

# DENTISTS AND DENTAL SPECIALISTS

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# Dentists and Dental Specialists



## INTRODUCTION

Dentistry is a unique part of the Canadian health-care system that has been described as an artistic as well as a scientific profession (Canadian Dental Association [CDA], 2014a). The scope of a dentist's work is much broader today than ever before: the modern dentist must not only have a deep understanding of oral anatomy and how the health of teeth, gums and mouth relate to general health, but also be able to navigate through the demands of cosmetic dentistry. Through oral health education, and diagnosis and treatment of dental disease, dentists provide an essential health service (CDA, 2014a).

## HISTORY OF THE PROFESSIONS

The first directory, published in 1791 for the region later known as Canada, included listings for those who practised the healing arts of the day: physicians, surgeons, midwives, apothecaries, and blood letters

and tooth pullers (CDA, 2002). Of the 52 healers listed in Québec City and Montreal, nine were classified as blood letters and tooth pullers. These professionals, although they did little beyond extractions, are considered the forerunners of modern-day dentists in Canada.

By 1816, dentists of a higher calibre and with more specialized training had started to replace these early tooth pullers. However, it is difficult to track exact numbers because dentistry was a sideline business for many: dental services were often provided by gunsmiths, blacksmiths and other tradespeople. By the 1850s, hardly anyone was practising dentistry as a profession in itself. Instead, those who practised were primarily physicians who performed emergency dental treatment, graduates of medical schools who took some apprenticeship training and limited their practices to dentistry, and men who served as apprentices to dentists under an indenture agreement (CDA, 2002).

## A CALL FOR REGULATION

In the early days of dentistry, there was intense variation in regulation and no real training or expertise. This was cause for increasing concern among patients and more specialized practitioners. Some practitioners began to advocate for establishing dentistry as a profession, but they were faced with legal, clinical and social obstacles. Levi S. Parmlly, who was in favour of regulating and “demystifying” the profession, was open about this issue in *The Summum Bonum*, the first dental book published in Canada:

*The veil of mystery which still hangs over Dentistry, renders it not only conjectural, but even a suspicious art. This has long ago been removed from the other sciences, which induces many to believe that Dentistry is a mere trick....Dentistry, however, needs only to be better known in order to secure the esteem of mankind. (Bishop, 2014)*

Efforts to establish dentistry as a regulated profession continued and became more organized. In 1860, Charles Brewster of Montreal sent a letter to all known dentists in Canada asking, “What is your opinion as to incorporating the dentists by Act of Parliament and obliging all those who in future may wish to practice in Canada, to pass a proper examination before a Board of Dentists?” (Gullett, 1971). He received many replies in favour of his proposal, but it could not go forward to Parliament because health care, as it does today, fell under provincial jurisdiction.

The first dental meeting in Canada took place in Toronto on January 3, 1867, and is considered the birth of the Ontario Dental Association (ODA). Working with medical leaders, the ODA produced a draft *Act Respecting Dentistry*, which was debated, amended and ultimately passed by the Ontario legislature in 1868. The act established the Board of Directors of the Royal College of Dental Surgeons of Ontario and gave it the right to establish standards for the now regulated profession (Crawford, 2002). Dentistry was regulated in Quebec the following year.

### THE ESTABLISHMENT OF DENTAL SCHOOLS

The first formal educational program was established in 1875 in Toronto, Ontario. The School of Dentistry was eventually affiliated with the University of Toronto, and remains so today. In 1892, the Dental College of the Province of Quebec became the first school of dentistry in French Canada.

The profession was then largely male dominated (CDA, 2014a). But in 1893, Caroline Louisa Josephine Wells became the first woman to graduate from a dental program, graduating from the School of Dentistry in Toronto (University of Toronto, 2011).

In 1905, dental schools opened at McGill University and Université de Montréal. In 1908, Dalhousie University in Halifax, Nova Scotia, became the first school in Eastern Canada to offer a dentist education program. By 1964, there were dental schools from coast to coast in Canada. As of 2018, there are still no dental schools in the territories. Table 1 lists Canada’s dental schools and the years they were established.

