

Dental Education in Singapore – From the Past to the Future

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Abstract

Dental education in Singapore has come a long way since the founding of the Dental School in 1929. With an initial intake of 7 students, the Faculty has over the years produced more than 1700 graduates. Its early years were fraught with physical constraints and recruitment problems. With a dedicated core of leaders and good planning, the dental school has overcome many of these shortcomings. The King Edward VII College of Medicine played a significant role in the early years of the school's development. Many a student of the past era has pleasant memories that bind and bond them to the SGH Sepoy Lines campus. Acquiring full Dental Faculty status in 1966, the progress of dental education took on a new urgency and stature. The basic medical science subjects were taught to the dental students by our medical colleagues at Sepoy Lines and now continue to be tutored at the Kent Ridge campus. With the shift of the Faculty in 1986 to Kent Ridge (NUS-NUH), together with the implementation of the changed curriculum in 1990 and 1997, the Faculty of Dentistry remains at the forefront of pedagogy and technology to train the future generation of dentists for Singapore.

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Introduction

The training of dental students has come a long way from its humble beginnings as a modest, 5-room “Temporary Dental Department” within the King Edward (KE) VII College of Medicine to its present standing as a premier dental school in the region with state-of-the-art training facilities. It shares an early common heritage and roots with the Faculty of Medicine, where many medical staff had taught common related courses to the dental students. This is so even to the present day.

Although the dental school first offered its course to applicants in June 1926, there were no takers. It was only in 1927 that the first dental student, FJ da Silva, enrolled for the 4-year course for the LDS Diploma (Singapore).^{1,2} The school was finally organised in 1929 with the appointment and arrival of Professor EK Tratman from Bristol as its Head. The first dental graduate successfully completed his LDS course in 1933. With the increasing popularity of dentistry as a profession, the student intake has increased from the initial 7 enrolled in the school's first 3 years to its current steady flow of 34 per year. To date, the school has produced almost 1700 dental graduates with the LDS or BDS (Singapore) degree. The training of dentistry has

undergone tremendous changes over the last decades from the simple training of undergraduates to the more advanced training in the various specialty branches of dentistry today. Besides formal clinical training, the Dental Faculty also has many graduate research students.

The Dental School – The Changing Physical Landscape

To cope with the training needs of the increasing student population and the new demands in the provision of public dental health services, the dental school and clinic has undergone numerous renovations over the past decades. It is easy to forget the modest beginnings of the dental school when it was first established in 1929. It was the first such teaching institution in Dental Surgery that existed in the British Colonies in the East.

“Five small rooms in Block C (currently called Norris Block) of the General Hospital were allocated for conversion into a temporary Dental Department for the clinical training of the dental students... The unit comprised a mechanical laboratory with room for a class of 5 students, a surgery to accommodate 3 operators, an extraction room with an adjacent small recovery and an office.”

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Demand for treatment at the Dental Outpatient Unit, established to service the dental needs of the public, together with the development of the dental school, prompted the need for expansion of the physical facilities in the late 1930s. It was not until 1955 that the school underwent another major facelift to upgrade its facilities (Fig. 1). New equipment, a main operating theatre, examination and extraction rooms and the X-ray department were added (Fig. 2). A new floor extension was subsequently added to the building in 1970, with new facilities like a lecture theatre, a seminar room, and 6 staff rooms and a refurbished operative technique laboratory. The School of Postgraduate Dental Studies was also started to provide advanced dental education.

The next most significant milestone was perhaps the relocation of the dental school in 1986 to its present home at the Kent Ridge Campus of the National University of Singapore. Before the move, the Faculty had undergone extensive refurbishment, with the addition of new floorings and air conditioning, as well as the replacement of the old



Fig. 1. The “Old Dental School and Clinic” at Sepoy Lines (SGH) with the cars of the times parked opposite the building (circa 1955). A new 3rd floor was subsequently added to the left side of the building in 1970.



Fig. 3. Dental students using the Maruchi-Eight motorised dental chairs of the 1980s.

dental chairs by 57 Yoshida Maruchi-Eight units (Fig. 3).

Dental students who received their training in the Dental School located at the Sepoy Lines campus at the Singapore General Hospital will fondly remember the modest facilities that had served their needs of dental education and service for almost 60 years. It will be but a sweet, lingering memory for the many who have passed through its portals. With the new facilities at Kent Ridge (106 of the latest dental chairs), the dental faculty forges ahead into the new millennium with its state-of-the-art training facilities and infrastructure (Fig. 4).

