, and these records must be retained for at least 5 years. A written prescription from a dentist to a technician may be included in these directives.

Since the publication of the Nuffield report, dental technicians have been discussing its recommendations, and the effect of implementing them on their careers. As the Dental Auxiliaries Review Group report<sup>9</sup> goes out to consultation, discussions will continue and the part played by the dental technician in delivering oral healthcare will be clarified.

The dental technician of the future may be a university graduate with postgraduate qualifications, seeking due recognition for his level of expertise and registered with an appropriate authority as a professional complementary to dentistry.

If the dentist is to maintain credibility as leader of the dental team, he must be familiar with the latest developments in all aspects of education and training of all auxiliaries, so that he can coordinate the highest level of care for his patients.

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