

# Teaching Innovations at McGill Prepare Students for Real-World Clinical Setting

In the preclinical labs of McGill's faculty of dentistry, the tried-and-true is fused with the innovative, as dental manikins share space with work stations augmented by plasma screens and keypads. The high-tech equipment serves an important purpose, helping students acquire skills during the condensed preclinical session. This portion of the DMD program lasts for just under 6 months in the final half of the second year, before students enter their final 2 years of clinical training. The plasma screens, an initiative of prosthodontics instructor Dr. Samer Abi-Nader, allow professors to demonstrate procedures for all students to observe — not just a few sitting near the front of the lab. These procedures can then be displayed continuously as the students practise the techniques. The keypads make it easy for a professor to ask multiple-choice questions and receive real-time responses, providing an immediate snapshot of the students' comprehension of the material. Thus, professors know when they are free to move ahead and when they must linger over more confusing parts of the curriculum.

"As professors, we must always aim to be efficient because we have a very short preclinical session in which to train our students on the skills they need," explains Dr. Marie Dagenais, associate dean (academic). The time squeeze is partly a result of dentistry students spending the first 18 months of the DMD program studying alongside their peers in the faculty of medicine in McGill's "Basis of Medicine and Dentistry" biomedical science program. "We want our students to have a very good medical background so they can understand complex health problems and interact well with their colleagues,"

says Dr. Dagenais. "Interdisciplinary training is important because, to provide good patient care, people across the health care system have to collaborate. The dentist has a role in the global health of the patient and needs to develop rich professional relationships with medical colleagues, physical therapists, nurses and other professionals," she says.

## Realistic Clinical Environment

Given the quick pace of the preclinical program, the move into clinical work can pose some challenges. To ease this transition, the faculty is also transforming the nature of its preclinical labs. "We want the laboratory environment to be as authentic as possible because the more realistic the lab is, the easier the transition to the clinic will be," says Dr. Dagenais. Consequently, the faculty is developing a simulation clinic that shares important characteristics with the real-world setting. "Right now, when students perform a procedure in the lab, it's just an exercise," she explains. "But if the preclinical lab is treated more like a true clinic, with students dressed in proper clinical attire, using correct charting techniques and treating their manikins like 'virtual patients,' it will help with the move into the actual clinic," she says. "By having the students begin charting in their second year, they will also have one less new skill to absorb when they enter the real clinic," adds Dr. Dagenais.

Another challenge for dental students is that they must learn about several different techniques simultaneously. For instance, they start preparing teeth for crowns early in the preclinical program, while also beginning work in orthodontics and removable prostheses.

Normally, a flesh-and-blood patient presents a logical sequence for treatment, beginning with prevention, moving to cleaning and basic restoration, and then more complicated restoration, and finally, perhaps removable prostheses. "This logical progression is difficult for students to grasp when they learn the various procedures at the same time," says Dr. Dagenais. "However if they treat

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*Dr. Marie Dagenais, associate dean of academic affairs*

the manikins like real patients, it helps create a learning context that is closer to reality.” In terms of manual skills, Dr. Dagenais believes students can usually reproduce what professors ask them to. The real challenge is being able to translate the ‘how-to’ of a procedure into an understanding of the ‘why.’

To fit all of the course material into the tight preclinical session, certain laboratory techniques must receive less emphasis. “Our philosophy is that we don’t want our students spending valuable time learning lab procedures that they will likely not perform as dentists,” Dr. Dagenais explains. For instance, McGill students no longer learn how to acrylize dentures or cast restorations, as most of these procedures are now performed by dental technicians. Since dentists will be interacting with technicians, students are given an overview of the processes and spend time evaluating the finished products.

### Critical Decision-Making Skills

Once students move into the clinical training phase, a new set of pedagogical priorities arise. “We want our graduates to be very good at providing diagnoses and planning treatments, so when they start treating patients, we emphasize the skills involved in clinical decision-making and evidence-based dentistry,” notes Dr. Dagenais. Students participate in seminars to discuss the treatment of patients and investigate the best available evidence for determining an effective treatment plan. Nurturing these skills also means that graduates will be better equipped to assess the myriad of

new technologies and materials that are being introduced to the profession. “Dentists are always being approached by companies that want them to buy new products and they have to be able to use credible evidence to determine if one product is truly better than others,” believes Dr. Dagenais. “We are teaching them to draw on the professional literature when making their choices.”

Recently, Dr. Jean-Marc Retrouvey, director of the faculty’s orthodontics program, developed a CD-ROM that facilitates the diagnosis of patients for orthodontics. Dr. Retrouvey’s program helps students refine their diagnostic skills and has been integrated early in the clinical program. “Performing a treatment is a bit like following a recipe. If you are good, you can do it without much trouble. But you cannot perform a good treatment if the diagnosis is not right,” explains Dr. Dagenais.

Dr. Retrouvey’s CD-ROM is another example of the faculty taking advantage of new technologies to develop educational tools. “Of course, we are constantly evaluating these tools to determine their educational value,” she says. “We’re not interested in using technology for teaching just because we can. We are trying to find ways to make instruction more authentic as well as more efficient.” Along these lines, computer-based examinations demonstrate the integration of advanced technology into the curriculum. “When I was a student, our exams were often multiple-choice,” recalls Dr. Dagenais. “But when I examine my students in radiology, I can now display images



Third-year dental student taking an Objective Structured Clinical Examination — a performance-based testing method designed to measure clinical competence.



McGill’s histology laboratory.



Students with Dr. James Lund at a white coat ceremony. The ceremony marks the students' transition from the preclinical classroom into patient clinics.

on the screen and ask them to comment. I have more flexibility in designing different question formats.”

### Well-Rounded Graduates

In addition to training students in the skills fundamental to the profession, McGill's undergraduate DMD program also stresses community outreach. “We want our graduates to be able to care for various populations that are underserved by the profession, so we have included the Community Clinics course in our program for several years,” says Dr. Dagenais. The faculty is currently considering ways of expanding this element, perhaps by offering an elective program in which students could spend more time pursuing particular areas of interest. Undergraduates are also exposed to dentistry research, through coursework and optional summer research positions. “Despite the

time crunch in the undergraduate program, almost one-third of our students become engaged in some form of research at one time or another,” she says. The desire to learn is clearly addictive, as most McGill students continue to residency and many move into specialty programs after graduation. “We hope that by exposing our students to research we will interest more of them in pursuing academic careers,” adds Dr. Dagenais. “Otherwise we're going to be facing a critical shortage of faculty members for dental schools.”

Compared to other dental schools, the McGill program is relatively small, with graduating classes ranging between 30 and 35 students. But this small size has been advantageous for students and teachers alike. Professors quickly get to know the students, who in turn benefit from individual attention. With this level of intimacy, professors can identify the relative strengths and weaknesses of their pupils and are quick to help if a student is experiencing difficulties. In addition, small class sizes allow for adaptability and agility. “We are always changing the curriculum in response to needs in the profession, it's never exactly the same from one year to the next,” notes Dr. Dagenais. The small class sizes, the early links with the medicine program, the use of new technologies, the clinical emphasis on decision-making and evidence-based dentistry and the strong research and outreach opportunities all make the McGill undergraduate program a modern and unique learning experience for its students ♦

### THE AUTHOR

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