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**Title:**

Clinical skills of a new Foundation Dentist: the experience of Dental Foundation Educational Supervisors.

**Author's names**

R. J. Jones<sup>1</sup>, J. G. Cowpe<sup>1</sup>, A. D. Bullock<sup>2</sup>, A.S.M. Gilmour<sup>1</sup>

<sup>1</sup> Cardiff University, School of Dentistry, Heath Park, Cardiff, UK

<sup>2</sup> Cardiff Unit for Research and Evaluation in Medical and Dental Education (CUREMeDE), School of Social Sciences, Cardiff University, 12 Museum Place, Cardiff, CF10 3BG, UK

**Introduction**

Dental Foundation training (formerly known as Vocational Training) is a one-year training programme, designed to further build on and develop the skills acquired during undergraduate (UG) dental training. Dental Foundation (DF) training is compulsory for those wishing to work in the NHS in the UK as only on satisfactory completion of the course will an NHS performers list number be issued, which is essential for entry into the NHS dental workforce.

Over a number of years there has been speculation and debate over the skill level and competences of the new dental graduate. Anecdotally some DF Educational Supervisors' (previously known as Trainers) have reported that there has been a decline in the standard of the new graduate, suggesting that they are not as clinically able as they used to be.<sup>1</sup> This debate continues and recent work by Oxley *et al* (2017) questions the preparedness of newly qualified dental graduates in some clinical skills.<sup>2</sup>

In this paper, we present data on DF Educational Supervisors' (ES) experience of their Foundation Dentist (FD) in relation to the ability to undertake a number of clinical skills. This article is a companion to one reporting ESs' expectations of their FD's ability to undertake a range of clinical (this ref is under-review and will be added later). In that paper, we consider the ESs' expectations of a new graduate outlined previously and discuss whether these expectations were met by their current FD. Although this work was undertaken in 2010/11 we feel the data is still relevant and adds to the current debate. The data relates to new graduate/FD – referred to from now on as FD - at the point of entry into DF training.

**Aims and objectives**

Our aim was to analyse ESs' expectations and consider the extent to which expectations matched or mismatched their experience of their current FD. We anticipated that the detection of any mismatch would allow us to identify areas where the training provided at UG dental schools is not aligned with the expectations of those who supervise FDs immediately following graduation. We also aimed to support meaningful discussion between dental educators across the UG/postgraduate divide.

## **Methods**

All Dental Foundation postgraduate training providers (named Local Education Training Boards and Deaneries (LETBs/Deaneries) at the time of the study) in England (11) and Northern Ireland (1) agreed to take part in the study. An online questionnaire was distributed via the postgraduate providers to all ESs (n=959) inviting them to participate. Reminder emails were circulated at regular intervals to encourage response.

In the questionnaire, ESs were requested first to indicate their expectations of an FD in relation to their performance of 104 clinical skills using one of five options ('on own with confidence', 'on own with limited confidence, slowly', 'on own, following advice', 'with difficulty, needing assistance', or 'unable to undertake'). Then participants were asked to evaluate if their current FD met their expectations, by using one of three options, 'met', 'not met' or 'not observed'. A 'met' response was selected if the ESs' expectation was matched or exceeded; 'not met' was used to indicate where experience fell below their expectation. The 'not observed' option enabled ESs to indicate where performance had not been observed. A free comments box was also provided for each skill allowing ESs to leave further explanation or information if desired.

Those clinical skills that had an 'expectation' 'Skill Rank score' above 3 were considered to be 'core' skills that ESs expected an FD could perform (see companion paper). We described skills with a 'Rank Score' of 4 and above as 'upper level' expectations and those with a 'Rank Score' of 2.7-3.9 as 'mid-level'. We present the results for 10 clinical themes identified through the GDC's undergraduate guidance and COPDEND's DF curriculum.<sup>3,4</sup> The authors note that these documents have been updated since this study was undertaken.

Further details on methods are provided in a companion paper. (Reference 1st Expectations paper)

## *Analysis*

All data were imported into SPSS v18 (SPSS Inc., Chicago, IL, USA) and descriptive analysis was undertaken. A mean 'Skill Rank score' was calculated to reflect 'expectation', as explained in the companion paper. This was assigned to each of the 104 clinical skills to reflect the ESs' expectations. Expectations data were then examined in relation to the 'experience' data. Where sizable numbers of ESs indicated that expectations were not being met, the open comments were used to explore reasons for this.

## **Results**

Of the 959 ESs, who were invited to take part in the study, a total of 510 (53.2%) completed the questionnaire with no missing data. There was representation from all DF training programmes in England and Northern Ireland.

We report the results of the observations on expectations and experience, based on 10 clinical themes.

### ***Treatment Planning (Table 1)***

ESs had high 'expectation' of FDs' performance of the management of basic dental disease (see Table 1). Areas of treatment planning when 'expectation' was lower than 3 related to tooth wear. However, a proportion of ESs reported that their FD did not meet their expectations, especially when managing edentulous patients requiring new complete dentures (QN°.3; 12% not met), patients with significant periodontal disease (QN°.5; 11% not met and QN°.7; 14% not met), and patients with extensive carious lesions that need restoring (QN°.6; 12% not met and QN°.8; 12% not met).

### ***Plastic Restorations (Table 2)***

Again ESs' expectations were high for the performance of simple restorations. However, it is noticeable that as cavity size increases, then so do the 'not met' percentages. This is reflected in the 15% 'not met' reported in relation to large broken down tooth restorations (QN°.14).

From respondents' free comments, it was clear that there were other issues in this area, in particular with the reduction of amalgam teaching/experience and the ability of graduates to recognise and manage caries.

