

# How prepared are foundation dentists in England and Wales for independent general dental practice?

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## In brief

Gives a contemporary assessment of new graduates' preparedness for independent GDP.

Provides undergraduate educators with specific feedback as to their students' perception of undergraduate preparation for independent GDP.

Raises awareness in foundation training educators as to where new graduates perceive their preparedness as good, and areas in which they may need additional support.

**Introduction** The Graduate Assessment of Preparedness for Practice (GAPP) questionnaire has been shown to be valid and reliable in assessing the preparedness of foundation dentists (FDs) for independent general dental practice (GDP). In this study it is used to establish preparedness at six weeks of dental foundation training (DFT) across England and Wales. **Method** GAPP questionnaires were sent to all FDs and ESs in England and Wales in mid-September 2012. Part 1 of the GAPP questionnaire collected the descriptive data of respondents. Part 2 comprised 34 'competence areas' designed to reflect the breadth of Preparing for Practice allowing respondents a 7-category Likert style response. Part 3 comprised open questions designed to allow respondents to expand on their views. Quantitative categorical data from Part 2 was analysed using IBM SPSS (version 20). Median scores were analysed and mean rank scores were generated in order to compare FD and ES responses. Part 2 results were cross-tabulated with the Part 1 descriptors and analysed using the Mann Whitney U and Kruskal Wallis H non-parametric tests. Mean rank scores were considered to be statistically significant if  $P \leq 0.05$ . Part 3 data was analysed thematically using NVivo (version 10). **Results** FDs and ESs felt that FDs were generally well prepared for independent GDP, although FDs rated their preparedness significantly higher than ESs in all areas. FDs who graduated from 4-year courses felt significantly more prepared across most of the curriculum than those from 5-year courses, and graduates from outside the UK felt less prepared for GDP than those from a UK school. **Conclusions** FDs appear to be well prepared for independent GDP at six weeks of DFT. FDs rated their preparedness significantly higher than ESs across the curriculum. Coupled with the finding that the more experienced ESs felt their FDs were less well prepared, that may indicate FDs potentially overstate their level of preparedness. FDs who completed 4-year courses were generally more prepared across a range of curricular areas, some of which may reflect differences in the courses they completed, while others may relate to the individual being a graduate on entry to the course. Distribution of questionnaires through DFT schemes has resulted in a large number of respondents which may allow valuable generalisations to be made about the preparedness of graduates entering DFT in the UK.

## Introduction

A pilot study using the GAPP tool has previously indicated that educational ESs and their FDs felt that they were well prepared for general practice after ten months of DFT.<sup>1</sup>

In order to ascertain if these results are representative of FDs' and ESs' opinions across England and Wales, the GAPP questionnaire was used to establish FD preparedness soon after graduation (at six weeks of DFT).

The General Dental Council's (GDC) curriculum *Preparing for Practice*<sup>2</sup> defines the required pre-registration learning outcomes to gain admission to the UK register. UK dental schools must demonstrate delivery of the curriculum in order to demonstrate sufficiency (the wording of the 1984 Dentist's Act).<sup>3</sup> Although the curriculum has been updated in 2015,<sup>4</sup> the timing of the research meant that the 2012 version, containing 154 competencies was used to define the curricular requirements at that time.

Vocational training emerged as a scheme driven by a profession-wide concern that a bridge between student and professional life needed to be made.<sup>5</sup> New graduates feel it is a good introduction to general practice, especially for those perceived to have lower confidence.<sup>6</sup> Now referred to as DFT, it takes place in one of 74 regional schemes that usually consists of 12–14 pairings of FDs, and their ESs. The majority of ES: FD pairings work together in GDP for a year, although there are some placements within salaried services. FDs attend a 30-day educational programme most commonly run by a Training Programme Director (TPD), who is responsible for the day to day management of a scheme's programme.<sup>7</sup>

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DFT also has a curriculum based on learning outcomes, first published in 2007 by the Committee of Postgraduate Dental Deans and Directors (COPDEND).<sup>8</sup> This curriculum has undergone several revisions, and the latest maps the 218 outcomes expected to be demonstrated during the DFT year.<sup>9</sup> This trend towards competency-based curricula and evaluation based on learning outcomes in healthcare has been deemed preferable for adult learners who tend to be self-directed and willing to assume responsibility in the learning process.<sup>10,11</sup>

New graduates are deemed competent when they are capable of functioning independently, by combining the acquisition of appropriate supporting knowledge, professional attitude and reliable performance in natural settings without assistance.<sup>12</sup> Although all UK dental graduates will have passed through a process aimed at delivering the same (GDC) curriculum, newly qualified dentists emerge from different schools as a heterogeneous group. Varying undergraduate skill coverage has been shown to be closely correlated to graduate confidence, which varies between dental schools.<sup>13</sup>

Not only will dental graduates differ from each other, but they may also differ greatly from their ESs, who have often been qualified for many years, and are likely to have had significantly different undergraduate experiences. Patel *et al.* highlighted a perception by ESs that undergraduate training has been 'diluted' and that new graduates entering their practices as FDs were not as capable practically as they once were.<sup>14</sup> If new graduates have not acquired sufficient experience in specific areas, dental schools and providers of DFT need to know so that appropriate action can be taken.<sup>15</sup>

Newly qualified dentists perceive a lack of training in their undergraduate course in certain key areas including dental extractions and endodontics, which matches deficiencies their supervisors have highlighted.<sup>14,16</sup> This correlates with reports of low confidence in these clinical areas.<sup>13,17,18</sup> In a recent study at a single dental school, 80% of the final year students felt unprepared for the clinical work presented.<sup>19</sup>

Communication with patients has been rated by ESs as the single most important trait in a good dentist, although felt to be the area where FDs were most likely to fall short in their actual expected performance.<sup>20</sup> Discrepancies between reported preparedness by ESs and FDs in diagnosis and treatment planning have been

postulated to represent a lack of self-awareness in their ability.<sup>14</sup>

In a recent study investigating 'What I wish I'd learned at dental school',<sup>21</sup> the most frequent areas in which respondents felt they needed more undergraduate instruction were business and practice management, oral surgery and endodontics, which were broadly aligned with their perceived shortfall in skills on graduation.