The Organisation of the Dental School over the Years

The growth of the dental school can also be seen from the healthy increase in the number of staff over the years. Despite the lucrative draw of private practice, many have chosen to dedicate their time and effort to the training of our



Fig. 2. The famous Sterling/SS White mechanical dental chairs used by students and staff from the 1950s to the 1980s.



Fig. 4. Faculty of Dentistry at National University Hospital with 4th level extension, 2001.

future generations of dentists, either as full-time academic staff or as part-time tutors. However, things were not always that optimistic. In the early years of the dental school, there was only one Professor of Dental Surgery, Professor EK Tratman, who was also the Head of the Dental School from 1929 to 1950. His successor, Professor RJS Tickle, had to overcome not only physical limitations in the existing dental school training facilities but also the challenge of finding suitable teaching staff.

In 1951, Visiting Professor WH Terrell was invited to chair Prosthetic Dentistry. Professor CH Graham later succeeded him. With the new extension in 1955, the dental school was reorganised into 3 main clinical units – Conservative Dentistry, Oral Surgery and Prosthetic Dentistry.

Professor Tickle actively recruited faculty members from Europe, America and Australia, and staff numbers grew from strength to strength. It was only in the 1960s that the first 2 local graduates were appointed to be Chairs – Professor JA Jansen (Prosthetic Dentistry) and Professor FAC Oehlers (Oral Surgery). The mantle as Head of the Dental Department then passed to Professor Jansen (1962 to 1964) and Dr Lee Ek Chong (1965 to 1966). The Heads of Department then were very grateful to the staff from the Faculty of Medicine who contributed significantly to the training of dental students in medically related subjects.

The Faculty of Dentistry was formally established on 16 September 1966, after 7 years of deliberation by the Senate for the conversion of the dental department to full Faculty status (Fig. 5). The first Dean was Professor Edmund Tay Mai Hiong. The dental teaching units were then reorganised into 4 separate departments with their own departmental heads: Department of Conservative Dentistry (Professor RJS Tickle); Department of Oral Surgery and Oral Medicine (Dr FMS Lee); Department of Preventive Dentistry (Dr

Goh Soo Wan); and Department of Prosthetic Dentistry (Professor JA Jansen).

The Faculty underwent another restructuring in 1970, which saw the abolishment of the Department of Preventive Dentistry. During this time, the School of Postgraduate Dental Studies was established, offering higher qualification in MDS under its first Director, Associate Professor RV Lam.³ Dr FMS Lee was appointed Head of Oral Surgery and Mrs Chan Yew Ai as Head of the Department of Operative Dentistry.

With the retirement of Professor Tay in 1986, Associate Professor Loh Hong Sai became Dean. In 1990, the faculty was restructured into the Departments of Oral and Maxillofacial Surgery, Preventive Dentistry and Restorative Dentistry. There was continued recognition by the General Dental Council (UK) of our BDS degree. In 1995, Professor Chew Chong Lin took over the mantle of leading the Faculty as its third Dean. Many new initiatives were implemented and the first International Advisory Panel (IAP) visited the faculty to assess its standards in 1998.

In 2001, Associate Professor Keson Tan Beng Choon was appointed as its fourth Dean. A second IAP visit followed, with further recommendations and the revamp of the faculty research roadmap. New initiatives included the use of Information Technology (IT) and Educational Technology (ET) in education and the implementation of a Clinical Information System for dental records and charting in 2003. The current Heads of the Dental Departments are Associate Professor Yeo Jin Fei (Oral and Maxillofacial Surgery), Associate Professor Grace Ong Hui Lian (Preventive Dentistry) and Associate Professor Jennifer Neo Chiew Lian (Restorative Dentistry).

Ever since the Faculty first awarded the MDS degree, the latter has been benchmarked against those of the Royal College of Surgeons in the United Kingdom and leading North American Dental Schools. Both external examiners as well as local internal examiners assess the MDS Examination. The postgraduate school enjoys a close working relationship with the Royal College of Surgeons of Edinburgh (RCS Ed) and in 2001, a Memorandum of Understanding (MOU) was signed between the 2 institutions. Since 2000, the first conjoint examination of the MDS with the membership of the RCS Ed was successfully conducted in Orthodontics. Since then, examinations have been conducted in the disciplines of Prosthodontics, Endodontics and Periodontics.

In the early years, the MDS degree was only offered in the disciplines of Operative Dentistry, Oral Surgery and Prosthetic Dentistry. Currently, the postgraduate dental school, now renamed the Division of Graduate Dental Studies, offers specialty residency training for MDS in 5 disciplines – Endodontics, Oral & Maxillofacial Surgery,



Fig. 5. Inauguration of the Department of Dentistry to full Faculty status in 1966, at the College of Medicine Building by Minister of Education Mr Ong Pang Boon.