#### *i) Caries*

*"unable to recognise caries remaining in cavity preps so although cavity form was correct and final restoration good caries not always removed and had to be done so by trainer on the occasions DF1 observed carrying out procedure."*

*"Caries removal is an issue here."*

#### *ii) Amalgam*

*"There is not enough experience/teaching of amalgam restorations in the Dental school the trainee attended. The teaching appears to be all composites as direct restorations."*

*"My trainee had never done an amalgam restoration on a patient!"*

### ***Fixed Prosthodontic Restorations (Table 3)***

ES expectations here varied widely but the main restorations had 'mid-level' expectations (3.6 and less). However a proportion of ESs reported a variance in experience compared to their expectations of their FD which is evident by the 'not met' percentages in some clinical skills, in particular post retained crowns (QN°.20; 18% not met), ceramic veneers (QN°.18; 15% not met) and the FDs' ability to assess the quality of technical work and effectively feedback this to the laboratory (QN°.31; 13%

not met). Other clinical skills where 'experience' did not meet 'expectation' were crowns on molar teeth (QN°.22; 12% not met) and inlay/onlays (QN°.23; 12% not met).

The ES's free comments highlight their FD's limited clinical experience in this area, on graduation. In particular post retained crowns and bridgework.

*"Over the years I find that graduates have very limited experience of crown provision and sometimes have never done bridges or post cores at undergraduate level"*

*"Expectation not met / unable to undertake due to zero experience of certain Tx as undergrad"*

#### ***Removable Prosthodontic Restorations (Table 4)***

As highlighted in the 'treatment planning' clinical theme, a disparity was evident between 'expectation' and 'experience' with regards to the ability of FDs to manage edentulous cases and provide complete dentures (QN°.32; 16% not met). In addition, FDs were perceived by their ESs to need some 'advice' or 'assistance' in assessing the quality of and feeding back on laboratory work. This was also seen in relation to designing partial dentures and fixed prosthodontic restorations. Chairside modification of tooth position was also noted as 'not met' (Q.N.40; 14%) by some ESs.

The percentage of ESs reporting that they did 'not observe' their FD undertaking a procedure was relatively high for copy dentures (QN°.33; 25% not observed), chrome partial dentures (QN°.35; 19% not observed) and relines (QN°.37; 19% not observed).

Free comments confirmed the view that FDs had limited UG experience in this area.

*"Lack of experience with denture prosthetics is a problem with trainees."*

*"Prosthetics seems too often be a weak area- know theory but v. little experience"*

#### ***Endodontics (Table 5)***

All primary endodontic treatments (QN°.43-47) had 'mid' to 'upper-level' expectations (rank score range 3.5-4.1). This included endodontic procedures on molar teeth (QN°.47) which had a ranking of 3.5 but 18% of ESs indicated that their 'expectation' had not been met for this skill. This was confirmed in the free comments.

*"very poor competence with molar endo-again very limited undergraduate experience. Reasonable competence with single rooted teeth"*

*"Primary endodontic skills for molar teeth very poor and source of most avoidable failures."*

#### ***Periodontal Therapy (Table 6)***

Most basic periodontal skills had high 'upper-level' expectations, (skill rank score range 4.3-4.9). 'Not met' expectations for the 'core' skills were relatively low.

### ***Paediatric care (Table 7)***

Eight of the Paediatric care skills had 'upper level' expectations and the remaining 6 skills, 'mid-level'. It appears that these expectations were met by the majority of FDs (not met range: 3-8%). Use of stainless steel crowns (Hall Technique<sup>5</sup>) was 'not observed' by over half the ESs (QN°.73; 52% not observed).

### ***Orthodontic Treatment (Table 8)***

High expectations and low 'not met' percentages would suggest that FDs were meeting ESs' expectations in this area. However higher 'not observed' percentages (range 10-68%) in this area were reported. In addition, the free comments suggested that many ESs felt that orthodontics was not appropriate under an NHS contract nor the ability to be able to refer appropriately using a recognised index (IOTN).

*"IOTN is complex and even trainers [Educational Supervisors] don't understand it."*

*"No chance of providing ortho appliances in our NHS system for most trainees."*

### ***Oral Surgery (Table 9)***

Many of the basic skills of extraction and wound management had high expectations reflected by the 'upper level' skill rank score. However, a notable percentage of ESs indicated that their expectations of their FD's performance were 'not met', particularly extraction of retained roots, either conventionally (QN°.86; 16% not met) or surgically (QN°.93; 17% not met). Further highlighted 'not met' areas were the recognition of the 'need for surgical extraction' (QN°.90; 18% not met) and even wound closure using sutures (QN°.92; 14% not met). The free comments confirmed that this was a concern for ESs.

*"limited experience of extractions and surgery"*

*"has had extremely limited undergraduate experience in extractions extremely poor in this area !!!"*

The 'not observed' for some of these procedures, such as 'assessment of surgical management of a failed extraction' (QN°.91; 18% not obs) and suturing (QN°.92; 14% not obs) were relatively high.

*"Experience in minor oral surgery differs greatly between trainees and dental schools"*

*"Suturing has proved to be a problem this year and I don't think trainees are equipped to perform surgical soft tissue treatments with the training they get at undergraduate level."*

### ***Oral Medicine (Table 10)***

As with orthodontics, relatively high expectations and low 'not met' scores were noted. High proportions of 'not observed' responses were given for all of the skills.

### ***Expectations ‘not met’***

We have reported earlier under each clinical theme where a proportion of ESs’ expectations were ‘not met’. Table 11 further illustrates a selection of such procedures (cross tabulated against the FD’s dental school) where ESs have relatively high expectations (skill rank score range 3.0-3.8), combined with a relatively high percentage of ESs reporting that their FD had ‘not met’ their expectations (overall range not met 13%-18%). These procedures are of interest as they could be defined as ‘core skills’ based on ESs’ expectations. However when cross tabulated with the FDs’ dental school of graduation (excluding those schools that had a less than 29 respondents) clear variations are apparent, with some schools consistently showing lower ‘not met’ percentages (schools 2 and 9) and others showing higher percentages (schools 3 and 5). This variation in experience was also alluded to in the free comments.

