

# University of Alberta Dental Students' Outreach Clinical Experience: An Evaluation of the Program

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## A b s t r a c t

*In a 25-year-old satellite dental program, advanced dentistry and dental hygiene students provide highly supervised dental treatment for patients in government-funded clinics in 3 under-serviced communities in northern Alberta. Analysis of the performance data of the 2003 University of Alberta dentistry students in their fourth and final year was used to evaluate this program. The data showed that the undergraduate students did numerous diverse general dental procedures during the 2-week rotation, most of which were basic treatments. Students could participate in the program up to 3 times. In subsequent rotations, students tended to do fewer preventive measures, and more restorative treatment and dental extractions. Available grading data for all students indicated that treatment objectives were fulfilled in the vast majority of cases. Such community-based field experience may significantly add to the competence of students entering private practice.*

**MeSH Key Words:** *clinical clerkship; community dentistry/education; curriculum*

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In 1978, in collaboration with the faculty of dentistry, the Alberta government agreed to fund a dental outreach program that would fulfill its objective to assist with monitoring, restoring and sustaining the dental health of Albertans. To broaden the spectrum of dental education, the faculty of dentistry agreed to provide dental instructors or supervisors and students for clinics in selected under-serviced areas in northern Alberta. These treatment centres were established as satellite sites to the faculty's clinical outreach program and provided with modern equipment. Currently, the collaboration continues: the government provides capital and operational funding; the university provides management, professional services and quality assurance; and the department of dentistry manages the satellite portion of the dental outreach service to 3 rural communities. The acceptance of these satellite clinics by the government, the department and the communities involved has resulted in one modern clinic being housed in a community hospital (McLennan) and a second, similar clinic in a hospital currently under construction (High

Level). The third clinic is located in a spacious double-wide trailer in a community without a hospital (La Crete). Although the satellite dental clinics program has now operated for 25 years, it is not well known within the national dental community: only one paper<sup>1</sup> about the program has been published.

Dental and dental hygiene students serve a minimum 2-week rotation at the satellite clinics during their final year of training. Students at McLennan serve their entire rotation there, whereas students and staff at High Level travel each week to La Crete, serving half their time at each site. Supervision and instruction are provided either by assigned instructors from within the department's clinic program or by experienced practitioners from various parts of Alberta. Suitable instructors are also accepted from other provinces, and interim licensure is available through the Alberta Dental Association and College. Travel, housing and salaries are paid through an annual grant from the government of Alberta, managed by the university. Instructors do not treat patients privately, but intervene and provide treatment if it



**Figure 1:** A typical visit to the dentist in La Crete, where families are inseparable.



**Figure 2:** Traditional values: visits to the dentist are often a family affair.

exceeds the students' skills. Funds from fees generated remain part of the clinic's revenue.

A detailed grading system is used for quality assurance. Students may return for second or third rotations, provided that there are appropriate openings. Each student is assigned 1 classical dental unit, and shares 1 of 2 certified staff dental assistants and 1 receptionist. An extra dental unit is available for overflow patients or diagnostics. Basic laboratory facilities are provided to allow the students to carry out many on-site technical procedures. Advanced technical procedures are completed in commercial laboratories in larger centres. Two of the 3 communities now have resident dentists, but the demand for dental care is significantly greater than their capacity to provide these services. The distance from the satellite clinics to a full range of oral health specialties varies from about 450 to 750 km.

The receptionists in each clinic manage patient appointments and accounting. In the in-hospital facility, students may provide oral health services to inpatients and to patients in attached geriatric wings. Occasionally some bedside service must be provided. Trauma management, close association and consultation with attending physicians provide invaluable experiences.

The following are the specific objectives of the program:

- to have dental and dental hygiene students provide basic oral health care for patients in under-serviced areas;
- to have students become more confident about their own abilities as clinicians by giving them greater responsibility for their professional actions;
- to have students recognize the health needs of patients in under-serviced communities and understand the cultural differences between urban and rural areas (**Figs. 1 and 2**);
- to facilitate students' professional and interpersonal relationships between dental practitioners, allied health professionals, peers and patients.

- to introduce dental and dental hygiene graduates to rural communities and encourage them to give serious consideration to establishing practices in such needy areas.

The objective of this paper is to report the results of an analysis of data for students' performance in 2002–2003, extracted from the comprehensive database of students' grades and delivered procedures maintained by the department of dentistry.