Despite the importance of overall competence, studies investigating FDs' capabilities have appeared not to cover the whole curriculum. In order to gain an understanding of overall FD preparedness, consideration of all underpinning curricular competencies was deemed essential. The only tool currently available to do so is the GAPP questionnaire.<sup>1</sup>

To date there has been no known nationwide questionnaire of FD preparedness for practice. We feel that the timing of this research is crucial to the on-going development of this critical interface between undergraduate and FD.

Young dentists should have a seamless transition from undergraduate education into DFT and into a career of lifelong learning. It is important that those responsible for educating and supporting this pathway have a well-informed understanding of their relative experience at any given time. This aims to demonstrate GAPP's use in better understanding the needs of FDs, to inform our educational programmes.

## Method

The GAPP questionnaire<sup>1</sup> was distributed in the second week of September 2012, at which time FDs would have been in their DFT scheme for approximately six weeks.

University ethical approval was granted (STEM 026) and permission from COPDEND was obtained for its distribution to all 74 DFT schemes in England and Wales.

The GAPP questionnaire is composed of three parts:

- Part 1 collected respondent descriptive data, including gender, age, school of qualification and length of course (four or five years). The ES questionnaire additionally asked for the number of years' experience as an ES, and also if they had completed 'VT'. The question on the four to five year course was omitted.
- Part 2 comprised 34 questions representing all four domains of *Preparing for Practice*,<sup>2</sup> displayed in Table 1. A 7-category Likert scale allowed definitive categorical

responses which were coded to allow statistical analysis as follows:

- Completely unprepared
- Very poorly prepared
- Poorly prepared
- Neither well nor poorly prepared
- Well prepared
- Very well prepared
- Completely prepared.

A comments column allowed respondents to elaborate on their categorical response for each question.

- Part 3 was designed to allow respondents to further expand and develop their Part 2 responses with open questions. FDs were asked what elements in their undergraduate course were particularly helpful/unhelpful; where they felt less prepared what they would change in their undergraduate course to rectify this and what they expected their DFT year to cover. ESs were asked to comment on which areas FDs appeared well/less well prepared in, what changes in undergraduate training were suggested to rectify areas of perceived poor preparation and what areas they aimed to cover in DFT. Both populations were finally asked if they had any other comments.

## Questionnaire distribution

Questionnaire bundles were posted to each DFT scheme's TPD with detailed distribution instructions. Each scheme's bundle comprised:

- Letter to the TPD introducing the project and detailing the required method of distribution
- Bundle of 15 enveloped FD questionnaires containing instructions for questionnaire completion and return
- Bundle of 15 enveloped ES questionnaires containing instructions for questionnaire completion and return
- Two stamped return envelopes addressed to the researcher.

FDs were asked to deliver the questionnaires to their ES and return them when completed to the TPD. Both ES and FD questionnaires were provided in an unmarked, unsealed A5 envelope allowing all respondents to complete and return their questionnaires in the sealed envelope to preserve anonymity and the nature of their responses from each other and the TPD.

TPDs were asked to return complete and incomplete questionnaires to the researcher using the postage-paid envelopes provided.

**Table 1 The 34 Part 2 GAPP survey questions, preceded by the stem: How well prepared do you feel for general dental practice in order to...?**

<b>Clinical</b>	
History taking	Obtain, interpret and record a comprehensive patient history, accounting for a patient's expectations and anxieties.
Patient examination	Complete a patient examination and be able to identify all relevant systemic and orofacial conditions and diseases.
Orthodontic assessment	Carry out an orthodontic assessment and discuss treatment options with the patient.
Acute patient management	Appropriately manage the patient presenting in an unscheduled appointment, including management of acute orofacial trauma, infection and pain.
Special tests	Appropriately prescribe and/or undertake relevant special tests to aid diagnosis, including radiography.
Diagnosis	Use all relevant data from the history, examination and special tests, formulate differential diagnoses, and from there, definitive diagnoses.
Treatment planning	Formulate an appropriate treatment plan with the patient, taking into account the risks and benefits of treatment options.
Prevention advice	Provide relevant, comprehensive, evidence-based preventive advice to patients.
Referrals	Refer patients appropriately for advice, assessment or treatment.
Safeguarding	Be able to identify the signs of abuse or neglect in patients and raise concerns appropriately.
Drug prescription	Appropriately prescribe and administer drugs and therapeutic agents.
Periodontal	Appropriately assess and manage the health of periodontal and soft tissues, including monitoring, and prevention treatment.
Local anaesthesia	Appropriately administer local anaesthesia.
Direct restorations	Appropriately assess and manage caries and non-carious tooth surface loss, using minimally invasive techniques that are long lasting, aesthetic and restore or maintain function.
Endodontics	Appropriately manage uncomplicated endodontic treatment.
Extraction	Appropriately manage uncomplicated extraction of erupted teeth and roots.
Surgical extraction	Appropriately manage simple surgical removal of teeth and roots.
Dentures	Assess the need for, design, prescribe and provide biomechanically sound partial and complete dentures.
Indirect restorations	Manage indirect restorative procedures that preserve tooth structure, replace missing or defective tooth structure, maintain function, are aesthetic and long lasting, and promote soft and hard tissue health.
Orthodontic appliance repair	Undertake limited orthodontic appliance emergency procedures.
TMJ management	Recognise and manage temporomandibular joint disorders.
Patient and public safety	Comply with current best practice guidance to ensure delivery of a high quality service to the patient, including appropriate documentation of patient records, decontamination procedures and maintenance of a safe environment.
Medical emergencies	Identify, assess, and manage medical emergencies.
Population-based care	Understand the current issues relating to inequalities in oral health, and how to plan to address these needs, including the role of evidence-based prevention.
<b>Communication</b>	
Patients and public	Communicate appropriately, effectively and sensitively at all times with and about patients, their representatives and the general public, and obtain informed consent.
Other healthcare professionals	Communicate and feedback appropriately with colleagues from dental and other healthcare professions, and raise concerns when problems arise.
Generic communication skills	Maintain accurate clinical records and use a range of communication methods to support clinical practice, within legal and statutory requirements.
<b>Professionalism</b>	
Patients and the public	Put patients' interests first and act to protect them. Respect patients' dignity and choices, and take into account equality and diversity.
Ethical and legal	Recognise and act within the GDC's standards and within other professionally relevant laws, ethical guidance and systems.
Teamwork	Understand the roles of, and co-operate effectively with other members of the healthcare team in the interests of patients.
Development of self and others	Demonstrate a commitment to lifelong learning, and the importance of reflective learning, feedback and development planning for you and your colleagues.
<b>Management and leadership</b>	
Relating to self	Recognise the importance of and demonstrate personal accountability to patients, the regulator, the team and wider community. Put patients' interests first and act as their advocate where appropriate.
Relating to others	Lead, manage and take professional responsibility for the actions of colleagues and other members of the team involved in patient care.
Relating to the working environment	Recognise and comply with local and national systems and processes to support safe patient care, including the safe use of equipment and materials.