**TABLE 1:** Canadian dental schools by year of establishment

School	Year of establishment
University of Toronto	1875
McGill University	1905
Université de Montréal	1905
Dalhousie University	1908
University of Alberta	1923
University of Manitoba	1958
University of British Columbia	1964
University of Western Ontario	1966
University of Saskatchewan	1968
Université Laval	1971

### THE CANADIAN DENTAL ASSOCIATION

On September 16, 1902, 344 dentists gathered in Montreal to found a national association to help them pursue the profession’s ambitions and values (CDA, 2002). As each dentist registered at the conference, he was handed a copy of a proposed constitution, complete with by-laws and code of ethics for the new association. These were adopted unanimously on the first day of the meeting. Much of the credit for the meeting’s success was due to the tireless efforts of Dr. Eudore Dubeau of Quebec, who wrote to every dentist in Canada to rally support for a national organization (CDA, 2002).

Since the 1902 Montreal conference, the CDA has been the national voice for dentistry in Canada. Today, the CDA’s official mission statement says that the association remains “dedicated to the advancement and leadership of a unified profession and to the promotion of optimal oral health, an essential component of general health” (CDA, 2014a).

### THE ADVENT OF DENTAL JOURNALS

Academic dental literature followed the advancement of the dental profession in Canada. The first national dental journal was the *Canada Journal of Dental Science*, which published in Quebec and Ontario from 1868 to 1879. The *Dominion Dental Journal* was established in 1889 and published until 1934.

It was succeeded by the *Journal of the Canadian Dental Association* in 1935, which is the present-day academic publication of the CDA (University of Toronto, 2011). A growing body of other academic literature also supported the clinical and professional advancement of the profession.

## DENTISTRY AND MEDICINE

The relationship between dentistry and medicine is unique among health-care fields. While most health-care occupations are treated as subordinate to medicine, dentistry has remained independent and largely outside of medical dominance. There are a number of reasons for this, as set out by Adams (1999):

*First, dentistry and medicine pursued their professional projects at the same time. Second, from the beginning, dentistry pursued a separate sphere of competence or jurisdiction than did medicine. Third, both medicine and dentistry claimed professional status and expertise by drawing upon the precepts of medical science; dentistry did not challenge medicine's claim to expertise. Fourth, similarities in the gender and class background of professional leaders encouraged positive relations between the two professions.*

## DENTISTRY TODAY

Today, dentistry continues to evolve as both a science and an art within an increasingly complex regulatory environment. Major changes to the field of dentistry have included the increasing number of female practitioners as well as changes to service coverage. For example, in Saskatchewan, fairly extensive public dental health plans have been replaced by private insurance or out-of-pocket payments. The future of dentistry in Canada will be predominately shaped by changes in the supply and demand of dental health-care services as well as advancements in regulation and technology. The culmination of all these factors—technological, regulatory and social—will continue to affect how dentists practise in Canada.