### ***Expectations ‘not observed’***

Non observation of an FD performing certain skills may have occurred because the skill was relatively straightforward or did not necessitate supervision, perhaps because its outcome required work to be sent to a laboratory. An alternative reason is that the procedure was not experienced in DF training. Table 12 shows a selection of clinical skills which were frequently ‘not observed’ cross referenced by LETBs/Deaneries (as named at the time of the study). A number of clinical skills were consistently ‘not observed’, such as ‘prescribe, fit and adjust a removable orthodontic appliance’ (QN°.83), ‘fit a stainless steel crown on deciduous teeth’ (QN°.73) and ‘manage an acute infection’ (QN°.95). However other clinical skills had a wide range. For example, the ‘not observed’ percentages for suturing ranged from 3% to 20% between LETBs/Deaneries.

## **Discussion**

The data presented is a snapshot of ESs’ opinions about the skills required of their FD, at the time they commence DF training, and whether those expectations are met by the FD. Much of the drive for UG education comes from two sources; the education provider, the University, and the regulator, the General Dental Council (GDC). The ‘product’ of that UG education starts work in a DF training post as an FD. The views of their workplace ESs are clearly important and to date have been underrepresented. Recent publications have highlighted concerns by ESs about the quality of UG dental education. However many of these studies are either anecdotal or have limited data.<sup>2</sup> The present study looked in detail at professional/communication skills<sup>6</sup> and 104 clinical skills.

It was pleasing to see that, in many of the areas of practice, the majority of the ESs felt that their experiences matched their expectations. Where expectations were not met, even in the worst cases,

less than a fifth of respondents felt that their expectations had not been met. In this paper we have focused on the mismatch between ‘expectation’ and the ‘experience’ that ESs have with their new FD but also discuss where skills are not being observed. There were a number of areas where disparity between ESs’ expectations and their experiences of their current FD’s performance were seen. Free comments added another level of detail.

Table 13 sets out a possible interpretation of high and low expectations in relation to whether they are thought to be met. Expectations ‘met’ suggest appropriate preparation in UG training. Where expectations of clinical performance are low, there is clear scope to develop skills further during DF training and beyond. Expectations ‘not met’ may indicate that the skill is under-developed in their FD. In cases where the ‘Skill Rank score’ is also high, suggesting that the skill is ‘core’ or quite basic, that expectations are not being met may suggest either inadequate preparation during UG education or overly high expectations by the ES. Where the ‘Skill Rank score’ is low but the unmet percentage is high, this may indicate a complex skill for which, unsurprisingly, new FDs are not ready to perform without assistance.

We summarise our interpretation of what this might mean and implications for action. We discuss the expectations and experience based on 10 clinical themes.

### ***Treatment Planning***

Complete denture teaching within dental schools has been reducing over the last 20 years. This mirrors the epidemiological data on tooth retention. Those ESs who graduated over 20 years ago will have been taught more complete denture prosthodontics at dental school and will have had extensive experience of the construction of complete dentures. The largest group of ESs in the study qualified over 20 years ago (48%). The limited experience of FDs (particularly those who were students in parts of the country with low caries experience<sup>7</sup>) in this area could be explained to ESs in terms of changes in UG teaching.

Another such area is the management of large carious lesions (QN°.6) which has relatively high expectations and 12% ‘not met’. Again, for similar reasons, undergraduates’ experience of such lesions will be reduced compared to their predecessors. The ‘lower-level’ expectations and experiences of ESs in relation to treatment planning and management of periodontal disease is interesting and suggests a lack of ES engagement, by some, in this area of clinical skills. Recent advice from dental protection organisations has highlighted the increasing medico-legal issues in this area. There may be a feeling that management of more complex periodontal problems is more of a specialist activity, however the early diagnosis and non-surgical management of the disease is very



much a role for primary care with referral when this clinical management fails to stop ongoing disease.

### ***Plastic Restorations***

The 'Skill Rank scores' are all high here highlighting that ESs see this as a 'core' area of activity. However, interestingly as restoration size increases (MO - MOD - larger) so the instances of expectations not being met increase, with large broken down restorations showing a 15% difference between expectations and experience. As discussed before, this could be explained by limited undergraduate experience linked to lower caries experiences in parts of the country.

Within the questionnaire respondents had an opportunity to add free comments. These comments are informative and suggest two main areas of concern; Firstly the new FD's ability to manage caries and secondly the move away from amalgam to composite. These are important issues but perhaps are not as clear as they first seem. Dental schools do need to take heed of some of these concerns about FDs' inability to remove caries completely from a cavity. However, there may be other reasons which reflect the differences in training in caries management and in particular its removal of caries close to the pulp. ESs may well have been taught complete caries removal and to manage any pulpal exposure that results. But over the last 10 years there has been a significant change in the underlying philosophy in this area.<sup>8</sup> Undergraduates will increasingly be taught to leave caries over the pulpal areas which may be at variance with ESs' established practise. This is also the basis of the Hall Technique (paediatric dentistry) in caries management in the deciduous dentition.<sup>9, 10</sup> Clearly this is an area where communication between dental schools and ESs would be valuable to highlight this fundamental change in caries management based on scientific evidence. In addition, as can be seen from the free comments, some ESs felt that UG training/experience of the use of amalgam was lacking. Worldwide dentistry is moving away from amalgam, particularly following the Minamata Convention on Mercury by the United Nations in 2013.<sup>11</sup> In line with this trend, dental schools in the UK are increasingly teaching posterior composite restorations and in some dental schools there may be no amalgam use.<sup>12</sup> The fundamental plastic restoration material in the NHS continues to be amalgam, making this a difficult issue.

