

University of Dundee

DOCTOR OF PHILOSOPHY

**Clinical Competency in Oral Surgery
History, Challenges and Solutions**

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Award date:
2015

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CHAPTER 1

INTRODUCTION.

This study is a reflection on the influences on and the development of dentistry in the United Kingdom (UK) and the development and modernisation of teaching and assessment in oral surgery and exodontia in the Dundee University Dental School (DUDS).

1.0 Historical Perspective – Then and Now.

When the DUDS students graduated in the past and in recent years the competency in exodontia had been adjudged by subjective marking of clinical procedures. There had been no standardisation of, induction to our methods of working, or definition of what competent meant in terms of the oral surgery discipline.

As the staff changed in the department they subsumed a set of values that they thought were the best translation of the criteria that were available. There were circuitous sketchy descriptors, which were Observer (O), Beginner (B), Learning (L), Competent(C) and Proficient (P) (Table 1.0) and there was no capacity to fail a procedure.

Table 1.0:- DUDS grading descriptors for the competency system of observer (O), beginner (B), learning (L), competent(C) and proficient (P) used throughout the school before 2004.

O = Observer	Observing the procedure
B = Beginner	Beginning to understand the procedure Needs considerable help. Lacking clinical skills
L = Learning	Learning the procedure Completed task with guidance. Satisfactory clinical skills.
C = Competent	Competent at the procedure. Completes task unaided. Good clinical skills.
P = Proficient	Proficient at the procedure Completes task unaided within reasonable time. Good clinical skills.

In Oral Surgery, the University grading system was introduced to provide an appreciation of the students' general ability for the whole clinical session. This then allowed the tutor to include other elements such as time keeping, professionalism and interaction with colleagues. But there were no departmental printed descriptors for the University system but vague instructions of "we mark on the University system of 1-8 (1 low to 8 high)".

The School then changed and simplified the competency system. It had only two categories Learning (L) or Competent (C) for each clinical patient exposure and there were descriptors (Table 1.1) to guide the awarding of these. It was to be used in conjunction with the 1 – 8 system.

Table 1.1:- DUDS instructions used from 2004 – 2009 on how to apply the clinical assessment system of competent (C) and learning (L) in conjunction with the university-wide numerical grading system of 1 – 8

<i>GRADE / ASSESSMENT</i>
<i>Two assessments will be given for each procedure</i>
<i>1) The first assessment will be on a numerical grade 1 – 8 for how you perform. This will be based upon what would be expected of you at this stage in your year based on the complexity of the procedure and patient management.</i>
<i>2) The second assessment will be given as either Competent (C) or Learning (L).</i>
<i>The 'C' grade will only be given if the procedure is carried out to a competent level expected of a newly qualified dentist. For this no assistance shall have been given and the student should have led and the student should have led the clinical session and treatment. All other treatments will be termed as 'Learning'.</i>
<i>Similarly, the student may be competent as no help was required but only achieved a bare pass mark 4. Obviously a competent assessment cannot be accompanied by a poor numerical assessment of 1 – 3.</i>

Exodontia is one of the tasks in which, on graduation, the General Dental Council (GDC) expects students to have gained competency, which they postulate is *'the ability to perform the task of simple exodontia and its complications safely in the practice environment'*. [1] This is in accordance with Chambers [1994] who suggests that it is *'...when an individual is capable of functioning independently with a degree of contingency solving in realistic practice'*. [2]

Acquiring the skill of exodontia is seminal to oral surgery. Evidence of early practice comes from the drains of a dentist shop in ancient Rome from which entire extracted teeth were retrieved. [3] (This apparently unhygienic disposal of this waste is not so far from recent memory as in DUDS oral surgery department during the 1960's there was a central trough for any hand and instrument washing. It vented down into a grill-covered drain, flowing across the floor to the sewer. And so did the waste from the spittoons in the surgeries.)

In an early mediaeval setting, all dentistry involved was the oral surgery skills of exodontia and a belief in the existence and treatment of the four humors. The early formal route to this profession was to be an articulated apprentice taught by a master surgeon or apprenticed to an apothecary – there were no regulatory bodies. So the skills learnt and the breadth and depth of knowledge was arbitrary. The outcome of this training route would produce an individual whose reputation depended upon their skill and word of mouth. Expertise was attributed by self-proclamation. The specialty of dentistry was entered in the full knowledge that extraction was the treatment skill that would be offered.

