What I wish I'd learned at dental school

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In brief

Highlights changes in UK dental undergraduate curricula.	Provides an appreciation of the areas in which current dental graduates feel training is deficient.	Identifies areas for further postgraduate training.

Background Much concern appears to exist as to the scope and content of contemporary dental school programmes, with the oft-cited criticism being made that dental graduates are 'no longer as good as they used to be'. **Aim** The aim of this project was to survey the views of dentists – both new graduates and more established practitioners – on aspects of their own dental school training they felt had been deficient as well as commenting on what aspects of dental school education they would like to see improved/enhanced in current times. **Methods** An invitation to complete an Internet-based questionnaire was emailed to the Fellows and Members of the Faculty of General Dental Practice (UK). Topics in the questionnaire included the respondent's own dental education history, how well they felt their dental school training had covered certain clinical and non-clinical topics; and their opinions on areas they felt should be included in contemporary dental school programmes. **Results** Six hundred and forty-nine responses were received from 3,348 emailed invitations (response rate = 19.4%). Sixty-one percent (395) of respondents were qualified for 10 years or more. Among clinical skills and techniques, a majority of respondents reported they felt they had not had sufficient teaching/training in dental school in surgical endodontics (76%), conscious sedation (72%), root surface debridement (71%), fixed orthodontic appliances (68%), porcelain veneers (63%), implants (56%) and posterior composites (53%). If designing a new dental school programme, the most common topics respondents would seek to include/increase were business and practice management (21%), communication skills (including patient management and leadership skills) (10%), and increased clinical time and experience (8%). **Conclusions** The findings of this project are of interest and relevance to those working with student dentists and young dental practitioners. A greater emphasis is needed on the teaching of certain non-clinical subjects such as business and communication skills, while within clinical subjects there is need to refine and expand teaching in identified areas such as exodontia and endodontics.

Introduction

The primary dental qualification, followed by dental foundation training (DFT – formerly vocational training) of one year duration is designed to equip a new dentist with the knowledge, skills and competences to be a 'safe beginner' in the clinical practice of dentistry.[1] The programme of study culminating in the primary dental qualification forms the basis of a career long continuum of dental education. The skills and competences necessary to qualify in dentistry should underpin the acquisition of those skills and competences which a practitioner acquires in the process of becoming an established practitioner, as well as the skills and competences associated with the application of new processes and techniques in clinical practice.

The General Dental Council's (GDC) '*Preparing for practice*' document was published in 2011. This document places greater emphasis than ever before on the so-called 'softer skills' that should be practised by all members of the dental team. The document outlines four main domains:

- Clinical
- Communication
- Professionalism
- Management and leadership.

Central to the thrust of this guidance is the requirement that 'a registrant will be expected to develop and maintain their knowledge and skills throughout their professional career'. Historically, there was a tendency to view dental education as a 'start-stop' phase of professional life, with the educational process ceasing at the time of graduating from dental school. Today the concept of lifelong learning, including mandatory continuing professional development, is accepted as an integral element of professional life. In time such learning will become fundamental to arrangements for the revalidation of all dental healthcare professionals.

Despite the ever-increasing range and sophistication of procedures and techniques involved in the provision of contemporary primary dental care, the undergraduate dental degree programme has remained at five years duration. This situation, although relieved in part by, for example, removing large elements of traditional, hands-on dental technology from the dental curriculum, is confounded by the relatively slow development of professional skill

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Table 1 Distribution of respondents by decade of graduation

Decade qualified	Number of respondents	Percentage of respondents
1949–59	5	1
1960–69	19	3
1970–79	80	12
1980–89	138	21
1990–99	94	15
2000–09	197	30
2010–13	56	9
Undisclosed	60	9

mix, leaving the different educational domains of dentistry fighting for space in a typically, heavily congested curriculum. Considerable tension tends to exist in dental schools between the many different, essential elements of the teaching programme. These tensions are typically exacerbated by the expectation to, for example, expand community-based, integrated oral healthcare experience, as well as the shared care of patients with other healthcare professionals in at least the later phases of a dental curriculum. This situation is in no way alleviated by reductions in student numbers. Despite the best efforts of dental schools, changed thinking on the content of the undergraduate curriculum, and many dental students excelling in their studies, gaining experience in many more techniques and processes than those that went before them, there are those in the profession who simply view new graduates as 'no longer as good as they used to be'.[2]

Such criticism of contemporary dental school graduates illustrates a more subtle tension: namely that of the divergences between modern, evidence-based, dental school education, and established 'custom and practice' in everyday dental care. Examples of such tension include increased teaching of posterior resin composites restorations at the expense of gaining experience in the placement of amalgam restorations,[3,4] minimum intervention management of caries,[5–7] moisture isolation techniques in restorative dentistry,[8] the design of removable partial dentures.[9] These departures from so-called traditional best practice have been the subject of most careful consideration, not the product of necessary cost saving measures, as some would maintain.[9]

In consideration of such concerns and views, the aim of the present study was to investigate the opinions and attitudes of dentists (specifically members of the Faculty of General Dental Practice, UK) on the perceived value of the education and training they received at dental school. To develop a meaningful overview of the perceived sufficiency of the dental education received, the investigation was planned to span subjects that respondents felt they had been taught well while students, as well as aspects of their dental education which the respondents felt would have benefited from additional time and attention.