Table 2 GAPP questionnaire Part 2 descriptive data				
	Mode		Median (IGR)	
	FD	ES	FD	ES
<b>Clinical</b>				
History taking	6	5	6 (5,6)	5 (5,6)
Patient examination	5	5	5 (5,6)	5 (5,5)
Orthodontic assessment	5	5	5 (4,5)	4 (4,5)
Acute patient management	5	5	5 (5,5)	5 (4,5)
Special tests	5	5	5 (5,6)	5 (5,5)
Diagnosis	5	5	5 (5,6)	5 (4,5)
Treatment planning	5	5	5 (5,6)	5 (4,5)
Prevention advice	6	6	6 (5,6)	5 (5,6)
Referrals	5	5	5 (5,6)	5 (4,5)
Safeguarding	5	5	5 (4,5)	4 (4,5)
Drug prescription	5	5	5 (5,6)	5 (4,5)
Periodontal	5	6	6 (5,6)	5 (5,6)
Local anaesthesia	6	6	6 (6,7)	5 (5,6)
Direct restorations	5	6	6 (5,6)	5 (4,5)
Endodontics	5	5	5 (5,6)	5 (4,5)
Extraction	5	6	6 (5,6)	5 (4,5)
Surgical extraction	4	4	4 (3,5)	4 (3,5)
Dentures	5	5	5 (4,5)	4 (4,5)
Indirect restorations	5	5	5 (4,5)	4 (4,5)
Orthodontic appliance repair	4	4	4 (3,4)	3 (3,4)
TMJ management	5	4	4 (3.25,5)	4 (4,5)
Patient and public safety	5	5	5 (5,6)	5 (4.5,5.5)
Medical emergencies	5	5	5 (5,6)	5 (4,5)
Population-based care	5	5	5 (5,6)	5 (4,5)
<b>Communication</b>				
Patients and public	6	6	6 (5,7)	5 (5,6)
Other healthcare professionals	5	5	5 (5,6)	5 (5,6)
Generic communication skills	6	6	6 (5,6)	5 (5,6)
<b>Professionalism</b>				
Patients and the public	6	6	6 (5,7)	5 (5,6)
Ethical and legal	6	6	6 (5,7)	5 (5,6)
Teamwork	6	6	6 (5,7)	5 (5,6)
Development of self and others	6	6	6 (5,7)	5 (5,6)
<b>Management and leadership</b>				
Relating to self	6	6	6 (5,7)	5 (5,6)
Relating to others	5	5	5 (5,6)	5 (4,5)
Relating to the working environment	5	5	5 (5,6)	5 (4,5)

### Data analysis

All numerical data was entered into IBM SPSS (version 20) and the qualitative data from Part 2 (comments) and Part 3 were transcribed into NVivo (version 10). All data were allocated to their unique questionnaire number and so could be tracked.

Categorical data from Part 1 was numerically coded in order to allow subsequent statistical analysis. Due to the large spread, ES data on year of qualification and years of supervisory experience were grouped to facilitate data analysis.

Quantitative categorical data from Part 2 of the GAPP questionnaire was coded from 1–7 as described above for statistical analysis, using IBM SPSS (version 20). Careful selection of statistical tests was required due to the categorical nature of the quantitative data, and because initial data analysis illustrated that the results were not normally distributed.

Due to the non-parametric nature of the data, median scores with inter-quartile range (IQR) were analysed in preference to mean and standard deviation, and mean rank scores were generated in order to cross tabulate Part 2 results with Part 1 descriptive data.

The Mann Whitney U test was used for two unrelated variables, while three-variable analyses required the use of the Kruskal Wallis H test. The step-down process was used as post-hoc of Kruskal Wallis to identify significant pairings.

Mean rank scores were considered to be statistically significant if  $P \leq 0.05$ .

All comments received in Part 2 of the questionnaire were explored on a question by question basis, and considered with reference to their Part 1 and 2 responses.