The evident success of Indian and Chinese dental operators in the market places of

today exhibiting, with pride, their pile of extracted teeth demonstrates that they have received some sort of training be it cursory observation or training given in an unstructured manner. These practitioners have served an apprenticeship but not had a dental education.

Given that periodontal disease was historically and in third world countries today is, in the ascendant all this was accomplished with limited hand instruments and no local anaesthetic. As entertainment in the market place the deed would have been carried out quickly; the demand for speed in this skill is mirrored later in the amputation skills of the early general surgeon.

In America the Indiana University School of Dentistry (IUSD) – the 16th school to open in the United States in 1879 - had radiograph facilities and teaching from 1909. In Dundee even in 1930 – 50s the arrival of this technology has to have a column hand ruled into the record book to add to the student's record. The implication here being that it was not available when the term sheets were designed and printed.

In 1909 dentist from IUSD earned about \$2,500 with the average salary being \$300-\$500. Dentists were only consulted when there was a pain episode and *'a dentist could expect to do a fair amount of business in extraction'*. [4] Their historical record also noted that from 1900-1910 *'too many dentists were opting for extraction'*. So it was acknowledged that practitioners carried out high numbers of extractions.

How could it have been otherwise or better in the UK?

Dental training has seen dramatic changes and major development to acquire the same set of skills. Whilst the skill is still, in part, taught by demonstration and observation, the insight of how education and training in the discipline are linked has radically altered the undergraduate experience. A student who can complete a task is encouraged to assess

and question its validity with knowledge from evidence-based dentistry.

'Education is key to shaping the future of the dental profession and careful thought must be given to the direction dental education is heading and whether it still allows for the necessary development and innovation that will lead the profession forth and raise it up.' [5]

The aim is for the undergraduate to acquire competency through repetition of the task and with reference to acquired knowledge, as they progress through the undergraduate clinical curriculum. Chambers and Glassman have proposed that the journey can be mapped. (Table 1.2)

Table 1.2:- Schematic for the journey to competence based on that proposed by Chambers & Glassman. [6]

<i>Prepare to acquire skills</i>	<i>New clinical undergraduate Unconsciously incompetent</i>	<i>Attain basic knowledge & skills working in simulated practice</i>
	<i>Novice clinical undergraduate Consciously incompetent</i>	
<i>Practice skills</i>	<i>Competent beginner Can apply skills whilst consciously incompetent</i>	<i>VT Supervised practice In a work setting</i>
	<i>Competent Consciously competent</i>	
<i>Perfect Skill</i>	<i>Expert Unconsciously competent</i>	<i>After 10 years of practice Fast problem solving</i>

More control of the undergraduate experience with goals for the outcome, provided by the GDC, has defined that the graduates' starting point should be as a competent / safe beginner – capable of independent practice progressing to expert which it is suggested is attained after 10 years of practice. [7] Preparing for Practice and The European Directive on Dental Education [8,9] provide a framework upon which undergraduate curricula are based, giving a universal basic surgical skill mix and experience for dental undergraduates acceptable to the UK schools. The GDC document (Table 1.3) mirrors the European as

drafted by the General Assembly of the Association for Dental Education in Europe (ADEE) in 2004 (Table 1.4), which gives guidelines for qualifying dentists in Europe. The major surgical competencies inherently demand UK compliance to show that our graduates' skills, at least, match those of the European dentist and must demonstrably do so.

The patient demand for skilful simple extraction of teeth varies across the country so undergraduate experience also varies. The Bachelor of Dental Surgery students are, apparently, 'safe beginners' on graduation.

The method of assessment of this skill varies throughout the UK; some schools examining clinical skills frequently whilst others relying on continuous clinical assessment there being no interschool consensus on the provision of systems to comply with the GDC guidelines for assessment.

Table 1.3:- GDC Guidelines 124 and 125, on interaction of regular assessment and feedback for students and requirement of monitoring and examining clinical skills .

124. Schools should make regular formative assessments of their students, feeding back the results and discussing them with each student. In-course assessment systems may be used to establish the progress of students toward achievement of attitudinal outcomes as well as testing knowledge and skills.