Method

Following ethical approval (Cardiff Dental School Research Ethics Committee) an electronic Internet-based survey (Bristol Online Surveys, Bristol, UK) was finalised.

The survey aimed to collect information on three areas:

- An understanding of the respondent's personal dental education history
- The opinion of respondents on how well their dental education had covered certain clinical and non-clinical topics
- The opinion of respondents on areas they felt should be included in contemporary dental school curricula.

The Secretariat of The Faculty of General Dental Practice (FGDP (UK)) invited Fellows and dentally qualified Members of the Faculty to participate in the study. An initial email was sent, followed by two follow-up emails, at one-month intervals. The questionnaire ran from the beginning of May until the end of July 2014.

Participation in the survey was entirely voluntary, and participants were free to answer as many questions as they wished. All responses were anonymous. Consent was implied by completion and submission of the questionnaire.

The information received was analysed using the Bristol Online Surveys software. Descriptive results and summary statistics are reported.

Results

Six hundred and forty-nine responses were received. Given uncertainties over the number of invalid, outdated and missing email addresses, it was estimated that responses were received from a c. 20% sample of the active membership of the Faculty.

The results were considered in terms of 'recent graduates' (qualified within the last ten years, n = 194) and 'established practitioners' (qualified for 10 years or more, n = 395), 60 did not respond in which year they qualified. The distribution of the respondents by decade of graduation is set out in Table 1

Demographics of respondents

Three hundred fifty-four responses were received from males (55%) and 231 (36%) responses from females (9% undisclosed). The responses from established practitioners had a male: female gender split of 65%: 27%, (8% undisclosed), compared to 58% male: 36% female (6% undisclosed) for the recent graduates.

Ninety-three percent of respondents (n = 581) qualified from a UK or Irish university. Five percent (n = 34) graduated from a dental school outside the EU, while1% (n = 7) graduated from an EU dental school outside the UK and Ireland.

The mean age of all respondents was 44 years (range: 24–88 years). For the recent graduates, the mean age was 30 years (range 24–45), compared to the mean age of 50 years (range 33–88) for the established practitioners.

Two thirds (66%, n = 428) of the respondents reported that they currently worked in a primary dental care setting. 4% (n = 26) work in the community dental service. Seven percent (n = 45) worked in non-consultant hospital posts. Ten (1.5%) had retired from dentistry, 3% (n = 21) were in the armed forces, 2% (n = 13) worked in specialist practice, 2.5% (n = 16) were employed by a university, 1% (n = 8) were NHS consultants, and 12% (n = 82) were undisclosed.

The majority of respondents (n = 458, 71%) worked full time. The remainder (n = 142, 22%) worked part time. Seven percent (n = 49) were undisclosed.

Ninety-four percent (n = 182) of recent graduates have completed DFT, compared

to only 42% (n = 164) of the established practitioners.

Opinions

Periodontology

Ninety percent (n = 541) of the respondents reported satisfaction (learned 'enough' or 'a lot') with their education in relation to simple scaling and oral hygiene instruction. However, only 71% (n = 419) were satisfied with their education on root surface debridement. Surgical periodontology elicited the most dissatisfaction with the teaching of periodontology, with 67% (n = 397) of respondents indicating that their education had been deficient, or could have been better. There were no significant differences between the levels of satisfaction between recent graduates and established practitioners (p >0.05).

Removable prosthodontics

There was a high level of satisfaction with education across complete, copy, acrylic partial- and metal-based partial dentures (68%, n = 408). There were no significant differences between the levels of satisfaction according to type of denture or between recent graduates and established practitioners (p >0.05).

Extractions

Satisfaction with the education received on simple, non-surgical extractions was extremely high (85%, n = 510) with no significant difference between recent graduates and established practitioners (p >0.05) (Fig. 1). In contrast, education on surgical extractions scored highly in 'wishing I had learned more' and 'training was deficient' among recent graduates (66%, n = 128). In comparison, established practitioners were split relatively evenly between 'learned a lot' (22%, n = 94), 'enough' (26%, n = 106), 'wish I had learned more' (28%, n = 118) and deficient training (14%, n = 55) (Fig. 2).

Conscious sedation

Education on conscious sedation, both oral and intravenous, tended to be scored as either 'deficient' or 'wishing I had learned more' (72%, n = 849). There was no significant difference between established practitioners and recent graduates for oral sedation (p >0.05). In contrast, 68% (n = 283) of established practitioners indicated that this aspect of their education had been 'deficient' or 'wish I had learned more', compared with 53% (n = 104) for recent graduates (p <0.05).