## Evaluation

The analysis of the program focused on data for the entire 2003 class of the University of Alberta dentistry graduates who had been on rotation in their final year of training. Data for advanced placement students (foreign-trained dentists enrolled in a 2-year program) were excluded from the analysis. The grading system requires the supervising dentist to grade the students on every patient case using a clinical evaluation form that had been developed and used for this purpose since 1996. The term "patient case" refers to all dental procedures carried out for a patient during one appointment. All types of treatment were graded. Treatment included all common dental procedures. The procedure codes found in the Canadian Dental Association Uniform System of Coding and List of Services<sup>2</sup> were listed on a common grading form. Students were evaluated in 4 categories: 1) knowledge of the preparatory phase, 2) delivery of procedures (standard of care), 3) patient management and 4) maintenance of infection control standards. The grading system was bimodal. First the acceptability or unacceptability of the procedure was determined and then further refined to determine the degree of acceptability. For the first 3 categories, students were scored on a scale of 1 to 4 (4 = excellent; 3 = clinically acceptable; 2 = unacceptable, inadequate, needs to be improved; and 1 = unacceptable, totally inadequate). Results for category 4 (maintenance of infection control standards) were rated as either acceptable or

**Table 1 Comparison of the numbers of graded procedures during first and second rotations for students with at least 2 rotations**

Procedure group	No. of procedures (mean)		Significance <sup>a</sup>
	First rotation	Second rotation	
Clinical exams	12.0	15.2	$p = 0.11^b$
Radiographs	12.9	14.3	$p = 0.39^b$
Preventive	26.9	13.5	$p < 0.01$
Restorations, amalgam	10.1	14.8	$p < 0.05$
Restorations, tooth-coloured	11.9	18.9	$p < 0.01$
Removals	7.0	9.7	$p < 0.05$

<sup>a</sup>Paired Student's t-test, 2-tailed.

<sup>b</sup>Not significant.

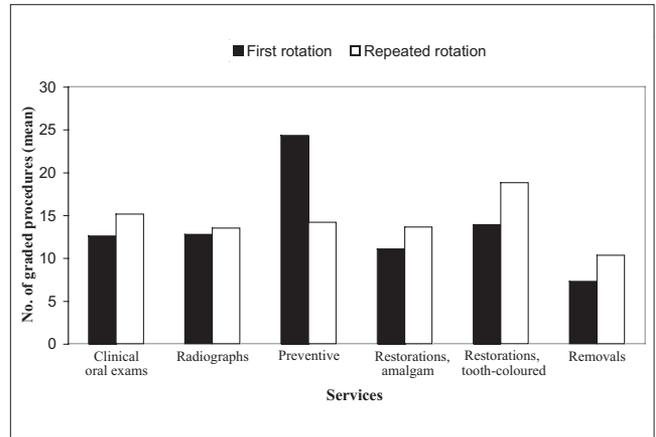
not acceptable. Related detailed grading criteria were provided in a clinical manual.

Two separate analyses were conducted, one for the first rotation of all 30 students and one for additional rotations offered to students. The data from the second (24 students) and third rotations (6 students) were pooled. The total number of included patient cases was 1,093 (first rotation) and 1,297 (second and third rotations). These cases were reviewed for the type of procedures graded and the grades themselves.

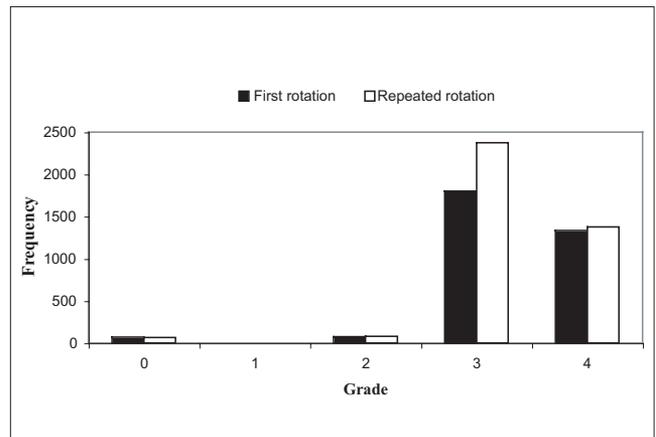
The average number of patient cases graded per dental student for each 2-week rotation (10 working days) was 36.4 (first rotation), and 43.2 (second and third rotations). The analyzed services focused on clinical oral examinations, radiographs, preventive measures, basic restorative treatment and tooth extractions. For evaluation, procedures were summarized according to procedure code groups<sup>2</sup> (Fig. 3). Some clinical treatments, such as single crowns, caries, trauma, pain control, endodontics, periodontics and prosthetic treatment, were infrequently done. No orthodontic treatment was provided. A notable portion of the treatments, 20% of the amalgam fillings and 10% of the tooth-coloured fillings, was done on primary teeth. These data were indicative of the relatively high percentage of pediatric patients treated.