*125. Schools are required to have effective systems of monitoring student progress in all years so that students have been adequately assessed with regard to their clinical skills and acumen before proceeding to the 5th examination. In addition students should take practical examinations in the programme of those assessments and external examiners should be given an opportunity to attend and participate.
With reference to surgical skills it is vital that the assessment includes an evaluation of awareness of limitations, of situations in which to refer patients and the importance of clinical governance, including peer review and audit.*

Table 1.4:- Association of Dental Education in Europe – Descriptors for Competencies in Surgical Procedures from uncomplicated exodontia 6.28, trauma 6.2 uncomplicated dento-alveolar surgery 6.30 to treating operative associated complications 6.32. [9]

<i>Major competence: surgical procedures</i>	
<i>On graduation, a dentist must be competent to treat and manage conditions requiring simple reparative surgical procedures of the hard and soft tissues in patients of all ages, including the extraction of teeth, the removal of roots when necessary and the performance of minor soft tissue surgery, and to apply appropriate pharmaceutical agents to support treatment.</i>	
<i>Supporting competences: Specifically, he or she must:</i>	
6.28	<i>Be competent to perform uncomplicated extraction of erupted teeth.</i>
6.29	<i>Have knowledge of the management of trauma in deciduous and permanent dentitions and be familiar with the surgical and non-surgical aspects of the management of maxillofacial trauma.</i>
6.30	<i>Be competent to perform surgical extraction of an uncomplicated unerupted tooth and the uncomplicated removal of fractured or retained roots.</i>
6.31	<i>Be competent to perform uncomplicated pre prosthetic surgical procedures.</i>
6.32	<i>Be competent to manage and treat common intra-operative and postoperative surgical complications.</i>

Acquiring this skill over a period of time requires sufficient material to be available.

Chamber surmises that it is ‘widely accepted’ that repetition is necessary for the acquisition of dental skills. [10]

Target numbers are set before students can be entered for the degree diet of exams. It has to be argued that repetition alone is not all that is necessary because of case variance and quality must be assessed. To rely solely on a target number is naive and simplistic.

After 36 years teaching students in Dundee my impression is that our students find exodontia challenging. They have an initial reticence to be involved in these procedures. Is this cultural? The force required to perform an extraction is much greater than any they use in the other disciplines where la délicatesse is a prerequisite. This degree of force against another person is quite out with their experience. If this is cultural reversing it is a hard

task. However from reticence they reach a phase when, perversely, 80% of them *'like taking out teeth'*. When does the acquired enthusiasm for exodontia wax and wane and why?

A Canadian survey found of 315 respondents to rate, on a 5-point Likert scale (1 Not Important to 5 Extremely Important), the importance of each of the 46 competencies for the beginning dental practitioner the surgical management of soft and hard tissues was 39th. [11] Questioning the final year at DUDS shows they have already assessed its practice importance and acknowledge that this skill will not be a one for daily use and that they do not consider it a 'practice builder'.

There were basic questions to answer that relate to the Dundee student acquiring adequate information and skill for them to carry out an extraction, ultimately without guidance. Why did some students have difficulty in deciding which forceps to use? The design of the basic forceps used today has changed little. There have been but a few limited phases in the advancement of the design of dental instruments for exodontia and are still recognizable in old texts. Some though have been discarded as unsafe – e.g. Winter's elevator being able to exert too great a torque and leverage. The tooth key has transmogrified or reinvented as the 'Tooth bumper' TM / 'Physics Forceps'TM. [12]

Sir John Tomes 1815 - 95 designed dental forceps. Others had noted the differing anatomy of the teeth and designed different forceps to accommodate this. He refined these earlier instruments to give a mechanical advantage with safety so much so that they are those, which are in essence used today. Only the surface finish and chroming of some has been modified to comply with the introduction and demands of the changes in sterilisation techniques although modern single use forceps are not so finished.

Was it because it was never formally taught? In addition the choice for each case was made by a dental nurse as the instrument tray was set up by her, for the student operator, without any teaching involved and before the patient was in the surgery. The nurse only having recourse to a list of manufacturers named forceps for her choices and there was no reference to the difficulties of the presenting tooth extraction.