Part 3 data were analysed thematically, facilitated by word frequency analysis on a question by question basis. The context of these themes was then examined using the ‘references’ facility, in order to ensure its relevance.

## Results

### Response rate

A total of 1110 questionnaires were sent to 74 DFT schemes in England and Wales (15 per group). There were 928 FDs allocated a place for this academic year,<sup>22</sup> and FDs returned 427 questionnaires while 322 were returned from ESs, representing response rates of 46% and 35% respectively.

### Part 1 results

#### Respondent descriptive data

The mean age of FD respondents was 24.74

**Table 3** The significantly different preparedness ratings given by ESs with differing supervisory experience

Domain/question	Mean rank			Significance
	1–3	4–8	9+	
<b>Clinical</b>				
Patient examination	167.94	164.83	142.1	P = 0.042
Orthodontic assessment	174.38	168.73	131.29	P < 0.001
Acute patient management	172.26	165.54	136.59	P = 0.005
Special tests	169.12	165.77	139.92	P = 0.02
Diagnosis	174.87	167.06	132.27	P < 0.001
Treatment planning	169.78	170.37	134.97	P = 0.003
Referrals	173.59	152.62	146.89	P = 0.046
Periodontal	174.9	155.47	142.81	P = 0.013
Local anaesthesia	178.78	146.43	146.71	P = 0.004
Direct restorations	169.05	164.65	141.01	P = 0.032
Extraction	174.63	156.27	142.39	P = 0.02
Dentures	174.02	166.17	134.03	P = 0.002
Orthodontic appliance repair	168.25	168.78	138.14	P = 0.017
Medical emergencies	169.74	163.36	141.41	P = 0.037
<b>Communication</b>				
Patients and public	170.03	163.99	140.51	P = 0.028
Generic communication skills	173.59	160.09	140.07	P = 0.013
Professionalism				
Patients and the public	176.48	158.94	137.88	P = 0.003
Ethical and legal	180.44	152.34	139.44	P = 0.001
Teamwork	178.92	163.49	130.97	P < 0.001
Development of self and others	176.44	156.24	140.38	P = 0.007
<b>Management and leadership</b>				
Relating to self	176.75	160.07	136.53	P = 0.002
Relating to the working environment	174.29	159.03	140.25	P = 0.014

(SD 2.97) years, median (IQR) was 24 (23, 25) and the range was 21–42 years. The gender distribution was 59.5% female to 40.5% male. The majority of FDs (93.7%) graduated from a UK school, with over 30 other dental schools represented, most of which were from Eastern Europe and Southern Asia. The majority of FDs had completed a five-year course (82.5%).

The mean age of ES respondents was 43.2 (SD 8.86) years, median (IQR) was 43 (36, 50) and the range was 27–63 years. The gender distribution was 26.8% female to 73.2% male. The mean amount of ES experience was 7.12 (SD 5.65) years, median (IQR) was five (3, 10.75) and the range was 1–28 years. Their mean year

of qualification was 1992 (SD 9.22), median (IQR) was 1992 (1982, 2000) and the range was 1971–2012. The majority of ESs (93.1%) graduated from a UK school, with others having graduated in a number of schools in Europe and Southern Asia. Most had participated in ‘VT’ (62.3%).

## Part 2 results

### Part 2 descriptive data

The median (IQR) and mode of all questions for FDs and ESs are displayed in Table 2.

FDs felt ‘well prepared’ or ‘very well prepared’ in 21 of the 24 clinical areas with only orthodontic appliance repair, surgical

extractions and TMJ management being ranked lower (‘not well or poorly prepared’).

ESs tended to rank FDs lower, meaning more areas were rated as ‘not well or poorly prepared’. Orthodontic appliance repair was the only area rated as ‘poorly prepared’.

In the three non-clinical domains, ESs and FDs felt that they were ‘well’ or ‘very well prepared’ in all areas, and the median scores were largely the same for both populations.

### Difference in opinion between FDs and ESs (Mann Whitney U)

$H_0$ : There will be no difference in ratings of preparedness between ESs and FDs.

For all questions considered as a whole FDs ranked their preparedness significantly higher than ESs with  $P < 0.001$ . FDs also ranked their preparedness significantly higher than ESs for all individual questions except two; orthodontic appliance repair ( $P = 0.136$ ) and TMJ management ( $P = 0.553$ ).

### Gender (Mann-Whitney U)

$H_0$ : There will be no difference between genders for ES and FD rating of preparedness.

For all questions considered as a whole, male ESs tended to rank their FDs higher than females. The only significant differences were seen for orthodontic appliance repair ( $P = 0.017$ ), TMJ management ( $P = 0.004$ ) and medical emergencies ( $P = 0.047$ ).

Male FDs felt more prepared than females in patient examination ( $P = 0.016$ ), diagnosis ( $P = 0.038$ ), treatment planning ( $P = 0.029$ ), acute patient management ( $P = 0.004$ ), local anaesthesia ( $P = 0.030$ ), extractions ( $P = 0.001$ ) and surgical extractions ( $P = 0.010$ ).

### ES year of qualification (Kruskal Wallis H)

$H_0$ : The length of time ESs have been qualified will not affect their rating of FD preparedness.

The length of time ESs had been qualified ranged from 2–43 years. This had little effect on their rating of FD preparedness, with only a single borderline difference for patient and public safety ( $P = 0.05$ ). Step-down illustrated that those who qualified before 1987 ranked their FDs significantly more prepared than those ESs who qualified later.

### ES experience (Kruskal Wallis H)

$H_0$ : The amount of ES experience will not affect their rating of FD preparedness.

The range of ES experience was from 1–28 years.