Paediatric dentistry

Both groups were satisfied with their education on fissure sealant treatment (90%, n = 535) and basic restorative work in deciduous teeth (79%, n = 473). Satisfaction dropped, however, in relation to pulp therapy in deciduous teeth (57%, n = 341), with no significant difference between recent graduates and established practitioners (p >0.05)

Restorative dentistry

Satisfaction with education on amalgam restorations (95%, n = 568) and anterior composites (86%, n = 509) was very high with almost all scoring 'a lot' or 'enough'. This satisfaction dropped, however, for posterior composites, with less than half (47%, n = 275) scoring 'a lot' or 'enough'. Recent graduates (60%, n = 117) were more satisfied regarding posterior composite than established practitioners (30%, n = 138) p <0.05. There were no significant differences between recent graduates and established practitioners in relation to anterior composites and amalgam restorations (p >0.05).

Orthodontics

Fifty-seven percent of the respondents indicated that their undergraduate education had included 'enough' or 'a lot' in relation to removable orthodontic appliances (n = 338), while 68% felt that their education had been 'deficient' or should have given opportunity to 'learn more' in relation to fixed appliances (n = 402).There was no difference between the responses received from recent graduates and established practitioners (p >0.05).

Endodontics

Eighty-one percent (n = 478) reported they had learned and experienced 'a lot' or 'enough' in relation to endodontics for anterior teeth in their undergraduate studies. This dropped to

Fig. 1 Satisfaction (%) with undergraduate teaching of non-surgical extractions

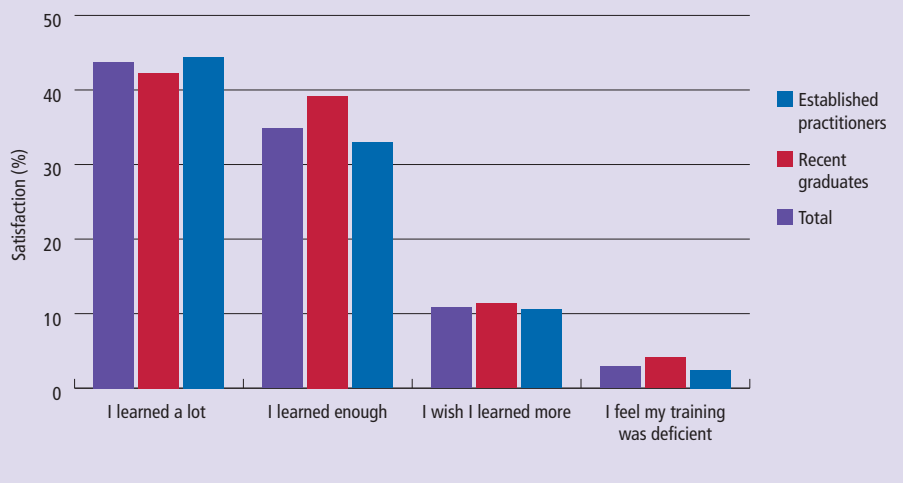


Fig. 2 Satisfaction (%) with undergraduate teaching of surgical extractions

55% (n = 327) for molar endodontics and to 24% (n = 141) for surgical endodontics. Recent graduates (72%, n = 277) were significantly more satisfied with their training in orthograde endodontics than the established practitioners (53%, n = 484) (Figs 3–5)

Fixed prosthodontics

In general, participants had learned and experienced 'enough' or 'a lot' in relation to crowns (77%, n = 459); however, a trend towards 'wishing to learn more' or 'deficient' learning in resin bonded bridgework (48%, n = 296), conventional bridgework (44%, n = 261) and porcelain laminate veneers (63%, n = 364) was apparent. There was no significant difference in the levels of satisfaction between recent graduates and established practitioners for any aspect of their undergraduate education in fixed prosthodontics.

Fig. 3 Satisfaction (%) with undergraduate teaching of endodontics for anterior teeth