Orthodontics, Periodontology and Prosthodontics. The Division also offers a basic medical sciences course to prepare candidates for the Part I MDS examination. Almost 100 students have since graduated with the MDS degree. In

Table 1. Changes in the Organisation of the Dental School Over the Years

1929	Dental School King Edward VII College of Medicine
1938	The Dental School & Clinic King Edward VII College of Medicine
1949	Department of Dentistry, Faculty of Medicine University of Malaya
1962	Department of Dentistry, Faculty of Medicine University of Singapore
1966	Faculty of Dentistry University of Singapore
1980 till present	Faculty of Dentistry National University of Singapore

recent years, the Division has also been conducting Continuing Dental Education (CDE) programmes for dental graduates to update their knowledge and skills.

The organisation of the Dental School has undergone several changes alongside developments within the University and the Faculty of Medicine over the years (Table 1).

The Changing Curriculum and Teaching – A Look Back over the Years

When the dental school was first started, the curriculum was designed to train the students to be proficient in managing the basic treatment of conditions that were prevalent then, namely caries, edentulism and periodontal disease. This was further complemented by the teaching of the disease processes, epidemiology and the use of dental materials.

From the early 1950s to the 1970s, the basic medical science subjects for dental students were taught by our medical colleagues at the College of Medicine Building.



Fig. 6. Teaching of Anatomy to 2nd-year dental students at the Tan Teck Guan Anatomy Building in the 1950s and 1960s.



Fig. 7. The famous “Dental Inter-Year Games”; tug of war event at the KE VII field opposite Ah Leng’s Canteen (1970s).



Fig. 8. General Medicine taught by Faculty of Medicine staff (Dr Andrew Chew) to 3rd-year students (1960s).



Fig. 9. General Dental Laboratory, 2nd floor (Sepoy Lines, SGH, 1976); students working on prosthetic lab work.

One can remember the need to dissect human cadaveric body parts at the Tan Teck Guan Anatomy Building (Fig. 6) and the running of physiology and pharmacology experiments on frogs' legs with Ringer's solution at the physiology laboratory and the pharmacology building located next to Ah Leng's canteen. It overlooked the famous KE VII field where many a medical and dental student had fond memories of the inter-year medical and dental games (Fig. 7). Biochemistry was taught in the main College of Medicine Building. Famous teachers in basic sciences include Professors Kanagaratnam, Elliot, WC Wong, TS Yeoh and HA Wong. The teaching of Medicine to Year 3, BDS students required them to travel to Tan Tock Seng Hospital to study under Professor Lee Yong Kiat, and to Medical Unit 2 (SGH) under Dr A Chew (Fig. 8) and Professor JS Cheah. Surgery was taught at the SGH Surgical A unit and Paediatric Medicine by Professor Wong Hock Boon at the Mistri West Wing. Professors EPC Tock and YS Lee taught general pathology to third year students. Those were the good old days, where many a medical and dental undergraduate developed close links and camaraderie at the Sepoy Lines campus.

In 1969, the 5-year dental course was reduced to 4 years and we had our first batch of so-called "super freshies" who entered the BDS course in the second year, skipping the pre-dental first year. The dental curriculum at that time was hectic and was procedure and number based. Students had to complete scheduled requirements which numbered 15 gold inlays, 16 sets of full and partial dentures and at least 20 Class II amalgam restorations coupled with 80 dental extractions. The dental faculty laboratory was the scene of many activities such as students casting gold inlays, packing dentures and bending orthodontic clasps (Fig. 9). These were done at the famous laboratory (with the cork flooring) equipped with the few dental laboratory motors running on pulley systems. Many a female dental student can surely remember accidents involving their hair being caught in the pulley cords of these Lab motors. Our students then were technically well trained, given the amount of laboratory work that each of them had to handle.

The curriculum of the 1970s and 1980s was based on the General Dental Council (GDC) recommendations, where the 3rd and 4th year exams were considered part of the Final Professional Part 1 and Part II examinations. General Medicine, Surgery, Paediatrics and Oral Pathology were examined under Part I and the pure dental subjects of Conservative Dentistry, Prosthetics, Oral Surgery, Oral Medicine, DPH and Preventive Dentistry including Paediatric Dentistry were in Part II. The courses were run on a lecture-tutorial-based system, with many of the courses taught using a direct hands-on practical demonstrations model. This took much time and effort on the part of the lecturers.