The general trend was that the more supervisory experience ESs had, the less prepared they felt their FDs were. This trend held for all individual questions and was significant for those areas displayed in Table 3. Step-down illustrated that the significant differences tended to lie between those with nine or more years' experience and those with less experience.

**School of qualification (Mann-Whitney U)**

H<sub>0</sub>: Qualifying outside the UK will not affect ratings of preparedness.

School of qualification was split into UK and non-UK.

The respondent distribution for FDs was UK; 400 and non-UK; 47, and for ESs, UK; 295 and non-UK; 22.

FDs from UK schools tended to feel more prepared than their peers who qualified overseas. This was found to be significant for referrals (P = 0.013), drug prescription (P = 0.001), periodontal (P = 0.006), medical emergencies (P = 0.003), teamwork (P = 0.037) and development of others (P = 0.05).

ESs from UK schools ranked their FDs' preparedness lower than their counterparts who qualified overseas. This was significant for drug prescription (P = 0.037), surgical extraction (P = 0.020), orthodontic appliance repair (P = 0.014), management relating to others (P = 0.037) and to the workplace (P = 0.019).

**Course length (Mann Whitney U)**

H<sub>0</sub>: The length of dental school course will not affect the FD rating of preparedness.

There were 75 (17.8%) FD respondents from four-year courses and 347 (82.2%) from five-year courses.

Length of course appeared to significantly impact on FDs' preparedness; those having done a four-year course feeling significantly more prepared than those doing a five-year course for all questions considered together (P = 0.003).

Those who completed a four-year course felt significantly more prepared in 19 of the 34 Part 2 questions, as shown in Table 4.

**Part 2 comments**

The Part 2 comments section was not used frequently, with only fifty FDs (11.7%) making 129 comments in total and 157 comments made by 57 ESs (17.7%).

The areas most commented on in the clinical domain were orthodontic appliance repair

(22 ES and 10 FD comments) and orthodontic assessment (17 ES and 11 FD comments). ESs tended to note that these curricular areas were not applicable, had experienced no cases and had not been assessed, for example:

*'Not needed as orthodontic work not undertaken.'*

FDs felt they had no or little experience in this area and that their undergraduate training had been insufficient.

*'Had limited orthodontic experience – simply observed.'*

Other areas frequently commented upon were surgical extractions and indirect restorations. Both ESs and FDs commented that they had little or no experience in these areas at undergraduate level, although they felt comfortable with the theory.

*'Theory good practically [sic] not good'* (indirect restorations)

*'Had never carried out a surgical at dental school'*

*'Limited/no exposure as an undergraduate'* (indirect restorations).

**Part 3 results**

Part 3 responses were analysed thematically. The results are presented below in pairs as the ES and FD questions were closely related.

The first question asked in what aspects FDs felt well prepared, and in what areas did their ESs feel they were strong. The response rates were FDs 92%, ESs 90%.

For FDs, there was a clear emphasis on clinical exposure, particularly the value of outreach placements. This was the most common single theme and all responses positively reflected their experiences, or complained about not having enough. FDs valued the ability to work more closely with DCPs,

**Table 4 Questions where FDs from 4-year courses felt significantly more prepared than those from 5-year courses**

Question/domain	Mean rank		Significance
<b>Clinical</b>			
Special tests	236.86	206.02	P = 0.031
Diagnosis	239.56	205.44	P = 0.015
Treatment planning	243.25	204.64	P = 0.006
Referrals	241.21	205.08	P = 0.012
Safeguarding	242.3	204.84	P = 0.011
Drug prescription	254.03	202.31	P <0.001
Periodontal	252.18	202.71	P = 0.001
Endodontics	242.29	204.84	P = 0.010
Extraction	240.71	205.19	P = 0.016
Surgical extraction	247.85	203.64	P = 0.003
Patient and public safety	236.47	206.1	P = 0.037
Medical emergencies	247.47	203.72	P = 0.002
<b>Communication</b>			
Patients and public	242.33	204.84	P = 0.011
Other healthcare professionals	236.03	206.2	P = 0.041
Generic communication skills	244.3	204.41	P = 0.006
Professionalism			
Patients and the public	241.05	205.11	P = 0.014
Ethical and legal	238.7	205.62	P = 0.024
<b>Management</b>			
Relating to others	237.19	205.95	P = 0.036
Relating to the working environment	247.87	203.64	P = 0.003

the patients being more like those they had experienced in DFT, familiarity with IT and NHS systems, including patient charging, as illustrated by the following comments:

*'Talking to other FDs on my scheme and my trainer I think (named GE school) has prepared us well compared to other schools'*

*'Outreach experience-for experience and understanding of the NHS.'*

ESs felt that FDs were good communicators and professional while their clinical attributes were theoretical knowledge, history taking and treatment planning and simple restorative work. Their apparent lack of clinical exposure was also commented upon frequently.

*'Good patient communication, good theoretical knowledge of most clinical procedures, but very limited practical experience'*

*'Patient management, simple extractions and most simple restorative work. Examination and history taking'*

*'Maybe do an outreach programme – emphasis on general practice skills – they need much more clinical experience'*

The second question concerned aspects FDs felt less prepared for, and areas ESs felt their FDs struggled with. The response rates were FDs 86%, ESs 89%.

Both FDs and ESs appeared concerned with the lack of clinical exposure. There was particular concern in their perceived lack of experience in extractions (particularly surgical) and endodontics (especially multi-rooted). There was also a concern that there was insufficient indirect restorative work (crowns, bridges and dentures) available at dental school. They felt underprepared for GDP in terms of the NHS system (banding and finance), and the business side of dentistry, for example:

FD: *'Lack of patients for crown/bridgework, lack of endodontic exposure'*

FD: *'No real teaching on life in NHS practice'*

ES: *'Not enough experience in clinical dentistry as an undergraduate, so many procedures are being presented for the first time'*

ES: *'Complex treatment – endodontics, surgical extractions, any type of denture work, bridges.'*

The third question concerned aspects respondents felt could be changed in the undergraduate course to better prepare them. The response rates were FDs 82%, ESs 78%.