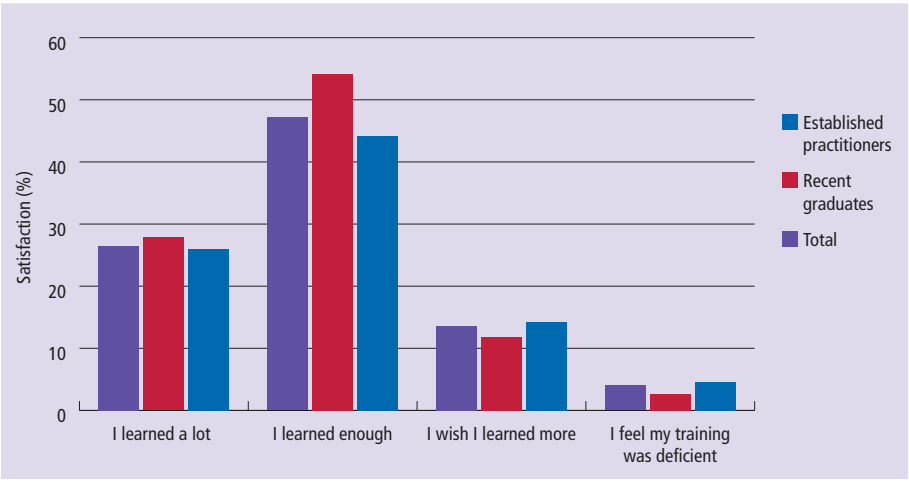


Fig. 4 Satisfaction (%) with undergraduate instruction in molar endodontics

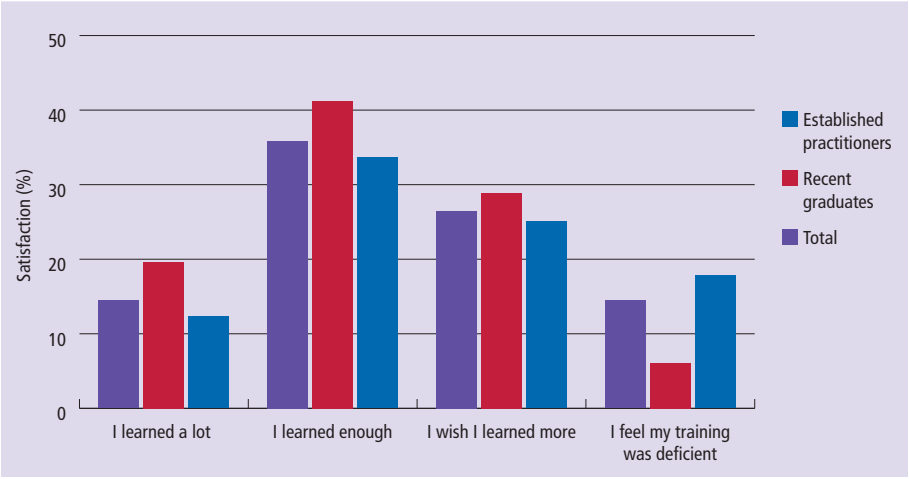
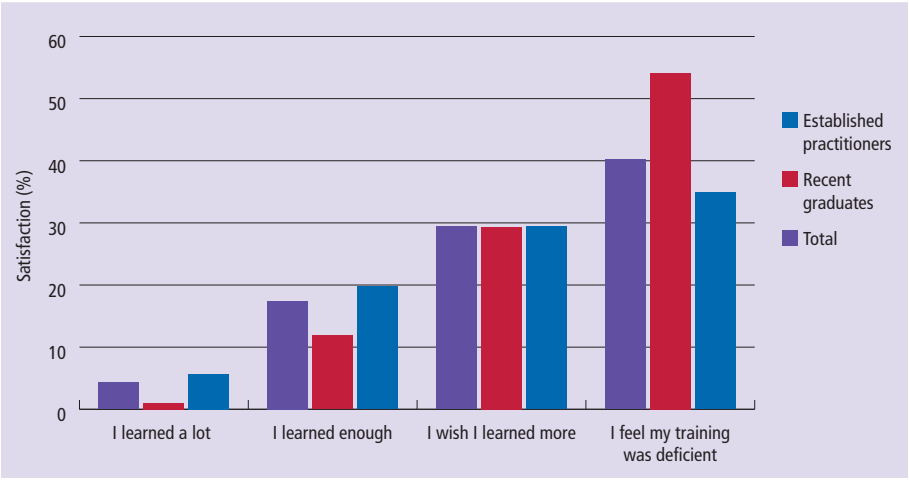


Fig. 5 Satisfaction (%) with undergraduate instruction in surgical endodontics



Implants

Recent graduates indicated a slightly higher level of satisfaction with their undergraduate education in implant dentistry in comparison to the established practitioners; however, an overall majority of 56% (n = 361) indicated that this aspect of their primary dental degree studies had been 'deficient' (Fig. 6).

Miscellaneous

Recent graduates indicated learning 'enough' or 'a lot' in relation to non-clinical topics such as audit (48%, n = 93), child protection (66%, n = 128), complaints handling (32%, n = 62), and working with therapists and hygienists (36%, n = 141) in their undergraduate education. In contrast, the vast majority of the established practitioners viewed their university studies to have been deficient; they wished they had learned more, in relation to audit (66%, n = 300), child protection (61%, n = 276), complaints handling (70%, n = 319), and working with therapists and hygienists (62%, n = 565). Employment law (90%, n = 522) and business skills (94%, n = 550) were universally thought of as having been inadequately dealt with ('deficient') in their undergraduate curriculum (Fig. 7).