### ***Fixed Prosthodontic Restorations***

Lower 'Skill Rank' scores are evident in this clinical theme but metal ceramic and all ceramic crowns (QN°.19;3.6), (QN°.21; 3.6), (QN°.22; 3.5) have upper 'mid-level' expectations with bridgework (QN°.25; 3.4), (QN°.26; 3.1), (QN°.27; 2.7), (QN°.28; 2.2), (QN°.29; 2.1) showing lower expectations particularly as the complexity of the bridge increases. Interestingly ceramic veneers had lower expectations (skill ranking 3.1) but a high experience of 'not met' (15%), suggesting variation

in the 'expectation' and 'experience' of ESs here. For anterior ceramic veneer (QN°.18) there was a high 'not observed' score of 25% suggesting that this procedure may not be extensively experienced in DF training. The 2015 and earlier editions of the 'Curriculum for Foundation Training' do not specifically mention ceramic veneers.<sup>3</sup>

Post retained crowns had a slightly lower ranking (3.2) but had a high 'not met' score of 18%. This is not entirely unexpected as these restorations are more variable (different types and techniques) and have a higher failure rate than other fixed restorations, so may cause a new FD difficulties. In addition UG experience in this area may be limited for the same reasons given before in relation to a decreasing caries experience in parts of the country.

From the open comments, several ESs were concerned about the 'experience' of their new FD in fixed prosthodontic restorations. Of particular concern are comments which suggest that the new FD has undertaken none of these procedures on patients in their UG course. This is clearly of concern and dental schools should look closely at student experience. However, it is important to realise that student experience will vary because of the patients they were exposed to during their training. A 'log of experience' during UG and DF training would allow ESs to structure and focus their training appropriately.

The assessment of technical laboratory quality (QN°. 42) also had a high 'not met' score although the expectations here were slightly lower ('mid –level'). Undergraduates have much less technical laboratory training than their predecessors and it may be assumed that they are less equipped to assess the quality of laboratory work. However with the changes in the professional status of dental technology then this may not be an issue but will require better teamwork. This is a shift highlighted in the "Dental Foundation Training Curriculum, 2015" (Page 22, Major Competency 11; pt5)<sup>3</sup> and it is an area that dental schools should reassess, specifically problem solving and quality control of laboratory work.

### ***Removable Prosthodontic Restorations***

The highest expectations of construction of an acrylic RPD (QN°.34; 4.1), repair (QN°.36; 4.0) and addition (QN°.38; 4.1) were largely met. However, expectations for a new FD's ability to undertake the construction of a complete denture (QN°.32; 3.8), design a partial denture (QN°.39; 3.7) and modify a try-in (QN°.40; 3.8) were also high but these were 'not met' by 14-16% of respondents suggesting that some FDs found these skills challenging. In relation to the complete denture (QN°.32; 3.8) this may reflect changes in undergraduate teaching and a significant reduction in the number of

people who are edentulous.<sup>7</sup> Other areas where the expectations were ‘not met’ include copy denture (QN°.33; 3.4) where again there may be a mismatch between the experiences and teaching of the FD compared to that of their ES. Copy denture teaching varies between dental schools and better communication of what the undergraduates are taught would help to make their experience more transparent.

A number of removable prosthodontic skills had high ‘not observed’ scores, such as construction of a chrome partial denture (QN°.35; 19% not observed), relining of existing complete denture (QN°.37; 19% not observed) and modifying a wax try-in (QN°.40; 23% not observed). The relining and modifying try-in are relatively simple procedures which may not need observation. However, the proportion reporting ‘no observation’ of the chrome partial denture is somewhat concerning. This may suggest that the FDs are not gaining experience in this area in DF training. There could be a number of reasons for this including the lack of suitable patients, ESs’ clinical preference and the NHS funding for this work. Further work would be required to confirm this and to ensure a broad-based experience within the DF training year. Recent changes in DF training have seen the introduction of ‘successful completion’; this process has set requirements for certain procedures, including chrome partial dentures.

The open comments in relation to removable prosthodontic restorations highlight some ESs’ concerns over the limited experience of the new FD. This is an area where constructive discussions again are needed between schools and ESs. Experience gained as a student 20 years ago may not be relevant today given the decline in edentulousness.

### ***Endodontics***

ESs expect the basics of endodontics (QN°.43-46) to be in place including all of the endodontic procedures for anterior and premolar teeth. In these procedures the percentage of expectations ‘not met’ is relatively low. Molar endodontics however, has ‘mid-level’ expectations (skill rank score 3.5) but a ‘not met’ figure of 18%. This is a skill where clinical experience and expertise is linked and where there needs to be discussion between dental schools and ESs about what can be achieved within the 5 years of the UG course. There will be variation in the experience of students because of difficulty in finding suitable patients for this procedure and it is likely that a student would graduate having undertaken few molar endodontic procedures and so would be inexperienced requiring advice and perhaps sometimes assistance as an FD. It is not unreasonable therefore to expect students from certain dental schools to have had less experience of more complex restorative procedures because of variations in the caries experience of the population around the schools.

Given that ESs expressed disappointment in their comments, open discussion about the level of 'experience' in these areas may be helpful. These discussions would need to concentrate on what are 'core' skills in this area and what skills would need to be developed after graduation.

### ***Periodontal Therapy***

The expectation of periodontal therapy skills again decreases as the difficulty of the procedures increases. There is a clear differentiation between 'core' skills that are expected at graduation (QN°54-58) and other 'non-core' skills where ESs' expectations are low. The percentage of expectations 'not met' is relatively low in these core areas. This, however, was not reflected in the treatment planning clinical theme where management of more complex periodontal problems where a higher percentage of respondents reported that their expectations were 'not met'. This perhaps suggests a mis-interpretation of the questions or a lower emphasis on these skills.