Having more clinical exposure was by far the most popular theme for FDs and ESs, with particular emphasis on having more outreach

placements. Greater surgical experience and more advanced restorative work and orthodontics were also commonly cited by both respondent groups, in keeping with previous responses.

ES: *'More practical experience (hands on). Most FDs know the theory but lack experience carrying it out'*

ES: *'Making CoCr dentures; bridgework; surgical extractions; appropriate and successful molar endodontics'*

FD: *'Our University did not have a quota system so left with little experience of restorative treatments such as crowns/bridges/endodontics'*

FD: *'Orthodontics and surgicals. Need more crown and bridgework'*

The penultimate question asked respondents what they wanted DFT to cover in order to better prepare them for GDP. The response rates were FDs 88%, ESs 89%.

FDs felt that they needed DFT to cover elements of management in GDP, the NHS system and the business side of dentistry. They also needed treatment planning experience, and felt increased clinical exposure would help them increase speed and efficiency and gain increased exposure to more complex work, for example:

*'How to run a business, more clinical experience in a variety of things, for example, endo, extractions, crowns and dentures'*

*'Treatment planning in the real world, working with other team members'*

*'I feel by the end of the year I should be competent in all areas of general dental practice for example, RCT/crowns/bridges through seeing more patients.'*

ESs responses were similar, but tended to focus on particular clinical elements such as extractions and advanced restorative work:

*'We will have to cover all areas to ensure he is up to standard and safe to practise solo by the end of the year'*

*'Endodontics, ethics, advanced prosthodontics, minor oral surgery, treatment planning'*

*'NHS regulations, prescription writing, denture work, endodontics.'*

The final question invited any other comments. The response rates were FDs 21%, ESs 43%.

The responses to this open-ended question resulted in far more diverse responses, very often being a paragraph of general feelings as opposed to specific answers.

The majority of FD responses duplicated

previous responses in terms of having more clinical exposure at undergraduate level, particularly in a general practice environment. Very few commented on feeling unprepared, indeed several FDs reported that despite feeling anxious and unprepared before the year, their experience was very positive, for example:

*'I felt quite practically prepared for general practice, but understood I had many weaknesses. I definitely think the (outreach placement) has helped'*

*'More clinical experience in dental school would be invaluable'*

*'We leave university feeling enormously unprepared but as soon as we are put in a clinical situation in practice, everything comes flooding back and it turns out we are actually more prepared and well informed than we initially think.'*

ESs commonly used previous experiences of DFT to rate their current FD, with an equal split of those feeling this FD was better or worse than previous years. Not only did they feel that there was quite a wide range of ability, but there was a trend in associating their experiences with particular dental schools. There was criticism of certain undergraduate courses which they felt were getting worse in terms of reduced general clinical experience:

*'My experience of FD1 over the years is that newly qualified dentists are generally well prepared. They lack experience and confidence only'*

*'I have been very lucky with my FD this year who is and will be an excellent dentist. All of the FDs I have had in the practice have not had enough experience of endodontics (particularly molars) and surgical extractions'*

*'Newly qualified dentists are now less clinically experienced than "in my day." Foundation training has to make up this deficit so that the FD acquires sufficient clinical experience. Things have changed since I qualified and I feel FDs are well trained in non-clinical areas but lack clinical experience and on paper appear "safe starters", but I believe we are storing up problems for the future by developing a de-skilled cohort of practitioners (a dinosaur!)*

This lack of clinical experience was blamed on a more theoretical emphasis at undergraduate level, resulting in FDs having excellent knowledge but struggling with its practical application:

*'Theoretical knowledge without the opportunity to put it into action to gain operating skills results in FD1 with poor experience and low confidence.'*

This was postulated to result in reduced FD competence and confidence in some 'basic' areas, as well as inexperience in more advanced treatments, rendering them less prepared for GDP. This appears to confirm the areas both populations felt less prepared in as reported in Part 2.

## Discussion

### Surveying health professionals

In this study, the GAPP questionnaire<sup>1</sup> was used to ascertain the self-reported preparedness for independent GDP of FDs early in their DFT year. It was also used to capture their ESs' perceptions of FDs' preparedness.

The effectiveness of any questionnaire is heavily dependent on understanding the information requirement.<sup>23</sup> Since the focus was to establish preparedness across the whole curriculum, the GAPP questionnaire was deemed appropriate having been derived from the GDC curriculum in place at that time.<sup>2</sup>

The GAPP questionnaire design, aimed at elucidating a respondent's self-efficacy may allow cautious postulates relating to successful performance in the areas examined as demonstrated in work<sup>24</sup> and academic performance.<sup>25</sup>

Using DFT schemes as a distribution methodology has previously been shown to achieve high response rates without the need for follow up.<sup>14</sup> That said, in this study the response rates were somewhat disappointing, with much lower response rates than a regional study of FDs and ESs.<sup>14</sup> Ideally, follow-up of schemes for which responses were low should have been carried out, and this may have enhanced the response rates and accompanying confidence in these results.

### Difference between FDs' and ESs' perceptions of preparedness

For all questions considered together, FDs ranked their preparedness significantly higher than ESs with  $P < 0.001$ . This also followed for all individual questions except orthodontic appliance repair and TMJ management. Both of these areas were reported in Parts 2 and 3 to have had little or no place in GDP, possibly identifying them as anomalies. The null hypothesis is therefore not proven.

