

# EDUCATION

## Undergraduate requirements in restorative dentistry in the UK and Ireland

C. C. Youngson,<sup>1</sup> L. E. Molyneux,<sup>2</sup> K. Fox,<sup>3</sup> E. L. Boyle<sup>4</sup> and A. J. Preston<sup>5</sup>

**Objectives** To ascertain the requirements in restorative dentistry that undergraduate dental students have to fulfil in order to sit the finals examinations in dental schools in the UK and Ireland and to compare those requirements with the competencies stipulated by the GDC in The first five years.

**Methods** Fifteen anonymised questionnaires, of open and closed question design, were sent by post to academics in the university departments of restorative dentistry in each of the undergraduate dental schools in the UK and Ireland. The first section concerned numerical information regarding total numbers of procedures that were required to be completed in undergraduate restorative dentistry. The second section was designed to ascertain information as to how decisions are made with respect to an undergraduate's readiness to sit the finals examination in restorative dentistry (such as continual assessment and/or competency assessments).

**Results** A total of 15 replies were received for analysis, a 100% response rate. Several institutions emphasised that they do not have 'requirements', but provide guidelines as to what should be achieved. Six institutions did not have set numerical requirements for direct placement restorations or bridges. The number of direct placement restorations required at the other nine institutions ranged from 50 to 160. Five institutions did not have numerical requirements for dentures; four institutions did not set numerical targets for crowns, veneers, inlays/onlays or endodontics. In institutions where numerical requirements were not used, forms of competency assessments were completed. The requirements across all institutions for periodontology, integrated treatment planning and completed cases were ill-defined.

**Conclusions** This study shows that there is a wide disparity amongst institutions in the UK and Ireland with regards to finals requirements in restorative dentistry. Ideally, such requirements should be similar between institutions and should be closely mapped to the GDC's required learning outcomes (The first five years) for the UK institutions.

### INTRODUCTION

Historically, within the UK and Ireland dental schools, one criterion that has been widely used to determine students' readiness to sit their finals examinations has been that they have achieved a minimum number of requirements of items of treatment within the areas of restorative dentistry. Although there have been slight variations on a theme, eg surfaces restored rather than teeth, different weightings given to different materials (eg more 'points' for gold than amalgam), patients treated rather than number of

dentures fitted, there has been strong reliance on a numerically-based system. Anecdotally, many general practitioners remember 'fondly' the level of experience they gained prior to graduation and consider the current undergraduate programmes as 'dumbed down'.<sup>1</sup> A recent paper on vocational trainers' perceptions of the preparedness of vocational dental practitioners appears to support this view.<sup>2</sup>

The General Dental Council's *The first five years*<sup>3</sup> suggests a number of competencies that must be achieved prior to qualification. *The first five years* states that a qualifying student should 'be competent at completing a range of procedures in restorative dentistry, including amalgam and tooth-coloured restorations, endodontic treatments of single- and multi-rooted teeth, anterior and posterior crowns, post crowns, simple bridges and partial and complete dentures'.<sup>3</sup>

How each dental school achieves these is left to the institution itself, but the process of dental education in the UK is subject to review by visitations of the GDC. 'Each report is then sent by the GDC to the Vice-Chancellor/Principal of the relevant university.'<sup>4</sup> The GDC have reported that all the 13 dental schools in the last round of visitations were all considered 'sufficient' under the terms of the Dentists Act 1984. This would suggest that all the previously stated competencies were achieved by each dental school (or that the visitors interpreted the objectives with some discretion). Some doubt has been cast as to the future of the GDC visitation process,<sup>5</sup> although the new dental schools in the South West and North West of England will be visited.