### ***Paediatric Care***

ESs expect most of the clinical skills in Paediatric Dentistry to be in place on graduation. The 'not met' percentages suggest that these skills are in place. However examining the 'not observed' percentages highlights areas where FDs may not be gaining experience particularly in areas such as the traumatised anterior tooth and pulp treatments on deciduous teeth. This again may relate to the patient base of the training practice, but also on ES treatment preferences. The figures also suggest that stainless steel crowns on deciduous teeth (Hall Technique) may not be undertaken which may again reflect ES practices which is at odds with current evidence based guidance for the management of carious deciduous teeth.<sup>9</sup>

### ***Orthodontic Treatment***

ESs have indicated that they expect that orthodontic skills should be in place by graduation and the low 'not met' percentages suggest that this is the case. However, high percentages in the 'not observed' column indicate that the FDs may have limited experience in orthodontics in their DF training year. Accurate assessment of the IOTN is important for onward referral but there appeared to be some confusion over this, which is reflected in the data (including the free comments) and by recent studies.<sup>13, 14</sup> This is particularly the case with the provision of a simple removable appliance. Again this may reflect ES practice and also contractual arrangements within NHS Dentistry. In the "Curriculum for UK Dental Foundation Training" (Page 20, Major competency 9: pt.1-5) there are statements that relate to orthodontic experience.<sup>3</sup> These are, of course, limited but the concern here is that FDs may not receive meaningful sufficient exposure to orthodontics, particularly diagnosis and emergency management. Clearly this issue requires further investigation.

### ***Oral Medicine***

Expectations in Oral Medicine are high and it appears that these expectations are being met. However, the high 'not observed' percentages suggest that FDs may have limited experience of these skills during DF training. Without access to a specialist centre then this is unlikely to improve. However new FDs should be able to recognise the abnormal and refer appropriately.

### ***Oral Surgery***

In this area of clinical dentistry it was clear that there was a mismatch in the expectations of ESs and experience at UG level. This was particularly evident in simple extraction of an erupted root (QN°.86; 16% not met), recognising the need for a surgical extraction (QN°.90; 18% not met), assessing the surgical management of a failed extraction (QN°.91; 15% not met) and suturing skills (QN°.92; 14% not met). Clearly these are all basic skills necessary for general practice and it is important that graduates are competent. Interestingly when we look at simple surgical skills as seen in the removal of roots (QN°.93; 17% not met), we can see a variation of opinion about whether a new FD would have these skills (rank score of 2.9) with over half of the respondents indicating that their new FD would need advice or assistance at least. The additional comments reinforce the concerns of ESs in this area.

Clearly a number of these skills are more relevant to a specialist oral surgery unit (QN°.93; 2.9), (QN°.94; 1.8), (QN°.96; 1.9) (QN°.97; 1.9) and the expectations are understandably lower. The "Curriculum for Foundation Training" is clear; by the end of DF training the dentists should be able to demonstrate an ability to extract erupted teeth and manage fractured or unerupted teeth.<sup>3</sup> Many of the skills here improve with experience and the comments suggest limited UG experience in this area. Discussions between dental schools and ESs may identify reasons for limited experience and how to improve the situation.

### ***Dental Schools and LETBs/Deaneries***

The Adult Dental Health Survey<sup>7</sup> shows that caries experience varies across the country Skills such as complete dentures and other complex restorative procedures were highlighted by ESs as causing concern. Four schools in particular had high (>25%) of expectations not met in these skills. The lower caries experience in these areas may be a factor.

However the variation in results between schools may also suggest deficiencies in teaching and experience in certain areas. It is important that schools look at ways of increasing experience where appropriate. To assist with this the authors produced individual reports tailored to dental schools; in the main these were well received.

When looking at the results from LETBs/Deaneries it was clear that certain ‘core’ skills were ‘not observed’. In some areas this was surprising and may suggest that these procedures were not undertaken. This risks deskilling. Again tailored reports were distributed at a local level for consideration and these concerns may have already been addressed in the new process for ‘satisfactory completion of DF training’ where an FD is required to complete certain procedures during the training year.

Once again, it is important to recognise that dental teaching institutions primary aim is to graduate a ‘safe beginner’ in line with the GDC’s directive. In so doing, they aim to address the learning outcomes described in the domains of the document ‘Preparing for Practice’.<sup>15</sup> It is to be hoped that the recent introduction of ‘enhanced CPD’ guidance by the GDC, which includes the requirement for graduates to compile a prospective ‘personal development plan’ will support trainees and educators in addressing some of the expectation and experience mismatch described in this study.<sup>16</sup>

## **Conclusions**

Robust data facilitates informed discussions between ESs and dental schools and could lead to improving the new FD’s preparedness for the next stage in their training.

Improved communication between dental schools and DF training providers, including ESs should be encouraged. This is key to improving the transition from the UG environment to the workplace. There is also a role for COPDEND (UK Committee of Postgraduate Dental Deans and Directors) and the DSC (Dental Schools Committee) to take a lead in such developments.

By improving the transparency of what is actually achieved as an undergraduate, ESs will be better able to target training and assistance for their FD. We hope that this work will start this process but it is down to individual dental schools and DF training providers to have detailed discussions.

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1. Cabot LB, Radford DR. Are graduates as good as they used to be? Br Dent J. 1999;186(7):318-9.