There has been shown to be a poor correlation between self-reported ability compared to external criteria such as peer or tutor evaluation.<sup>5,26,27</sup> The parallel ES questionnaire was used in an attempt to moderate the potential of self-reporting, although it is accepted that assessment of others' preparedness may also be subject to a number of fundamental concerns. When people

make judgements of others they do so egocentrically, emphasising characteristics they possess.<sup>28</sup> Respondents may also use such opportunities to put themselves in a positive light through social comparison which occurs through the opportunity to reaffirm their self-integrity.<sup>29</sup>

Another potential reason for ES and FD disparities in ratings, is overestimation of the FDs own ability. This may be in the knowledge of their shortcomings, and an attempt at maintaining self-integrity or alternatively being unaware of their weakness, believing themselves to be competent. This may be due to undergraduate educators failing to identify and rectify these areas, or inadequate use of undergraduate assessment systems.<sup>30</sup>

Other authors have suggested that dental trainee ratings of confidence tend to be higher than those of their supervisors in certain areas including diagnosis and treatment planning postulated to indicate a lack of self-awareness in their ability.<sup>14</sup> If this is the case, it remains unexplained why a lack of insight appears to apply to a small number of categories across three of the four curricular domains.

We postulate that alternatively these discrepancies (particularly involving complex planning processes) may be a failure of ESs to recognise FDs' thought processes as fully refined. Experts and relative novices have fundamentally different cognitive processing mechanisms, and consequently ESs may view this disparity and conclude FDs must therefore be unprepared. It is noteworthy that other publications alluding to ESs' reduced ratings of FDs' abilities, have not found evidence that FDs made incorrect planning decisions, and these ratings may simply reflect the incongruence of FDs' deliberative cognitive patterns and the ESs intuitive ones.

### Gender

The general trend of males to rank preparedness higher than females was present in both FD and ES questionnaires and consequently the hypothesis was not proven.

Where significant differences were seen, respondents often commented that these areas were difficult to assess or that had not been assessed, and therefore warrants cautious interpretation. Orthodontics and TMJ management were considered by many respondents to be a specialist subject as illustrated in their Part 2 and 3 comments. Patients were often referred out of the practices, reducing FD exposure and increasing the potential for inaccurate assessment.

It is noteworthy that the latest 2015 COPDEND curriculum<sup>9</sup> no longer mentions

TMJ management directly, although could be construed to be part of the statement:

*'Assess dental, skeletal and occlusal relationships in the primary, mixed and permanent dentition accurately, and identify conditions which may require treatment of [sic] referral onwards.'*

Orthodontics is still covered by the most recent curriculum, under the major heading of 'Management of the developing dentition'. It is noted that the emphasis within the latest curriculum is geared towards screening and appropriate onward referral of those patients who may require the specialist services of an orthodontist, rather than the provision of orthodontic treatment *per se*.

Male FDs felt significantly more prepared in six of the 23 clinical competency areas, including diagnosis, treatment planning, extractions and surgical extractions. These were commonly referred to by ESs in Part 3 of their questionnaires as being areas in which their FDs were less strong:

*'Extractions, surgical extractions due to very limited experience at dental school.'*

This may reflect a lack of objectivity in self-reporting by male FDs. When considering gender differences in self-confidence, authors have shown that for unfamiliar tasks males tend to rate their expectations of success to be higher than their female counterparts. This included manually dextrous tasks<sup>31</sup> and academic tasks,<sup>32</sup> despite the sexes being comparable in all of the psychological elements that are purported to comprise the feeling of self-confidence.<sup>33</sup>

### ES GDP experience

The results showed a general trend of ESs with greater professional practice experience ranking their FDs less prepared, but only one issue was shown to be statistically significant; patient and public safety. As a result, the null hypothesis was not proven. ESs qualifying between 1988 and 1997 ranked their FDs least prepared of the groups, with the most recently graduated ranking the most prepared.

In 2009 the publication of *Health Technical Memorandum 01-05: Decontamination in primary care dental practices*<sup>34</sup> had a huge impact in GDP, giving essential and best practice guidance and necessitating a steep learning curve and large financial investment for most practice owners.

This means that all ESs qualified before its publication, while FDs should have been

introduced to this guidance as an undergraduate. This may explain why ESs who qualified earlier felt their FDs were well prepared, perhaps better than they themselves were.

### ES supervisory experience

More experienced ESs ranked their FDs less prepared across all domains of the curriculum, and therefore the null hypothesis was not proven.

The frame of reference used by these ESs during their assessment of the FDs' preparedness is an important area which may help to elucidate the underlying reasons for these results. It may be that the more supervisory experience an ES has, the more accurately they can judge the preparedness of FDs. This factor alone could be responsible for the difference in ratings between more and less experienced ESs, with several comments in Part 3 illustrating the use of previous FDs to benchmark responses.

This factor is juxtaposed by the increased GDP experience, distancing their own undergraduate transition to professional practice further from that of their more recently qualified FDs. Since there was little significance attributable to this factor, we postulate the significant differences here are predominantly due to their supervisory experience.

As new FDs come and go each year, 'serial ESs' may be more attuned to the evolving graduate over a period of time, rather than being faced with a completely different 'product' than they perceived themselves to be on graduation.

Out of all of the results gained in this study, this one is considered to be the most crucial. If ESs with considerable experience of DFT feel that FDs are generally becoming less well prepared for general practice, something needs to be done to investigate this concern in greater detail.

### UK qualification

The comparison between UK and non-UK schools should be cautiously interpreted due to the large difference in sample sizes. However, due to the differences in ranking between schools, the null hypothesis was not proven.

Although the model of medical teaching is different from dentistry, there is strong evidence to suggest that in medical training, the more patient contact or 'meaningful' work experience that is present as an undergraduate, the more prepared graduates feel irrespective of school diversity.<sup>35</sup> In UK dental schools, this

'meaningful' experience manifests itself in a number of ways.