## EDUCATION

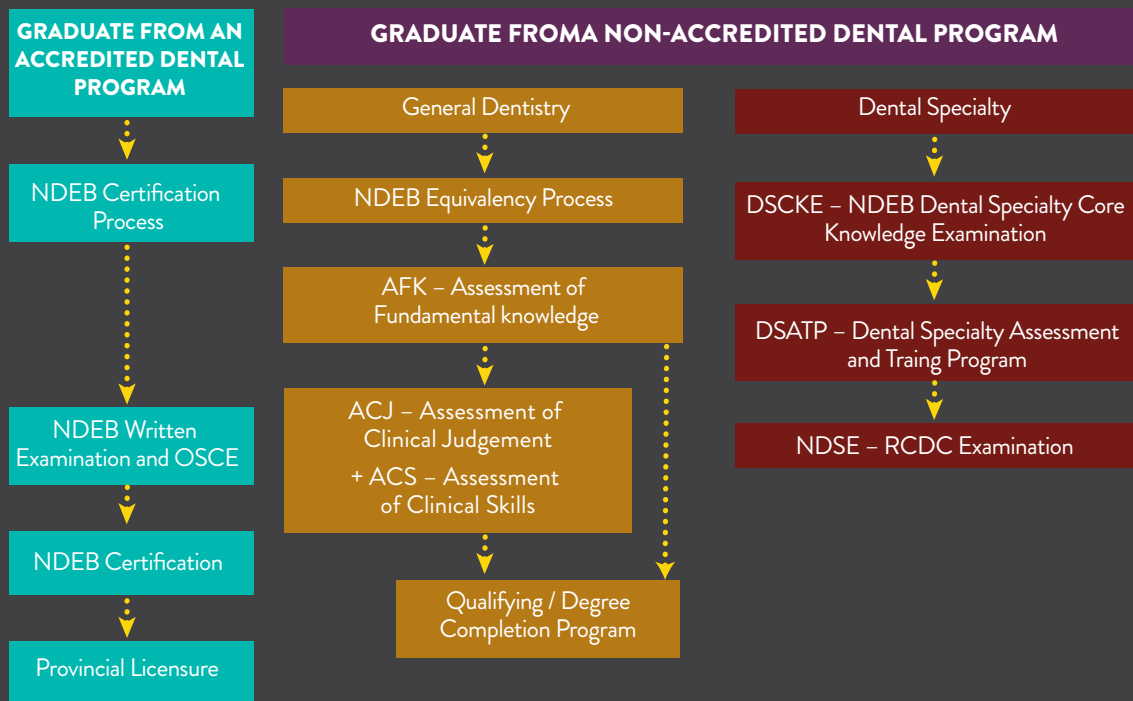
In Canada, dentists must complete at least eight years of education beyond secondary school. In addition to a bachelor's degree, dentists must also complete a four-year Doctor of Dental Surgery or Doctor of Dental Medicine degree.

Most schools require certain basic pre-dental education courses—mainly in the maths and sciences—that must be completed during an undergraduate degree before enrollment in a dental school. Advanced biology and physics are typically not required. However, since these requirements vary from school to school, prospective students should contact the school(s) they are interested in to determine specific admission requirements.

Most Canadian dental schools also require applicants to complete a Dental Aptitude Test (DAT), which is conducted by the CDA and designed to help students assess their aptitude for a career in dentistry. The DAT is an in-person exam available in French or English, held in November and February each year. Test centres are available across the country and are usually located on college and university campuses. The DAT consists of a reading comprehension test, a perceptual ability test, biology and general chemistry questions, and a manual dexterity test. In 2011, the manual dexterity test portion of the DAT became optional as some dental schools do not require these test results.

There are 10 schools of dentistry in Canada at universities across the country. These include: University of British Columbia, University of Alberta, University of Saskatchewan, University of Manitoba, University of Toronto, Western University, McGill University, Université de Montréal, Université Laval and Dalhousie University. In 2018, there were 491 Graduates of Canadian DDS programs, 68 Graduates of accredited Qualifying/Degree Completion programs, 263 Graduates of accredited programs in the US, Ireland, New Zealand, and Australia and 320 Individuals who successfully completed the Equivalency Process for a total of 1143 newly certified dentists. Figure 1 outlines the different pathways to licensure depending on where a dental graduate obtained their dental degree.

**Figure 1: Becoming a licensed dentist in Canada**



Source: National Dental Examining Board of Canada, <https://ndeb-bned.ca/en/requirements>

In dental school, students are educated in basic and dental sciences, and receive practical training and hands-on clinical experience. They also have the opportunity to gain experience working in hospitals and to undertake supervised clinical practice.

Pursing a dental specialty requires additional training, and many schools also require at least two years of formal experience as a general dentist before entering a specialty residency. For example, a specialty in orthodontics requires an additional three-year Master of Science degree and a residency program. And once a dentist has graduated from an orthodontic residency program, they must successfully complete the national dental specialty board certification examination. A fully certified orthodontist will have spent upwards of 12 years in school.

### TUITION COSTS

Undergraduate students in dentistry pay the highest average university tuition fees. In 2016–2017, Canadian dentistry students paid, on average, \$22,297 in tuition fees per term. This figure does

not include additional compulsory fees that vary from institution to institution, such as fees for athletics, student associations and student health services (Statistics Canada, 2018). In addition to the high cost of tuition, dental students are also required to purchase their own dental instruments. Students at the University of Toronto are expected to spend almost \$10,000 on required dental instruments in the 2018–2019 academic year (University of Toronto, 2018).