If competence is defined as 'fitness for the purpose or ability to do a task to a pre-determined standard',<sup>6</sup> then there should be a robust method of ensuring that these

<sup>1</sup>Head of Division of Dentistry, <sup>2</sup>P/T Clinical Lecturer, <sup>3</sup>Lecturer, <sup>4</sup>Senior Clinical Teacher, <sup>5</sup>Senior Lecturer, Restorative Dentistry, School of Dental Sciences, The University of Liverpool, Pembroke Place, Liverpool, L3 5PS  
\*Correspondence to: Professor Callum C. Youngson  
Email: c.c.youngson@liverpool.ac.uk

### Refereed Paper

Accepted 11 June 2007

DOI: 10.1038/obj.2007.777

©British Dental Journal 2007; 203 (Suppl): 9-14

objectives are met during the undergraduate course. Numerical requirements have traditionally acted as a proxy for assessments of these competencies. There is some anecdotal evidence that undergraduate dental schools are increasingly moving away from numerically-based assessment systems to those that are more competence-based. Bould's statement that 'assessment methods and requirements probably have greater influence on how and what students learn than any other single factor'<sup>7</sup> has given rise to the widely-used phrase 'assessment drives learning'. It is perhaps therefore logical to note the corollary that 'requirements drive treatment' by undergraduates. However, this perception has not always been borne out by evidence.<sup>8-10</sup>

The move away from numerical requirements, or a reduction in the number required, is not without risks. There is some evidence that recent undergraduates do not have the same amount of endodontic experience as previously.<sup>11</sup> One should be careful not to confuse experience with expertise, as many items of treatment can be provided (thus achieving the numerical schedule) without any of them being excellent or even performed competently. The other side of this coin, that 'practice makes perfect', is widely believed and few professional musicians do not practice routines on a regular basis to maintain their level of skills. Is the acquisition of clinical skills as an undergraduate very different? Certainly, for oral maxillofacial surgical trainees, the comment has been made that 'the more often you do something, the better you get' and the argument proposed 'Given the choice for minimally invasive coronary artery bypass surgery, who would choose the surgeon performing her tenth procedure of this type when you could select a surgeon who is doing her two hundredth?'<sup>12</sup> The increased tendency to concentrate specialist treatments such as cleft lip and palate surgery in fewer centres supports the view that repetition (and therefore a numerical schedule) is of value.

The anecdotal reduction in skills base within newly qualified undergraduates lacks validation and therefore it was considered valuable to examine the output of the dental schools in the UK and Ireland

Fig. 1 Questionnaire distributed to schools

Section A Does your Department use a fixed numerical requirement/total to assess progress to finals? If 'yes', can you please indicate how many of the following are required; if not please go to Section B				
	YES	NO	NOT ASSESSED	IF YES NUMBER
<b>1. Crowns</b> - broken down into				
a. Porcelain bonded to metal/metal-ceramic				
b. Full veneer metal				
c. Partial veneer				
d. All-ceramic				
<b>2. Inlay/onlay</b> - broken down into				
a. Metal				
b. Ceramic				
c. Composite				
<b>3. Plastic restorations</b> - broken down into				
a. Composite/compomer				
b. Amalgam				
c. Glass-ionomer/RMGIC				
<b>4. Veneers</b> - broken down into				
a. Porcelain laminate				
b. Other				
<b>5. Bridges</b> - broken down into				
a. Conventional				
b. Resin bonded				
Any differentiation made				
<b>6. Endodontic procedures</b> - broken down into				
a. Teeth				
i) Single-rooted				
ii) Multi-rooted				
b. Root canals				
Other restorations numerically recorded (eg PRRs or fissure sealants)				
<b>7. Removable prosthodontics: cases or dentures</b> (please circle)				
<b>Complete dentures</b> -broken down into				
a. Conventional				
b. Copy/duplicate technique				
<b>8. Partial dentures</b> - broken down into				
a. Acrylic				
b. Cobalt/chrome				
<b>9. Immediate Dentures</b>				

**Fig. 1 Questionnaire distributed to schools**

Continued from page 10	YES	NO	NOT ASSESSED	IF YES NUMBER
10. Other procedures (relines/additions etc.)				
11. Periodontology – broken down into				
a. Diagnostic clinics				
b. Non surgical cases				
i) Scaling				
ii) Root surface instrumentation				
c. Surgical treatment of periodontal disease (operate or assist)				
d. Mucogingival cases				
e. Topical/systemic antibiotic				
f. Occlusal analysis/adjustment				
12. Integrated treatment planning				
13. Whole patient treatments				
<b>Section B</b>				
<b>Can you please note the format currently used to assess the Final Year undergraduates' readiness: please record whether one system is used exclusively or a combination is employed</b>				
Sequence of competency tests across the field (please record competencies tested)				
Monitoring of progress against expected experience				
Case presentations in the separate clinical areas (please record areas)				
OSCE or SCOT in the restorative domain(s)				
Other assessment: (please state)				
Has 'The first five years' or the QAA benchmarking for dentistry affected your requirements or competency assessments? Comments:				
Do you think your Institution's assessments within restorative dentistry will change within the next five years?				
If so, what direction do you think your assessments will take?				
If not, why not?				