For appropriate statistical analysis, first and second rotation data for students with at least 2 rotations were compared. This analysis yielded significant differences (Table 1).

The distribution of services may be suggestive of the character of rural dental demands and, to some extent, may be affected by the limitations to the dental services that students can deliver. During their second and third rota-



**Figure 3:** Selected services according to procedure code groups of the Canadian Dental Association Uniform System of Coding and List of Services.<sup>2</sup> Average number of graded procedures within the procedure group per student and rotation. Code groups: Clinical oral examinations, code 01000; Radiographs, code 02000; Preventive measures, code 10000; Restorations, amalgam, code 21000; Restorations, tooth-coloured or plastic with silver fillings, code 23000; Removals (extractions), erupted teeth and surgical, codes 71000 and 72000.



**Figure 4:** Distribution of grades for the first (n = 3,279) and repeated (n = 3,891) rotations. Range of acceptability = 3–4. Range of unacceptability = 1–2. No grade available = 0.

tions, students tended to do fewer preventive measures, and more restorative treatment and tooth extractions. This finding reflects the higher skill and competency level of the more advanced students during this period. The longer clinic hours, greater private practice-like commitment to completing treatment and more professionally managed appointments clearly reflected increased contact between students and patients compared to an equal clinical time period at the department of dentistry.

To evaluate the students' grades, data from the first 3 grading categories, knowledge of the preparatory phase, delivery of procedures (standard of care) and patient management, were pooled. The grading results revealed that the vast majority (98%) of all cases were scored in the

range of acceptability (Fig. 4). The average score was 3.3 in the first and 3.4 in the repeated rotations. In most cases, the students were clearly able to fulfill the treatment objectives. The similarity of the grading results in both first and repeated rotations was anticipated because the grading system refers to the level of experience that can be expected at each stage of clinical expertise.

Each student was required to write a report about his or her learning experience after the rotation. A review of the reports indicated overwhelming student support for the program, particularly because of its community-based private practice-like environment.

### Discussion

The evaluation showed that the students readily adjusted to an unfamiliar environment. Their motivation seemed high and that, along with a supportive professional environment, seemed to enable them to manage the challenging assignments to which they were exposed. The students managed a high number of diverse general dental procedures that focused on basic treatment. This experience may materially add to the competence of graduates entering private practice.

Community-based field experiences have been recognized as a meaningful element of the dental curriculum.<sup>3</sup> Students seem to develop increased self-awareness, empathy, communication skills and self-confidence in such programs.<sup>4</sup> Professional educators are increasingly interested in the evaluation of these programs.<sup>5,6</sup> Several schools have explored opportunities for integrating community-based experiences into their curricula.<sup>7</sup> However, establishing community-based programs for dental students may create numerous difficulties that could vary from site to site. These problems may include adequate infrastructure and funding, appropriate supervision and students who can provide the dental services that are in demand.<sup>8</sup>

The outreach program of the University of Alberta has dealt with such issues. Competent management and the judicious choice of instructors resolved seemingly insurmountable problems. The mandate of providing service to the community and educational experience to the students was fulfilled, although not all treatment requests were managed. Within the new hospital settings, contemporary information and communication technologies (e.g., Telehealth) offer consultation and guidance opportunities that should further enhance the experience of the student and the service to the public.

Over the past 2 years, an international student exchange component has been added to the outreach dental program of the University of Alberta. To date, 24 dental students from Dresden, Germany, have participated for up to 4 weeks each at the clinics. Their positive experience assures the continuation of this international module.

After 25 years of service, the outreach dental program may serve as a template for other such Canadian programs. It is a highly valued component of the University of Alberta dental curriculum. ♦



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