Medical emergencies

Overall, the respondents were satisfied with their undergraduate instruction in medical emergencies – 66% 'enough' or 'a lot' (n = 389). However, 85% of recent graduates (n = 164) were of such thinking, compared to only 45% (n = 203) in established practitioners. This difference was significantly different ($p < 0.05$).

Important deficiencies

The top three topics participants wished they had received more instruction in were: business and practice management (23%, n = 151), oral surgery, notably extractions (18%, n=114), and endodontics, including surgical endodontics (14%, n = 93) (Table 2).

Shortfall in skills

The most common skill deficiencies in undergraduate instruction were found to be oral surgery, in particular extraction skills (21%,

n = 137), followed by endodontic skills (18%, n = 114). Orthodontic, removal prosthodontic, business and practice management and crown and bridgework skills each scored 7% (n = 44) (Table 3).

Additions to the curriculum

When asked what three things respondents would add to the traditional dental school curriculum, the most commonly reported topics were:

- Business and practice management – 21% (n = 135)
- Communication skills, including techniques to relate to patients and leadership skills – 10% (n = 66)
- Increased clinical time and experience – 8%, (n = 50)
- Treatment planning – 7% (n = 43)
- Law in relation to employment, consent and medico-legal issues – 6% (n = 38)
- Implant dentistry – 6% (n = 38).

The suggestions for additions to existing curricula by recent graduates and established practitioners are set out in Table 4.

Deficiencies in current curricula

When asked: 'With what you know of current dental school programmes, what do you think are the three most important areas that dental students are not taught enough of?, the most common answers, by general consensus were oral surgery, notably extractions (17%,

Fig. 6 Satisfaction (%) with undergraduate instruction in implant dentistry

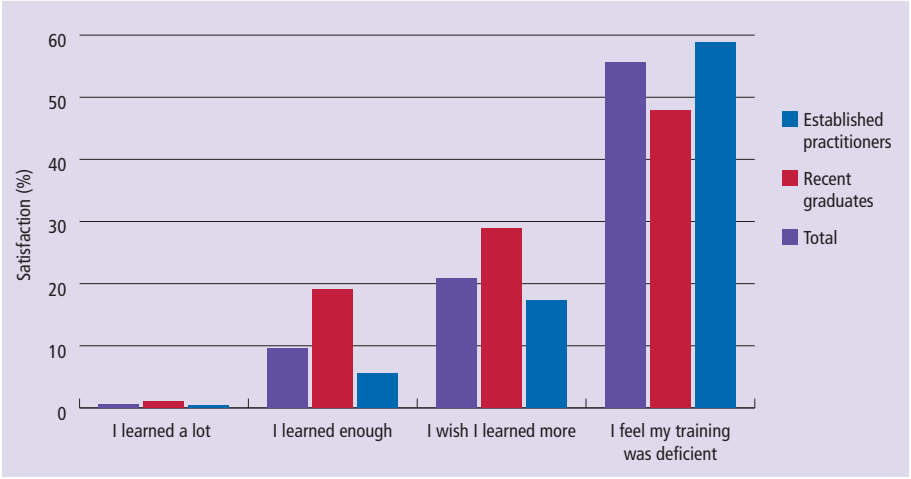


Fig. 7 Satisfaction (%) with business skills taught in undergraduate studies

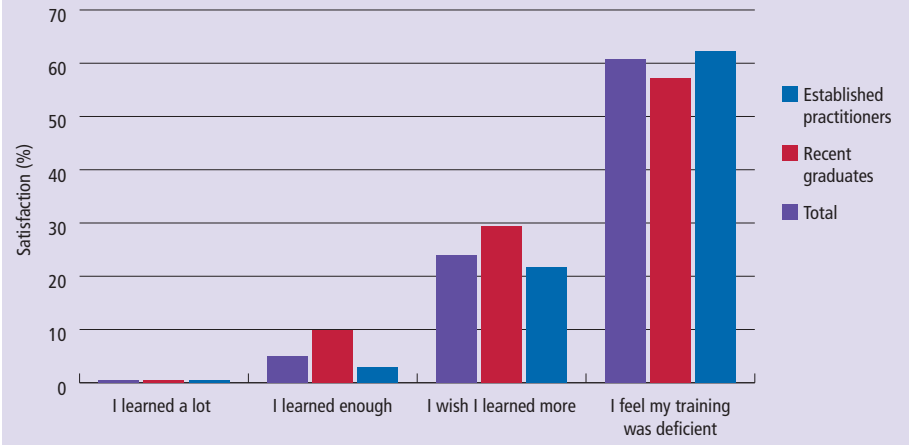


Table 2 Top 'deficiencies' in undergraduate education by percentage of respondents