(which historically have followed broadly parallel teaching programmes). The aims of this current study were therefore to:

- 1) Identify the current status of minimum undergraduate requirements to progress to the final examinations and assess likely developments
- 2) To compare the requirements of the UK schools with the competencies stipulated by the GDC in the *The first five years*.

**METHOD**

All the undergraduate schools in the UK and Ireland were selected and the heads of the restorative departments identified. Fifteen anonymised questionnaires (Fig. 1) were sent by post to these individuals with a request that the questionnaire be passed to the most appropriate member of staff for completion.

The questionnaire included open and closed questions and comprised of two parts. The first section was designed to determine which schools were using a numerical-based ('points', 'totals' or 'requirements') system and attempted to gather numerical information regarding total numbers of procedures that were required to be completed in all spheres of undergraduate restorative dentistry. The second section of the questionnaire was designed to ascertain information as to how decisions were made with respect to an undergraduate's readiness to sit the finals examination in restorative dentistry when the institution principally used continuous assessment and/or competency tests. Any school(s) that used a combination of assessment techniques could complete the relevant sections.

**RESULTS**

A total of 15 replies (100%) were received. Several institutions emphasised that they do not have 'requirements' as such, but provide guidelines as to what should be achieved. One dental school noted that they did not use requirements/competency tests to prevent students from sitting their finals examinations, but that the student could not pass finals without having satisfactorily completed the department's requirements.