2. Oxley CJ, Dennick R, Batchelor P. The standard of newly qualified dental graduates - foundation trainer perceptions. *Br Dent J.* 2017;222(5):391-5.
3. UK Committee of Postgraduate Dental Deans and Directors. Dental Foundation Training Curriculum 2015. UK: 2015.
4. General Dental Council. The First Five Years: The Undergraduate Dental Curriculum. London: GDC, 2008.
5. Welbury RR. The Hall Technique 10 years on: its effect and influence. *Br Dent J.* 2017;222(6):421-2.
6. Gilmour AS, Jones RJ, Cowpe JG, Bullock AD. Communication and professionalism skills of a new graduate: the expectations and experiences of dental foundation trainers. *Eur J Dent Educ.* 2014;18(4):195-202.
7. Steele JG, Treasure ET, O'Sullivan I, Morris J, Murray JJ. Adult Dental Health Survey 2009: transformations in British oral health 1968-2009. *Br Dent J.* 2012;213(10):523-7.
8. Ricketts D, Lamont T, Innes NP, Kidd E, Clarkson JE. Operative caries management in adults and children. *Cochrane Database Syst Rev.* 2013(3):CD003808.
9. Innes NP, Evans DJ, Bonifacio CC, Geneser M, Hesse D, Heimer M, et al. The Hall Technique 10 years on: Questions and answers. *Br Dent J.* 2017;222(6):478-83.
10. Innes N, Evans D, Stirrups D. The hall technique. *Br Dent J.* 2008;205(4):167-8.
11. United Nations Environment Programme. Minamata convention agreed by nations. UNEP, 2013. 2013. Available from: <http://wedocs.unep.org/handle/20.500.11822/8458> (accessed March 2018)
12. Wilson NH, Lynch CD. The teaching of posterior resin composites: planning for the future based on 25 years of research. *J Dent.* 2014;42(5):503-16.
13. Jawad Z, Bates C, Hodge T. Can dental registrants use the Index of Orthodontic Treatment Need accurately? Part 1: Knowledge of IOTN among dental registrants. *Br Dent J.* 2016;220(10):527-32.
14. Jawad Z, Bates C, Hodge T. Can dental registrants use the Index of Orthodontic Treatment Need accurately? Part 2. Factors influencing knowledge of IOTN among dental registrants. *Br Dent J.* 2016;220(11):591-5.
15. General Dental Council. Preparing for Practice - dental team learning outcomes for registration. London: General Dental Council, 2012.
16. General Dental Council. Enhanced CPD. London: GDC, 2018. Available from: <https://www.gdc-uk.org/professionals/cpd/enhanced-cpd> (accessed March 2018)

**Table 1: Treatment Planning (Clinical Judgement)**

	Treatment Planning (clinical judgement)	Expectation	Experience	
QN°	<i>A new FD should be able to complete a history &amp; examination, diagnose, carry out special tests and plan effectively in the following situations...</i>	Skill Rank score	Not Met	Not Observed
1	Dentate minimal dental disease	4.6	5%	0%
2	Partially dentate minimal disease	4.5	7%	0%
3	Edentulous wearing old complete dentures	3.9	12%	7%
4	Dentate simple periodontal disease (BPE 3)	4.3	7%	1%
5	Dentate minimal caries complex periodontal disease (BPE 4)	3.6	11%	6%
6	Dentate several large carious lesions simple periodontal disease (BPE 2-3)	3.7	12%	2%
7	Dentate several not simple large carious lesions complex periodontal disease (BPE 3-4)	3.3	14%	6%
8	Dentate heavily restored dentition - failing. Simple periodontal disease	3.0	12%	4%
9	Dentate young - significant anterior toothwear	2.7	10%	26%
10	Partially dentate - older significant generalised toothwear moderate periodontal disease	2.8	11%	13%



**Table 2: Plastic Restorations**

	Plastic Restorations	Expectation	Experience	
QN°	<i>A new FD should be able to....</i>	Skill Rank score	Not Met	Not Observed
11	Restore single surface (occlusal) amalgam or composite	4.9	4%	0%
12	Restore 2 surface (MO) amalgam or composite	4.7	8%	0%
13	Restore 3 surface (MOD) amalgam or composite	4.5	11%	2%
14	Restore large broken down tooth	3.7	15%	4%
15	Restore CI V cavity with plastic restoration	4.7	4%	4%
16	Restore a CI III composite	4.6	6%	4%
17	Restore a CI IV composite	4.4	8%	7%

**Table 3: Fixed Prosthodontic Restorations**

	<b>Fixed Prosthodontic Restorations</b>	<b>Expectation</b>	<b>Experience</b>	
QN°	<i>A new FD should be able to undertake all the necessary procedures involved in the provision of...</i>	<b>Skill Rank score</b>	<b>Not Met</b>	<b>Not Observed</b>
18	Anterior ceramic veneer	<b>3.1</b>	15%	25%
19	Anterior metal ceramic/ceramic crown	<b>3.6</b>	10%	9%
20	Post retained anterior metal ceramic/ ceramic crown	<b>3.2</b>	18%	14%
21	Metal ceramic/ceramic crown on a premolar tooth	<b>3.6</b>	10%	11%
22	Metal ceramic/ceramic crown on a molar tooth	<b>3.5</b>	12%	11%
23	Gold inlay/onlay	<b>3.0</b>	12%	36%
24	Aesthetic inlay/onlay (ceramic or composite)	<b>2.8</b>	12%	45%
25	Resin retained bridge (Maryland)	<b>3.4</b>	9%	17%
26	2 unit cantilever metal ceramic bridge	<b>3.1</b>	8%	32%
27	3 unit fixed-fixed metal ceramic bridge	<b>2.7</b>	10%	48%
28	Large anterior fixed-fixed metal ceramic bridge	<b>2.2</b>	8%	61%
29	Large posterior metal ceramic bridge	<b>2.1</b>	9%	61%
30	Implant retained crown/bridge	<b>1.2</b>	10%	66%
31	An assessment of the quality of technical work and provide effective feedback to the laboratory	<b>3.0</b>	13%	18%

**Table 4: Removable Prosthodontic Restorations**

	Removable Prosthodontic Restorations	Expectation	Experience	
QN°	<i>A new FD should be able to undertake all the necessary procedures involved in the provision of...</i>	Skill Rank score	Not Met	Not Observed
32	Complete denture	3.8	16%	7%
33	Copy denture (complete denture)	3.4	16%	25%
34	Acrylic partial denture	4.1	9%	5%
35	Chrome partial denture	3.4	11%	19%
36	Repair to an existing complete/partial denture	4.0	7%	9%
37	Reline to an existing complete denture	3.8	10%	19%
38	Addition of teeth to an existing partial denture	4.1	6%	8%
39	Effectively design a partial denture	3.7	14%	8%
40	Modify the tooth position on a wax try-in	3.8	14%	23%
41	Communicate effectively with the laboratory through written and verbal means	4.0	11%	5%
42	Effectively quality control laboratory work in relation to removable prosthodontics	3.6	15%	14%