Some schools have multidisciplinary clinics where students are expected to complete courses of treatment in order to attempt to simulate GDP. This approach certainly goes some way to facilitating the transition to independent practice, but may be 'artificial' inasmuch as the patient's treatment needs may significantly differ from patients in GDP<sup>36</sup> and hospitals may be unable to simulate the NHS environment of charges and management.<sup>37</sup>

Other schools have adopted community-based clinical teaching or 'outreach' which aims to more closely resemble work in GDP, therefore preparing students better. In a number of articles evaluating dental outreach programmes in the UK, findings suggest dental outreach training in primary care settings is more effective than dental school training alone in improving students' confidence in tackling clinical situations, and consequently enhancing feelings of preparedness.<sup>36,38-43</sup>

This may go some way to explaining the significantly greater reported preparedness in graduate-only schools in this study, particularly in the clinical domain.

The timing of this questionnaire may result in the most accurate disclosure of graduate preparedness, due to its proximity to graduation and current experience of GDP. In medical students, preparedness ratings reduced significantly by the third postgraduate year.<sup>44</sup> In a recent study looking into 'What I wish I'd learned at dental school'<sup>21</sup> practising dentists were asked to reflect on their preparation for GDP by their undergraduate education. While providing an interesting insight into their opinions, the consideration of those labelled 'recent' graduates' as being within ten years may merit cautious interpretation of the results.

Detailed examination of our data at school level may provide undergraduate courses with essential feedback into curriculum development. Undergraduate educationalists must decide how to balance the time spent on certain aspects of the curriculum and ESs in DFT must be alert to these changes, and be prepared to 'fill the gaps'.<sup>15</sup>

### Course length

FDs who completed four year (graduate-entry) courses felt significantly more prepared than those having done a five year course in half of the questions, and therefore the hypothesis was not proven.

Of the graduate entry (GE) students, some attended schools dedicated to a four-year

programme (at the time of sampling UCLan and Peninsula), while others attended schools running both five-year courses and graduate entry programmes.

In broad terms, differences in preparedness between GE, and undergraduate entry (UE) graduates may be attributed to the nature of the course, that is, four-year courses prepare students better in many areas; or the nature of the student, that is, GE students feel better prepared because they are graduates, or a combination of both.

Further analysis of those having completed a graduate entry course was carried out to examine differences between those in a graduate only school and those in a school accepting graduates and undergraduates. These populations differed markedly in their feelings of preparedness in the clinical domain. In ten out of 24 of the clinical questions, graduates attending graduate-only schools felt significantly more prepared than those training alongside undergraduates. There were no significant differences seen in any of the other domains. This intimates that the school is likely to be responsible for these differences, rather than the status of being a graduate.

Further examination of areas that were not significantly different between these two graduate entry populations, but were significantly different to 'five-year' students, elucidates the areas where the schools may play less of a role; the nature of being a graduate being the significant factor. It is interesting to note that these are within the three non-clinical domains of communication, management and professionalism. Perhaps this is due to transferable skills being brought to the course by graduates which are not as prevalent in their undergraduate peers. Whether this is due to the academic background, or other factors in their lives such as work and life experience, warrants further research.

Four-year courses often rely on the patient-based practical elements of the course taking place in simulated or actual general practices, not dissimilar to GDP. Five-year course models often differ, sometimes relying on 'specialist' clinics for individual aspects of dentistry and taught in isolation. There may be no mechanism to charge patients and participate in any of the day to day practice management that is present in 'outreach' clinics or extended training practices.

Clinical experience was the most commented upon theme in Part 3, the theme from five-year courses being that both FDs and ESs felt that their clinical experience was insufficient, in terms of time spent treating patients, but also in their exposure to advanced restorative

treatments and surgical extractions. Both FDs and ESs felt that they were unprepared at graduation in elements of the GDP environment, that is, the NHS system and the business elements of general practice.

FDs greatly valued their outreach placements, which many wished were substantially longer. This may be because of the increased pace of work, and the consequent increase in clinical experience.

Four-year graduates felt significantly better prepared in most areas of 'routine' dentistry, which may be a function of increased general practice experience. Many of them felt that their GDP-like clinical experiences had greatly contributed to their preparedness.

### Conclusions

The GAPP questionnaire has been used for the first time to assess FDs' preparedness for independent GDP. In a questionnaire covering all DFT schemes in England and Wales, both FDs and ESs reported that they feel that FDs were generally 'well prepared'.

FDs felt they were 'neither well nor poorly prepared' in orthodontic appliance repair and surgical extractions. ESs felt they were 'neither well nor poorly prepared' for orthodontic assessment, safeguarding, surgical extraction, dentures, indirect restoration and TMJ management. They felt that FDs were 'poorly prepared' for orthodontic appliance repair.

In this questionnaire, FDs ranked their preparedness for independent general practice significantly higher than ESs in almost all areas except some areas which they felt were outside the remit of DFT.

More experienced ESs ranked FDs lower in almost all areas, which may indicate a change in graduate preparation over the years, or may be the result of the very different 'product' of dental schools to how they perceived they were on qualification.

Graduates from four-year (graduate-entry) courses were significantly more prepared across the board than those from a five-year course. It would be interesting to explore in greater detail how the course delivery, selection criteria, and other factors such as previous educational, work and life experiences may influence this.

Male FDs felt more prepared in extractions and treatment planning than their female counterparts, although many areas showed no significant differences.

FDs qualifying outside the UK generally felt less prepared than those graduating from a UK school, significantly so in areas of referral, prescription of drugs, medical emergencies, teamwork and self-development.

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