Some institutions had numerical requirements for some procedures but

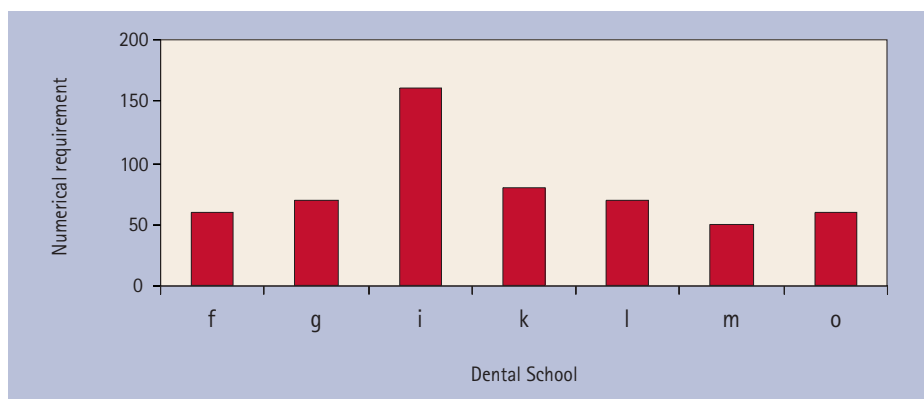


Fig. 2 Requirements for plastic restorations

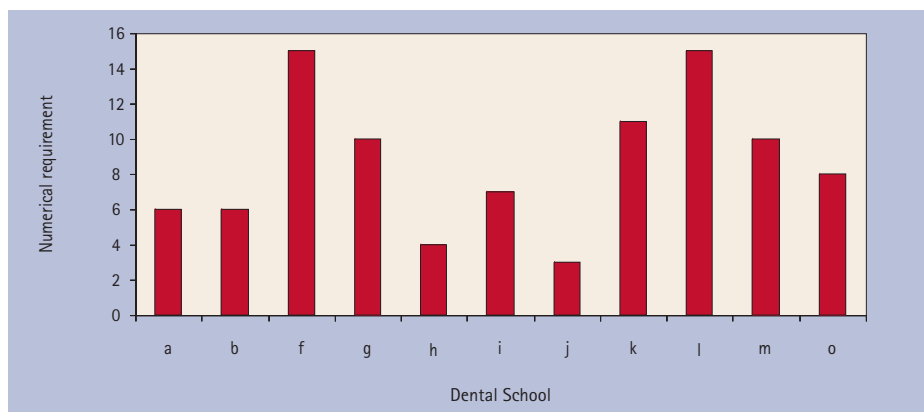


Fig. 3 Requirements for indirect restorations

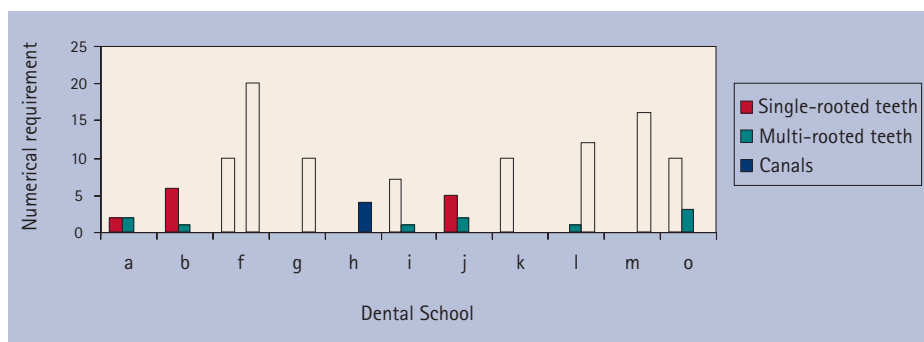


Fig. 4 Requirements for endodontics

used competence tests for others. For simplicity the data is presented in groupings. The schools are identifiable only as letters (a-o) to maintain confidentiality.

**Plastic restorations**

Figure 2 illustrates the levels of numerical requirements for plastic restorations that seven dental schools used to monitor progression. School g used a 'points' requirement with 250 points being roughly equivalent to 70 MO or DO. Of the 60 restorations stipulated by school o, 20 must be class II.

Six schools (a, d, e, h, j, n) used competence assessments. Two schools used

requirements for progression from 3rd to 4th and 4th to 5th (b) or from 4th to 5th years (c) rather than determining progression to finals.

**Fixed prosthodontics**

Figure 3 illustrates the level of numerical requirements for crowns, inlays/onlays and/or veneers. Eleven schools had some form of requirement. One school (a) stipulated that two inlays and two veneers were required, another that two inlays or veneers were required (o) and one that a veneer had to be placed (k). Dental school h used a competency assessment in crowns but required the student to have

completed four units before being allowed to undertake this. Schools f, g, i and l used less prescriptive descriptions and measured the requirements in units of crown/bridgework or indirect restorations.

Five schools (f, g, k, l, o) required that the student complete at least one bridge and two schools (a, m) required the student to complete two bridges before proceeding to finals. Six schools used competence assessments but not all students would be required to undertake these. Two schools had no form of assessment of bridgework.

**Endodontics**

Eleven schools had numerical endodontic requirements measured either by canals or teeth (Fig. 4). School h required that students had completed four canals before undertaking a competence assessment in endodontics. Schools c, d, e and n used competency tests but did not stipulate any prior experience.

**Prosthetics**

Five schools (c, d, e, h, n) used a competency-based assessment and the remaining ten schools used a combination of forms of numerical assessment (eg completed patients, materials or techniques) as demonstrated in Figure 5.

**Periodontics**

Six schools (a, g, i, k, l, m) had numerical periodontal requirements as illustrated in Figure 6. The remaining nine schools used competency assessments.

**Total patient care**

Three schools (b, i, m) had a requirement that four to six integrated treatment planning cases took place and six (a, d, l, k, m, o) required that between one and 20 whole patient treatments were completed.

Two schools (e and n) used only competency assessments and had no numerical requirements in any part of their restorative course.

Five schools did not plan to change their form of assessment and five planned to increase the proportion of competency-based assessment within their restorative departments. Three schools planned to use OSCEs as a significant part of their assessment process.