**Table 5: Endodontics**

	<b>Endodontics</b>	<b>Expectation</b>	<b>Experience</b>	
QN°	<i>A new FD should be able to...</i>	<b>Skill Rank score</b>	<b>Not Met</b>	<b>Not Observed</b>
43	Effectively manage a vital pulp exposure	<b>4.1</b>	7%	6%
44	Effectively manage acute periapical abscess	<b>4.1</b>	8%	3%
45	Undertake primary endodontic treatment in an anterior tooth	<b>4.2</b>	6%	5%
46	Undertake primary endodontic treatment in premolar tooth	<b>4.0</b>	9%	5%
47	Undertake primary endodontic treatment in molar tooth	<b>3.5</b>	18%	7%
48	Re-treat a Root Canal Treated anterior tooth	<b>2.7</b>	8%	38%
49	Re-treat a Root Canal Treated premolar tooth	<b>2.4</b>	6%	51%
50	Re-treat a Root Canal Treated molar tooth	<b>2.1</b>	8%	53%
51	Remove a fractured post from canal	<b>1.7</b>	9%	59%
52	Remove a fractured endodontic instrument from canal	<b>1.5</b>	9%	65%
53	Undertake apical surgery	<b>1.4</b>	9%	66%

**Table 6: Periodontal Therapy**

	<b>Periodontal Therapy</b>	<b>Expectation</b>	<b>Experience</b>	
QN°	<i>A new FD should be able to...</i>	<b>Skill Rank score</b>	<b>Not Met</b>	<b>Not Observed</b>
54	Give effective oral hygiene advice	<b>4.9</b>	4%	1%
55	Make an accurate diagnosis of the periodontal condition	<b>4.6</b>	5%	1%
56	Make an effective treatment plan for the periodontal condition	<b>4.3</b>	6%	2%
57	Undertake simple non-surgical scaling and root surface debridement	<b>4.7</b>	4%	2%
58	Accurately prescribe topical or systemic antibiotics for periodontal diseases	<b>3.8</b>	9%	17%
59	Undertake surgical periodontal therapy	<b>1.7</b>	10%	65%
60	Undertake surgical root coverage treatment for receding gums (such as grafting procedures)	<b>1.2</b>	10%	71%
61	Undertake surgical crown lengthening procedures	<b>1.4</b>	11%	67%
62	Undertake regenerative treatments for soft tissues	<b>1.1</b>	10%	71%
63	Undertake regenerative treatments for bone lost	<b>1.1</b>	10%	72%

**Table 7: Paediatric Care**

	<b>Paediatric Care</b>	<b>Expectation</b>	<b>Experience</b>	
<b>QN°</b>	<b><i>A new FD should be able to...</i></b>	<b>Skill Rank score</b>	<b>Not Met</b>	<b>Not Observed</b>
64	Effectively manage the behaviour of young children	<b>4.0</b>	4%	2%
65	Effectively diagnose and manage caries in young children	<b>4.3</b>	6%	1%
66	Undertake simple restorations in deciduous teeth	<b>4.4</b>	4%	2%
67	Provide effective diet and oral hygiene advice to parents/guardians and children	<b>4.8</b>	3%	3%
68	Provide effective caries prevention measures such as fluoride supplements	<b>4.6</b>	4%	6%
69	Effectively undertake fissure sealant procedures	<b>4.7</b>	3%	7%
70	Undertake simple restorations in permanent teeth in children	<b>4.5</b>	3%	3%
71	Effectively manage traumatised anterior teeth	<b>3.4</b>	7%	20%
72	Understand the guidelines for referral for extraction of teeth under GA	<b>3.7</b>	7%	12%
73	Appropriately prescribe and provide stainless steel crowns on deciduous teeth	<b>3.1</b>	7%	52%
74	Undertake pulp treatments on deciduous teeth	<b>3.4</b>	8%	26%
75	Undertake root canal treatments on permanent teeth when appropriate	<b>3.6</b>	5%	17%
76	Manage extraction of primary teeth under LA	<b>4.1</b>	4%	7%
77	Manage extraction of permanent teeth in a child under LA	<b>3.9</b>	5%	14%

**Table 8: Orthodontic Treatment**

	Orthodontic Treatment	Expectation	Experience	
QN°	<i>A new FD should be able to...</i>	Skill Rank score	Not Met	Not Observed
78	Accurately assess the orthodontic treatment need (IOTN)	3.6	8%	16%
79	Explain to patient & parent the role of IOTN in the provision of orthodontic care	3.8	7%	19%
80	Appropriately refer a patient for orthodontic treatment at the correct age	4.0	6%	10%
81	Recognise the difference between normal occlusal development and malocclusion	4.2	6%	13%
82	Judge the severity of a malocclusion and explain to patient & parent the likely treatment requirement	3.6	9%	22%
83	Prescribe fit and adjust a removable appliance for space maintenance or simple tooth tipping	3.6	9%	68%

**Table 9: Oral Surgery**

	<b>Oral Surgery</b>	<b>Expectation</b>	<b>Experience</b>	
QN°	<i>A new FD should be able to...</i>	<b>Skill Rank score</b>	<b>Not Met</b>	<b>Not Observed</b>
84	Perform effective local anaesthetic procedures	<b>4.8</b>	6%	1%
85	Extract erupted teeth	<b>4.3</b>	9%	1%
86	Remove simple erupted roots	<b>3.8</b>	16%	2%
87	Manage common peri-operative and post-operative complications of extraction	<b>3.9</b>	7%	4%
88	Diagnose and manage a dry socket	<b>4.4</b>	4%	4%
89	Diagnose and manage pericoronitis	<b>4.5</b>	3%	4%
90	Recognize the need for surgical extraction	<b>3.8</b>	18%	4%
91	Assess surgical management for a failed extraction	<b>3.2</b>	15%	14%
92	Perform wound closure by suturing using appropriate suture materials	<b>3.5</b>	14%	18%
93	Undertake surgical removal of simple roots with mucoperiosteal flap and bone removal	<b>2.9</b>	17%	21%
94	Perform surgical removal of a lower third molar tooth	<b>1.8</b>	11%	54%
95	Manage non-airway threatening acute infection	<b>2.9</b>	10%	38%
96	Manage oro-antral communications	<b>1.9</b>	10%	67%
97	Perform simple soft tissue surgery polyp mucocoele	<b>1.9</b>	10%	69%