Recent Changes to the Dental Curriculum

"Over the years, the undergraduate dental curriculum has undergone many changes but its primary focus remains the same – to mould each student into an informed dental practitioner who, amongst other desirable attributes, should also possess adequate ability to know what should be done for his patients, how it should be done and why it should be done."

In 1990, with the reorganisation of the departments to the current Departments of Oral and Maxillofacial Surgery, Preventive Dentistry and Restorative Dentistry, the Faculty embarked on a better integration of the dental subjects. This resulted in the streamlining of the many subjects within the departments, to better link related disciplines and make the clinics more multidisciplinary in nature. Common subjects were also integrated into the Faculty-based Occlusion and Cariology courses.

The years 1996 and 1997 saw a major revamp of the curriculum and took place with the completion of the report

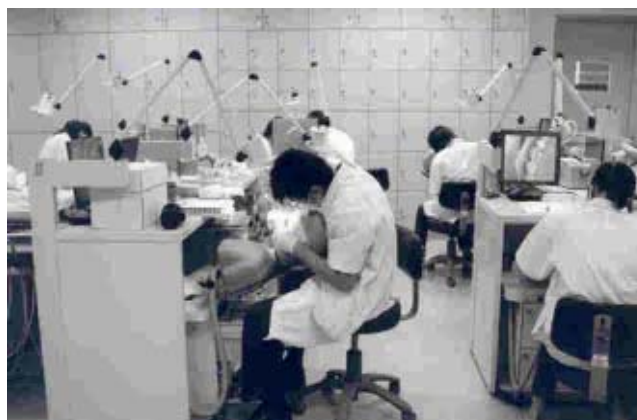


Fig. 10. Simulation pre-clinical laboratory using the latest equipment for the training of dental students at Kent Ridge (2002).



Fig. 11. Dentistry Clinic 2, with students and their notebook computers used to keep the clinical dental records of patients (2004).

by the Faculty's Curriculum Review Committee.⁴

The following initiatives have been implemented over the years.

1) Competency-based Curriculum

The didactic and clinical competencies teach basic knowledge and skills essential for general dental practice. This approach aims to reduce the excessive knowledge and skills taught in the "bloated" traditional curriculum. There is also greater integration between and within the disciplines.

2) Problem-based Learning (PBL)

This method of learning aims to develop critical thinking, problem-solving skills and independent learning among the students. Clinical case scenarios are used to make learning more relevant for the students and allow them to apply their basic scientific knowledge.

3) Student Exchange Programme (SEP)

To further broaden the students' exposure to different learning environments, student exchange programmes were initiated by the Faculty. They spent 2 to 3 weeks at overseas dental schools to learn and interact with their peers.

4) Undergraduate Research Opportunity Programme (UROP)

All undergraduates undertake a research project, working in groups to learn about research methodology. These projects are then showcased at the Faculty's research day and at local and regional meetings.

5) The Use of IT and ET to Enhance Teaching and Learning

The use of IT and ET is pervasive in a modern school setting. The Faculty uses the preclinical simulation system (Fig. 10), DentSim, to enhance the teaching of operative dental procedures. The advantage of these simulations is the instant computerised feedback given to students on their technical abilities and performance. Web-based teaching modules are also included.

6) Clinical Information System (CIS)

In 2003, the Faculty implemented the Dental Exact CIS for the recording of patient information and charting.

This has enabled faster and easier retrieval of records and checking (Fig. 11).

7) General Practice Management (GPM)

The GPM and the Human Resource Management modules help prepare the undergraduate student for the demands of clinical practice on graduation.

Future Directions

The present curriculum at NUS is a hybrid one, consisting of problem-based learning, competency-based management of clinical cases, small group teaching complemented with lectures, tutorials, seminars, and research projects. Evidence-based literature reviews are advocated to ensure that what is taught encourages the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients. Students are also exposed to private practice management styles in their outpatient postings.

Over the years, teaching in the Faculty has become less teacher-centred, and more oriented towards self-directed learning. With today's information explosion, it is not surprising that our future students will need to place a greater emphasis on learning, and developing their skills. They also need to have nimble fingers, superb hand-eye coordination to use sophisticated instruments, understand the use of molecular and genetic science, understand the use of IT and ET as enabling and marketing tools, develop entrepreneurial and management skills, and last but not least have a big heart, a listening ear and an eye for beauty. We need to find these students for the future as the Faculty takes on the challenge of producing the new generation of dentists for Singapore.

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