## DISCUSSION

Within academic circles there have been many discussions regarding the definitions of competence and competencies as well as the value of assessments. The multiplication of these factors has led to heated (and often unresolved) discussion on how to best assess competence. Regardless of the difficulties involved, one of the main roles of a dental school must be to do just this.

Two main streams exist – numerical requirements and competence assessments. Both of these have shortcomings. As stated previously, reaching a numerical requirement does not prove competency has been achieved (but it can be expected in most cases), and passing a competence test does not prove that that competency is maintained after that test. Only one dental school (h) has transparently matched numerical requirements before a competency assessment can even be attempted. This would appear to be a sensible approach.

The views regarding future developments were balanced, with five schools not planning to change their assessment methods (partly due to some of them having only recently changed) and five planning to become more competency-based. It appears that the considerable majority of schools will still maintain some numerical component for the foreseeable future.

One potential difficulty of a competence-based system is ensuring that all dental students gain similar levels of experience before graduation – this requires robust and time-consuming policing by the school. Anecdotal evidence suggests that some students may be able to qualify having avoided aspects required by the GDC – this is, however, impossible to prove. Numerical requirements are easier to review.

Beyond *The first five years* there is no 'national curriculum' for dentistry in the UK and disparities within orthodontic teaching have been recognised and published.<sup>13-15</sup> However, one group (the Teachers group of the British Society of Oral and Maxillofacial Pathology) from 13 UK dental schools, in conjunction with one Irish dental school, have reached a consensus on a minimum curriculum that

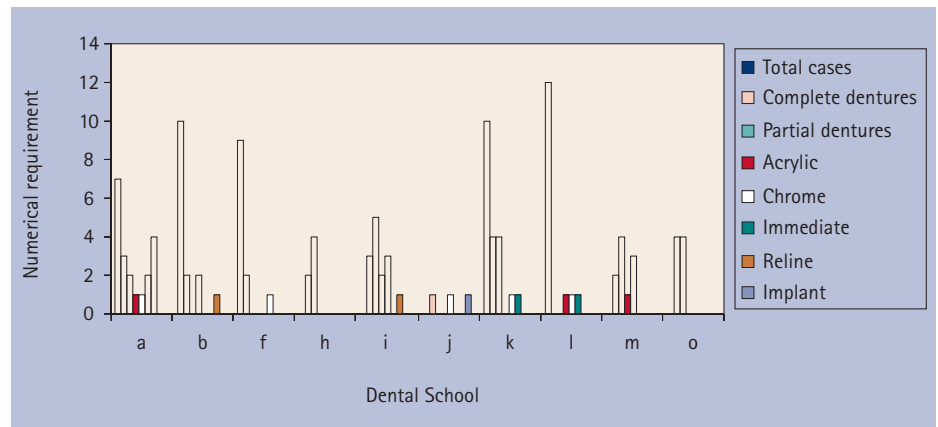


Fig. 5 Requirements for removable prostheses

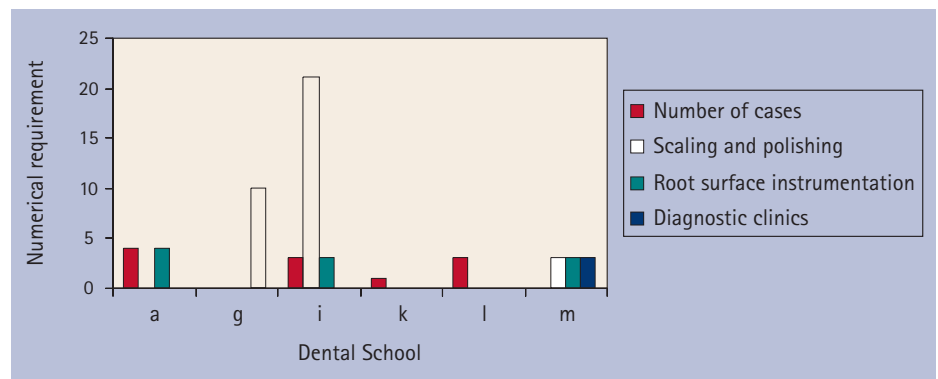


Fig. 6 Requirements for periodontal procedures

meets Quality Assurance Agency benchmarks and GDC requirements.<sup>16</sup>

Lynch and Allen<sup>17</sup> have provided a full account of the methods of teaching partial denture prosthetics in the UK and Ireland and have discussed the limitations in students achieving their schedules. These authors observed: 'Variations were noted between dental schools in both the amount and content of teaching programmes'. The current study endorses that conclusion and would add that assessment also varies.