**Table 10: Oral Medicine**

	<b>Oral Medicine</b>	<b>Expectation</b>	<b>Experience</b>	
QN°	<i>A new FD should be able to...</i>	<b>Skill Rank score</b>	<b>Not Met</b>	<b>Not Observed</b>
98	Identify both premalignant and malignant oral lesions and order a biopsy	<b>3.3</b>	7%	36%
99	Detect difference between oral leukoplasia and a candidiasis infection	<b>3.3</b>	7%	40%
100	Prescribe an adequate treatment for oral candidiasis	<b>3.8</b>	6%	32%
101	Manage primary and secondary Herpes Simplex lesions appearing on intraoral tissues	<b>3.6</b>	6%	45%
102	Prescribe a symptomatic treatment for recurrent aphthous ulcers	<b>3.9</b>	6%	31%
103	Prescribe an adequate treatment for halitosis	<b>3.8</b>	4%	38%
104	Identify oral cancer risk factors from the History and Examination and provide appropriate advice	<b>4.5</b>	3%	15%

**Table 11: Expectations 'not met': Procedure cross-tabulated against Dental School**

	Plastic Restorations				Removable Prosthodontics			Endo	Oral Surgery		
%	Restore broken down tooth (QN°14)	Anterior veneer (QN°18)	Post retained anterior MCC (QN°20)	QA Lab work pros (QN°31)	Modify tooth position on wax try-in (QN°20)	Complete denture (QN°32)	Copy Denture (QN°33)	Primary Endo in molar tooth (QN°47)	Remove Simple erupted roots (QN°86)	Need for surgical extract (QN°90)	Suturing (QN°92)
School 1	17	15	15	12	12	17	12	17	10	10	17
School 2	9	7	12	9	7	7	9	14	19	9	5
School 3	28	24	38	28	28	24	14	24	24	21	28
School 4	11	16	20	7	7	9	9	9	14	14	9
School 5	21	22	30	17	17	25	22	28	23	31	16
School 6	16	25	25	21	28	23	30	19	14	17	21
School 7	16	16	19	9	19	25	22	19	19	28	22
School 8	10	5	8	8	0	8	16	13	10	5	5
School 9	2	4	10	8	2	8	10	8	8	8	8
Non-UK	20	12	5	15	22	12	8	15	20	17	13
Mean	14.70%	14.70%	18.40%	14.70%	14.20%	16.00%	16.00%	16.80%	15.90%	17.50%	14.30%
Range	2-28%	4-25%	5-38%	7-28%	0-28%	7-25%	9-30%	8-28%	8-24%	5-31%	5-28%

**Table 12: Expectations ‘not observed’: Procedure cross-tabulated against LETB/Deanery (Deanery)**

%	Fit Removable Ortho (QN°83)	SSC (QN°73)	Small F-F Bridge (QN°27)	Cantilever Bridge (QN°26)	Resin retained bridge (QN°25)	Acute Infect (QN°95)	Treat plan Ant tooth wear (QN°9)	Anterior veneer (QN°18)	Complete Copy Denture (33)	Chrome partial Denture (QN°35)	QA Lab work pros (QN°31)	Explain IOTN (QN°79)	Suturing (QN°92)
Deanery 1	64	62	62	50	36	33	33	33	33	24	19	12	24
Deanery 2	75	59	63	35	16	51	31	43	35	18	14	27	22
Deanery 3	66	47	49	31	15	33	23	23	21	17	17	19	20
Deanery 4	73	48	48	18	9	24	18	15	30	24	12	6	24
Deanery 5	62	69	38	24	17	38	34	21	35	34	24	24	21
Deanery 6	74	45	32	19	10	35	23	16	26	6	10	19	19
Deanery 7	69	44	12	6	6	44	19	6	13	6	12	44	19
Deanery 8	79	54	37	33	4	50	29	37	42	17	8	17	12
Deanery 9	71	50	46	35	12	39	22	20	17	12	12	18	13
Deanery 10	61	52	45	31	29	40	26	32	28	28	19	26	20
Deanery 11	64	48	64	42	16	39	26	19	13	13	35	10	3
Deanery 12	69	42	50	38	15	31	27	19	19	19	11	8	19
Mean	68.4%	51.8%	48%	32%	16.9%	38%	26%	25%	25.3%	19%	18.2%	19%	18.4%
Range	61-79%	42-69%	12-64%	6-50%	4-36%	31-51%	18-34%	6-43%	3-42%	6-34%	8-35%	6-44%	3-24%

**Table 13. Interpretation of 'expectation' & 'experience'**

<b>Table 13. Interpretation of 'expectation' &amp; 'experience'</b>			
	<b>EXPERIENCE</b>		
<b>EXPECTATION</b>	<b>Met</b>	<b>Not Met</b>	<b>Not Observed</b>
<b>Upper Level High Expectation (On Own)</b>	Successful outcome	Core skills not met: Expectation of ES and Dental School at variance  Inadequate UG training? Expectations too high?	Insufficient experience? De-skilling?
<b>Mid-Level (with advice / assistance)</b>	Successful UG teaching. Consolidation & development in FT	Core skill (?) but requiring more experience / assistance for independent working	Of concern – would require closer assistance in FT
<b>Low Level Low Expectation (with assistance)</b>	Successful UG teaching. Further training in FT	Complex skill (not core) FD not prepared?	Not Core Skill (but could be developed)