The stance of the operator was acknowledged as important even in the 16th C. Ambrose Pare in 1575 made recommendations for this. Patients, as now, sat with their head tilted back but it was supported between the operator's thighs. The dentist Pierre Fauchard's 1678 – 1761 works preceded John Hunter 1728-1793 by some 30 years. When dental skills were still acquired by apprenticeship, he published a textbook "Le Chirurgien Dentiste" in 1728, which formalised exodontia skills. In 1758 Hunter too recorded a method of extracting teeth and encouraged William Rae to lecture on the subject. [13] As the previous positioning was seen as unseemly, Hunter described a different position, which he thought offered the best advantage for the surgeon and patient to adopt when extracting teeth. Because focused light being at a premium this position was behind or to the side of the patient. [14] *Plus ça change* - much of this is in accord with what is taught today and shown in the new Oral Surgery manuals. When this discipline was in a rudimentary state, these professional instructions were seen then as fundamental to producing the best result with the minimum of equipment but our students seem to drag their heels when acquiring this knowledge. How can our student find the positioning of patients so difficult given the ease with which this can be accomplished and finessed today with the modern chair and lights?

With staff well imbued with this concept and teaching it, why did we still have the

occasional 4th year who stands incorrectly or applies the forceps so? When these elements were seen as so important by leading pioneers why it is difficult to stimulate interest in the students on the best use of the instruments with which they will have to work?

With students who at first appear interested when does their enthusiasm take its dip? Is it when the reality of what has to be done to accomplish an extraction is appreciated? Or do we miss the student who isn't interested from the start given the overriding curiosity of the majority?

Being that one of the aims of this study was the production of a UK wide agreed checklist that has been validated; UK wide teaching and assessment was investigated. Investigation of past and present teaching methods is difficult to carry out. Historical facilities have to be derived from the implication of photographic evidence. The access to curriculum content and teaching method is jealously guarded. Although the University of Michigan has good virtual learning environment (using Blackboard IncH, Washington, DC, USA.) their current and historical material on a standing extraction method, has no hint of the preparation of the student prior to their clinical experience. [15] Barts and the London School of Medicine and Dentistry, an institute of Queen Mary University of London present available teaching material includes a few moments on standing exodontia and nothing of their preclinical training or assessment. [16] This is reflected by other schools in the UK where there is no assessment of the student prior to their clinical exposure.

Table 1.5 :- Responses from eight of the UK dental schools who responded to a questionnaire on clinical skill testing. It details if the students were tested, when, which form it took and the point in the curriculum when it were carried out. Three schools did not test prior to clinical entry.

Assessment of Technical skill	Pre-clinical testing	Clinical testing
Dental school 1	NO	SCOT OSCE some years
Dental school 2	NO	SCOT after 10 extractions
Dental school 3	YES / OSCE	SCOT 4th BDS OSCE 5th BDS
Dental school 4	NO	SCOT 4th BDS single root SCOT 4th BDS multi rooted
Dental school 5	YES / OSCE	OSCE 4th BDS
Dental school 7	YES / OSCE	NO
Dental school 7	YES / OSCE	OSCE 4th BDS
Dental school 8	YES / OSCE	OSCE 3rd BDS OSCE 4th BDS

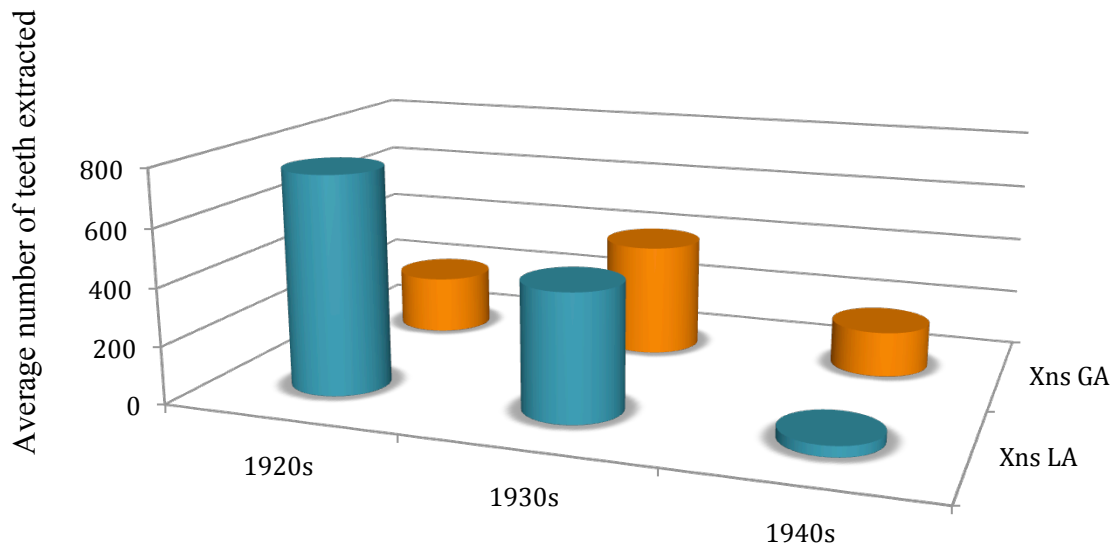
It would seem that today the skill of the oral surgeon in exodontia is not one that engages the postgraduate in general dental practice. More interesting and lucrative disciplines fascinate them as they move through their undergraduate career and into practice. The first London dental school opened in 1859 and the Dentists Act of 1921 established a protected title. This required formal registration of all dentists. This meant finally a formal curriculum, however meagre or flawed, was established. This gives 90 years of regulation with the later introduction of the British Dental Association (BDA) and the General Dental Council (GDC). Dundee Dental School as part of St Andrews University was opened in 1916 although a hospital had been there since 1914 until it devolved to the University of Dundee in 1967.