From the results it is clear that the considerable majority of dental schools do not expect their undergraduates to have performed many bridges or endodontic procedures. Given the relatively low numbers required to be provided by undergraduates it is unlikely that the students are competent in bridge-work and multi-rooted endodontics upon qualification. However, their education and training may well have provided them with sufficient generic skills to provide competent treatment in a training environment within VT. An appropriate analogy may be the driving test,

where young adults are required to pass a competency test. This establishes that a minimum standard has been achieved but further (accident-free) experience is subsequently recognised by insurance companies via reduction of their insurance premiums. *The first five years* states that graduates must 'be competent at... endodontic treatments of... multi-rooted teeth... and... simple bridges'. As the GDC have found the schools 'sufficient' in the most recent round of visitations, we should assume that the GDC visitation process applied discretion and recognised that the schools allowed the development of the students to a point where they were capable of being competent.

## CONCLUSIONS

This study shows that there is a wide disparity amongst institutions in the UK and Ireland with regards to finals requirements in restorative dentistry. Ideally, such requirements should be similar between institutions and should be closely mapped to the GDC's required learning outcomes (*The first five years*) for the UK institutions. 📌

1. Cabot L B, Radford D R. Are graduates as good as they used to be? *Br Dent J* 1999; **186**: 318-319.
2. Patel J, Fox K, Grieveson B, Youngson C C. Undergraduate training as preparation for vocational training in England: a survey of vocational dental practitioners' and their trainers' views. *Br Dent J* 2006; **201 (Suppl)**: 9-15.
3. General Dental Council. *The first five years: the undergraduate dental curriculum*. 2nd ed. London: General Dental Council, 2002.
4. General visitation of UK dental schools 2003-2005. London: General Dental Council, 2006.
5. Walmsley A D. GDC visitations – on their way out? *Br Dent J* 2006; **201 (Suppl)**: 3.
6. Evans A W. Assessing competence in surgical dentistry. *Br Dent J* 2001; **190**: 343-346.
7. Boud D (ed). *Developing student autonomy in learning*. 2nd ed. London: Kogan Page, 1988.
8. Dodge W W, Dale R A, Hendricsson W D. A preliminary study of the effect of eliminating requirements on clinical performance. *J Dent Educ* 1993; **57**: 667-672.
9. Stacey M A, Morgan M V, Wright C. The effect of clinical targets on productivity and perceptions of clinical competency. *J Dent Educ* 1998; **62**: 409-414.
10. Holmes D C, Trombly R M, Garcia L T, Kluender R L, Keith C R. Student productivity in a comprehensive care program without numeric requirements. *J Dent Educ* 2000; **64**: 745-754.
11. Stewardson D A, Shortall A C, Lumley P J. Endodontics and new graduates. Part 2: undergraduate experience and course evaluation. *Eur J Prosthodont Restor Dent* 2003; **11**: 15-21.
12. Hupp J R. Mastery through surgical repetition. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2006; **101**: 1-3.
13. Rock W P, O'Brien K D, Stephens C D. Orthodontic teaching practice and undergraduate knowledge in British dental schools. *Br Dent J* 2002; **192**: 347-351.
14. Derringer K A. Undergraduate orthodontic teaching in UK dental schools. *Br Dent J* 2005; **199**: 224-232.
15. Derringer K A. Undergraduate orthodontic assessment and examination in UK dental schools. *Br Dent J* 2006; **201**: 225-229.
16. Odell E W, Farthing P M, High A *et al*. British Society for Oral and Maxillofacial Pathology, UK: minimum curriculum in oral pathology. *Eur J Dent Educ* 2004; **8**: 177-184.
17. Lynch C D, Allen P F. The teaching of removable partial dentures in Ireland and the United Kingdom. *Br Dent J* advance online publication 29 June 2007 (DOI 10.1038/bdj.2007.581).