	Overall	Recent graduates	Established practitioners
1	Business and practice management – 23%	Oral surgery – 27%	Business and practice management – 27%
2	Oral surgery – 18%	Business and practice management – 20%	Oral surgery – 15%
3	Endodontics – 12%	Removable prosthodontics – 14%	Orthodontics – 14%
4	Orthodontics – 11%	Implant dentistry – 12%	Endodontics – 13%
5	Implant dentistry – 11%	Endodontics – 11%	Implant dentistry – 11%
6	Crown and bridgework – 8%	Crown and bridgework – 10%	Crown and bridgework – 8%

Table 3 Ranking of skills which respondents (%) wished they had acquired more expertise in while at dental school by percentage of respondents

	Overall	Recent graduates	Established practitioners
1	Oral surgery – 21%	Oral surgery – 24%	Oral surgery – 21%
2	Endodontics – 18%	Endodontics – 19%	Endodontics – 14%
3	Orthodontics – 7%	Removable prosthodontics – 11%	Orthodontics – 10%
4	Removable prosthodontics – 7%	Crown and bridgework – 9%	Business and practice management – 7%
5	Business and practice management – 7%	Business and practice management – 8%	Crown and bridgework – 6%

Table 4 Subjects, in rank order, that respondents (%) considered to be important additions to contemporary dental school curricula

	Overall	Recent graduates	Established practitioners
1	Business and practice management – 21%	Business and practice management – 19%	Business and practice management – 24%
2	More on communication skills – 10%	More clinical experience – 8%	More on communication skills – 12%
3	More clinical experience – 8%	More on communication skills – 8%	More on treatment planning – 8%
4	More on treatment planning – 7%	Working within the NHS contract – 7%	Implant dentistry – 8%
5	More on law and ethics – 6% and implant dentistry – 6%	More on law and ethics – 6%	More clinical experience – 8%

Table 5 Subject areas, in rank order, which respondents (%) considered deficient in existing undergraduate dental education

	Overall	Recent graduates	Established practitioners
1	Oral surgery – 17%	Oral surgery – 18%	Oral surgery – 19%
2	Endodontics – 11%	Endodontics – 13%	Endodontics – 11%
3	Business and practice management – 9%	Business and practice management – 11%	More detailed treatment planning – 11%
4	More detailed treatment planning – 8%	More on removable prosthodontics – 9%	More clinical experience – 9%
5	More clinical experience – 7%	More restorative dentistry – 6%	Business and practice management – 8%
6	More restorative dentistry – 7%	More on communication skills – 5%	More restorative dentistry – 8%

n = 112), endodontics (11%, n = 72) and business and practice management (9%, n = 55). Only 7% (n = 46) of the respondents indicated that they felt that current dental students do not have enough clinical time and experience (Table 5).

Additional comments

Respondents were also asked for any further comments on their own or current dental education. A representative sample of the additional comments made is set out in Box. 1.

Discussion

The FGDP (UK) was selected to assist in the present investigation given the wide age, geographic and role in dental oral healthcare distribution of its dentally qualified members and fellows. It was disappointing that only c. 20% of the members and fellows of the Faculty accepted the invitation to participate in the study. As such, the findings of the study may not be considered to be representative of those affiliated with the Faculty, let alone dentists in the UK. It is suggested, however, that the views and suggestions obtained from 649 members and fellows of the Faculty provide a valuable insight into perceptions on the sufficiency of dental education in the UK, past and present.

Fees for degree programmes at British universities, including dentistry increased in 2012/13 to £9,000 for home and European Union students[10] leading to the likelihood that students who have entered university since that time have adopted a more consumerist approach to their education than previous learners.[11] All those who participated in the present study should not have held such a consumerist view, having paid at most relatively modest, if any, university fees; however, it is anticipated that all the respondents expected their university programme to prepare them for their future career in their chosen profession of dentistry. Those respondents who qualified before the introduction of mandatory vocational training (subsequently foundation training) in 1993, would have expected their undergraduate dental degree programme to make them fit for independent practice, without any further training or instruction – compulsory lifelong learning (continuing professional development, CPD) not having been introduced by the General Dental Council until 2002. As such, the attitude of the respondents to the sufficiency of their dental education may have varied according to the expectations and views of dental students at the time they attended university. The division, analysis and consideration of the data obtained of the respondents into data from 'recent graduates' (<10 years out of dental school) and 'established practitioners' (>10 years out of dental school) gave the views of not just

Box 1 Sample of representative additional comments

'Dentistry is not a business it is a profession first and some should appreciate this!'

'I feel unable to treat complex cases especially non-carious tooth surface loss. I feel all dentists should have access to free lifelong support training and mentoring in their professional lives.'

'I believe that early interaction with patients as a first year student is of paramount importance. You will mainly be judged by patients on your interpersonal skills and less so on your handiwork.'