The Dental School teaching record was entered into a bound ledger. (Figure 1.1) The

student record in Dundee shows that from the 1920s to 50s, only the raw number of extractions under local anaesthesia (LA) and general anaesthesia (GA) was recorded.

It was not unusual for a student to extract more than 300 teeth in LA and GA over the course of their two-year undergraduate careers. One student extracted 280 teeth under LA in one month. Repetition was certainly attainable in these decades. There was an unchallenged acceptance that a high number of extractions was meritorious and desirable. Number conferred proficiency. By default multiple patient episodes alone would accomplish the instruction of the student in the art and science of exodontia and produce clinicians who were competent to complete the procedure and treat its accompanying problems.

Figure 1.0:- Average number of extractions carried out under local anaesthetic and general anaesthetic, by each student in their clinical years during the 1920s, 1930s & 1940s. Data collated from the hand-written record book shown in Figure 1.1.



It did not record the number of teeth removed with the number of patients seen for these procedures and took no account of the other procedures that are carried out in an exodontia clinic for example treatment of post-operative bleeds, dry sockets and assessment referrals. No assessment of the clinical ability exhibited by the student, for the procedure, was made. The number of teeth removed under LA and GA varied widely. The Licentiate in Dental Surgery (LDS) students recorded extracting more teeth than those students sitting the BDS examination. This may be a reflection of the increase in academic input for the BDS students.

From the minimal comments entered in these records no censure was applied if an individual's total numbers were low in comparison with his colleagues. 'His' is used rightly as a reflection of the sexism of the decades 20 and 30 since it is noticeable that few ladies were admitted before the end of the 1930s when a larger number of ladies were accepted during the war years.

Even in these glory (gory) days the number of extractions fell dramatically during the World War II years when those 'called up' service recruits had their oral fitness addressed elsewhere. Some students were recorded as having done no extractions and others very few in the 1940s. This may be the knock on effect of this change of demographic. Although the dentist had an opportunity to practice being more conservative there was the traditional management of a repeat restoration cycle of fill, fill, fill, extract.

[17]

Modern technology caught up with these printed bound daybooks and a new column was hand ruled in, to accommodate radiographs taken by the student. These books were not

kept after these decades and new departmental 'day books' were used.

In these day books was recorded which student had taken a tooth out but there was no summation of the number each had done. Only latterly in the 70s was a personal record of each student's work recorded, by the student with only a signature of confirmation from a staff member.

The skill was taught by demonstration and observation and there had been little significant change in the act and art of exodontia. In the 1950s the Dundee student was taught, hands-on, in real time from the first clinic attendance, there were no initial opportunities to practice on any model with varying degree of verisimilitude. [18] The best my alma mater (Cardiff) delivered was to suggest the students attempt an extraction on a pig's head; an exercise doomed to failure to deliver an intact tooth; indeed we were told we would break it - hardly encouraging! These methods in one guise or another continued up until very recently.

It must be recognised that tooth extraction numbers have fallen over the last 14 years and continue to do so. In Glasgow two audits, taken fifteen years apart, show that there are fewer extractions. [19] In 2001 across Scotland there was a fall of 30% per dentist when compared with 1982. The prime reason for the extractions was caries but a substantial number, for patients below the age of twenty-one, the premolar extractions were for orthodontic reasons. Dental Schools in Glasgow, Newcastle and Leeds have now advertised for patients. Glasgow advertised (Figure 1.2) with quarto page colour for patients such is the reduction in their caseload. [20]