'I enjoyed my undergraduate training but it didn't prepare me for:

1. *The stress of dentistry;*
2. *Correct posture and the importance of core strengthening exercises such as Pilates;*
3. *The business of dentistry;*
4. *Real life dentistry – in NHS practice there were no face bows and I didn't take 10 steps to make a denture;*
5. *Boredom – it gets routine, students should be encouraged to try different things in their career.'*

'I felt my oral surgery experience was very poor, I only learnt to remove teeth properly and be able to manage surgicals [sic.] after my Maxfax DF2 post.'

'I think modern day dental school training is of an extremely high standard and my experience of working with young dentists has been good. Most have been superb clinicians and surgeons.'

'I wish vocational training had been around when I qualified.'

'younger' and 'older' practitioners, but views of graduates before and after compulsory CPD became established. It is acknowledged that there may be some un-investigated differences in the views and attitudes of respondents who graduated before and after the introduction of vocational training, evidenced by the final comment included in Table 5: *'I wish vocational training had been around when I qualified'*.

Given the multifaceted achievements, attainments and aspirations of students who graduate from dental schools, and the diversity of situations they subsequently find themselves practising in, it is no surprise that some graduates believe that their dental education, although sufficient for registration with the GDC, did not best prepare them for their existing contribution to dentistry. This is seen in previous surveys of undergraduate teaching which found that some dentists do not feel that their dental education adequately prepared them for life in practice, especially in the areas of orthodontics, endodontics and surgical extractions.[12,13]

The results of the present survey reinforce the findings of previous studies and provide new food for thought for all those with responsibilities to ensure that undergraduate education in dentistry is fit for purpose, albeit to produce a dental graduate who, as a minimum, is a so-called 'safe beginner' in oral healthcare provision. From the findings, three areas have been selected for detailed discussion: oral surgery, endodontics and practice and business management.

Oral surgery

Oral surgery, in particular exodontia, constitutes a large, element of dental practice in the UK, with 73% of the population having experienced a dental extraction, other than the removal of one or more permanent third molar (wisdom) teeth.[14]

Previous studies have reported limited undergraduate experience of extractions in the UK, with the average minimum target for the number of extractions being 51,[15] and only four surgical extractions on qualification.[16] Many graduates, who do not develop their competence and confidence in exodontia in DFT seek follow on senior house officer or equivalent positions in oral and maxillofacial surgery. Referral patterns of general dental practitioners suggest that the majority of referrals for extractions could be managed in primary care.[17–19] In one referral centre half of the patients referred for the extraction were successfully treated under local anaesthesia without complication, with 34% of the referrals having been considered inappropriate.[19] While the reasons for such referrals are multi-factorial, they suggest that whatever competence or confidence certain practitioners may have had in undertaking extractions may have been lost, possibly leaving them wishing that they had received more instruction in this aspect of primary dental care while at dental school. In the present study 28% percent of recent graduates reported that they felt their surgical extraction teaching to be deficient – double the value for established practitioners. Oral surgery and oral surgery skills featured high, if not at the top of the perceived areas of deficiency (Tables 2, 3, 5) in dental education. While the need and demand for routine forms of oral surgery may have reduced, relative to former times, dental schools are to be encouraged to find innovative ways, possibly in partnership working with commissioners of dental services and the local dental community, to provide primary dental care oral surgery services to those patients who still require them.

Endodontics

Irreversible pulpitis and loss of pulp vitality are common problems requiring management in general dental practice. With endodontic therapy having many advantages over the alternative of extraction, in many cases, it is of interest that endodontics was as prominently identified as being deficient in dental education. Although educational guidelines require dental schools to ensure that their graduates are competent at performing root canal therapy, dental schools in the UK tend to be relatively well off in terms of endodontic expertise, and the quality of endodontics in general dental practice has been shown to be cause for concern,[20] endodontic education has been shown to have a lower priority in UK curricula compared to curricula in the rest of Europe and the USA.[21] As with oral surgery, the findings of the present study indicate that dental schools should look afresh at the sufficiency of instruction in endodontics in existing curricula. That said, it is acknowledged that suitable instruction in state of the art endodontics, ideally including experience with endodontic microscopes is resource intensive. As with problems of what to leave out of the typically overcrowded curriculum when introducing something new, there is the problem of where to take precious, hard-pressed resources away from to finance developments in another area.

Practice and business management

Practice and business management was an area which was highlighted as problematic and in need of inclusion in existing curricula by both new graduates and established practitioners. There is no mention of business skills as such in the GDC learning outcomes; however, management skills are mentioned in the context of good communications with staff and patients and in respect of the following:

- 12.1 Recognise and comply with systems and processes to support safe patient care
- 12.2 Recognise the need for effective recorded maintenance and testing of equipment and requirements for appropriate storage, handling and use of materials
- 12.3 Recognise and demonstrate the procedures for handling of complaints as described in the *Principles of complaints handling*
- 12.4 Describe the legal, financial and ethical issues associated with managing a dental practice
- 12.5 Recognise and comply with national and local clinical governance and health and safety requirements.

While it is acknowledged that the vast majority of graduates go on to work in, and in many cases own and manage a dental practice, it could be argued that a dental school environment, including most outreach centres, are not well placed to meet this perceived educational need, which may be better addressed in DFT. Perhaps dental schools and DFT schemes could work more closely than at present to help address this perceived deficiency in existing dental education, and also embark on programmes of innovative joined-up working to tackle some of the other issues identified in the present and related studies. Interestingly in other professional degree courses that produce graduates who go on to work in, and in many case eventually own and manage, a practice (for example, law and veterinary medicine and surgery), it is understood that the undergraduate curriculum, like dentistry, is not required to include practice and business management.

Conclusion

Dental schools continue to face many challenges; not least their ability to deliver an undergraduate curriculum that is fit for purpose, meets the minimum requirements of the GDC, and satisfies the needs and expectations of their students. The findings of the present study reinforce those of previous investigations and provide new food for

thought for all stakeholders in dental education, in particular in the fields of oral surgery, endodontics and practice and business management. Solutions to the perceived deficiencies in dental education may lie in innovations in joined up working with dental foundation training (DFT) schemes, commissioners of dental services and local dental communities. Much has, and continues to be achieved in dental education in the UK, which is generally well regarded, but opportunities for continuous quality improvement remain.

Acknowledgements

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1. General Dental Council. Dental team learning outcomes for registration. 2011.
2. Cabot L, Radford D. Are graduates as good as they used to be? *Br Dent J* 1999; **186:** 318–319.
3. Lynch C, Frazier K, McConnell R, Blum I, Wilson N. State of the-art techniques in operative dentistry: contemporary teaching of posterior composites in UK and Irish dental schools. *Br Dent J* 2010; **209:** 129–136.
4. Lynch C, Frasier K, McConnell R, Blum I, Wilson N. Minimally invasive management of dental caries: contemporary teaching of posterior resin composites in North American dental schools. *J Am Dent Assoc* 2011; **142:** 612–620.
5. Blum I, Lynch C, Wilson N. Teaching of direct composite restoration repair in undergraduate dental schools in the United Kingdom and Ireland. *Eur J Dent Educ* 2012; **16:** e53–e58.
6. Lynch C, Blum I, Frazier K, Haisch L, Wilson N. Repair or replacement of defective direct composite restorations: contemporary teaching in U S, Canadian dental schools. *J Am Dent Assoc* 2012; **143:** 157–163.
7. Kidd E. How "clean" must a cavity be before restoration. *Caries Res* 2004; **38:** 305–313.
8. Lynch C, McConnell R. Attitudes and use of rubber dam by Irish general dental practitioners. *Int Endod J* 2007; **40:** 427–432.
9. Lynch C, Allen P. Why do dentists struggle with removable partial denture design? An assessment of financial and educational issues. *Br Dent J* 2006; **200:** 277–281.
10. Department for Business Innovation & Skills. Announcement: Changes to tuition fees and higher education. Available online at: https://www.gov.uk/government/news/changes-to-tuition-fees-and-higher-education (August 201).
11. Molesworth M, Nixon E, Scullion R. Having, being and higher education: the marketisation of the university and the transformation of the student into consumer. *Teaching in Higher Education* 2009; **14:** 277–287.
12. Patel J, Fox K, Grieveson B, Youngson C. Undergraduate training as preparation for vocational training in England: a survey of vocational dental practitioners' and their trainers' views. *Br Dent J* 2006; **201:** 9–15.
13. Murray F, Blinkhorn A, Bulman J. An assessment of the views held by recent graduates on their undergraduate course. *Eur J Dent Educ* 1999; **3:** 3–9.
14. Chenery V. Adult Dental Health Survey 2009 England Key Findings.,Health & Social Care Information Centre, 2011.
15. Macluskey M, Durham J. Oral surgery undergraduate teaching and experience in the United Kingdom: a national survey. *Eur J Dent Educ* 2009; **13:** 52–57.
16. Durham J, Moore U, Corbett I, Thomson P. Assessing competency in Dentoalveolar surgery: a 3-year study of cumulative experience in the undergraduate curriculum. *Eur J Dent Educ* 2007; **11:** 200–207.
17. Tyrer G. Anaesthesia: Referrals for dental general anaesthetics — how many really need GA? *Br Dent J* 1999; **187:** 440–444.
18. Bell G. An audit of 600 referrals to a primary care based oral surgery service. *Br Dent J* 2007; 203: E6.
19. Halai T, Yates J. Assessment of oral surgery referrals from primary care to a regional dental hospital. *Oral Surg* 2014; **7:** 168–176.
20. Qualtrough A, Dummer P. Undergraduate endodontic teaching in the United Kingdom: an update. *Int Endo J* 1997; **30:** 234–239.
21. Dummer P. Comparison of undergraduate endodontic teaching programmes in the United Kingdom and in some dental schools in Europe and the United States. *Int Endo J* 1991; **24:** 169–177.