### INTERNATIONALLY TRAINED DENTISTS

Internationally trained dentists (ITDs) coming to work and live in Canada bring innovation and offer diversity and culture to the Canadian dental health workforce. To become licenced to practise as a dentist in Canada, ITDs must:

1. Contact the relevant regulatory body in the chosen province/territory for assessment and recognition of credentials, including language proficiency for registration and other licensing requirements;

2. Complete an accredited dental program, as a regular or degree completion student, or complete an accredited qualifying program (to enter a qualifying program, applicants must complete the Eligibility Examination administered by the Association of Canadian Faculties of Dentistry);
3. Pass the National Dental Examining Board of Canada written examination and the Objective Structured Clinical Examination;
4. Pass the National Dental Specialty Examination through the Royal College of Dentists of Canada (if the prospective dentist wants to practise as a dental specialist); and
5. Register with a provincial/territorial regulatory body (CIHI, 2011)

The licencing of ITDs has been the subject of debate within the profession, with some arguing ITDs do not meet Canadian standards of practice. Cholakis, speaking in favour of ITDs, reminds his colleagues that “concerns should lie in our attitudes toward change and realities of a modern world that globally produces highly skilled, mobile professionals” (2005).

The CDA has been actively involved in easing the transition of ITDs into the Canadian dental health workforce. In 2014, the CDA published an online guide to help ITDs navigate the Canadian regulatory environment, manage the economic realities of practising in Canada, improve communication skills and seek out mentorship opportunities to further assist in the transition into Canadian oral health-care teams (CDA, 2014b).

## SCOPE OF PRACTICE

Dentists perform a number of duties, some of which are regulated acts. These acts may differ slightly across provinces. Provinces and territories define dentists’ scope of practice in legislation, most commonly titled “Dentists Act”. The CDA (2015) speaks to the variety and depth of a dentist’s scope of practice. For example, dentists may take part in some or all of the following activities on any given workday:

- **Prevention/public education:** Dentists educate their patients and the general public on how to prevent oral health problems. As primary health-care providers, they provide nutritional guidance

as well as information and advice on developing and maintaining good overall health.

- **Detection and management of oral conditions:** Research shows there may be a link between oral disease and other health problems such as diabetes, heart disease and stroke, as well as pre-term and low-birth-weight babies. Dentists are often the first health-care professionals to spot a wide variety of systemic diseases, such as hypertension and cancer.
- **Aesthetic improvement:** Dentists can help improve a patient’s appearance (as well as health) through the use of newly developed cosmetic dental techniques.
- **Restoration:** Dentists repair damage to the teeth and address gum and oral tissues caused by accidents or diseases such as dental caries (tooth decay) and periodontitis (gum disease).
- **Correction:** Dentists correct oral health problems caused by crooked, crowded or poorly spaced teeth or misaligned jaws with orthodontic appliances, mouth splints, and other devices and treatments.
- **Reconstruction:** Dentists fabricate substitutes for lost teeth and oral tissues, including fixed replacements and dentures.
- **Surgery:** Dentists perform many kinds of oral surgery aside from tooth extractions. They also perform surgery to correct facial and dental deformities caused by accidents and birth defects.

## SPECIALIZATIONS

Dental specialties were not governed in Canada until 1944, when Ontario adopted bylaws to recognize specialties and certify specialists (Royal College of Dentists of Canada [RCDC], 2015). In 1945, the CDA established a Committee on Specialists and Specialization as a stepping stone to creating training programs in the various branches of dentistry while also clearly delineating each specialty. In 1960, a CDA report shed light on the lack of regulatory uniformity for dental specialties across the nation. That report included a proposal to institute a national specialty regulations body.

In 1965, the *Act of Incorporation for the Royal College of Dentists of Canada* was passed in Parliament, which gave the RCDC the parliamentary authority to examine dental specialties at the national level (RCDC, 2015).

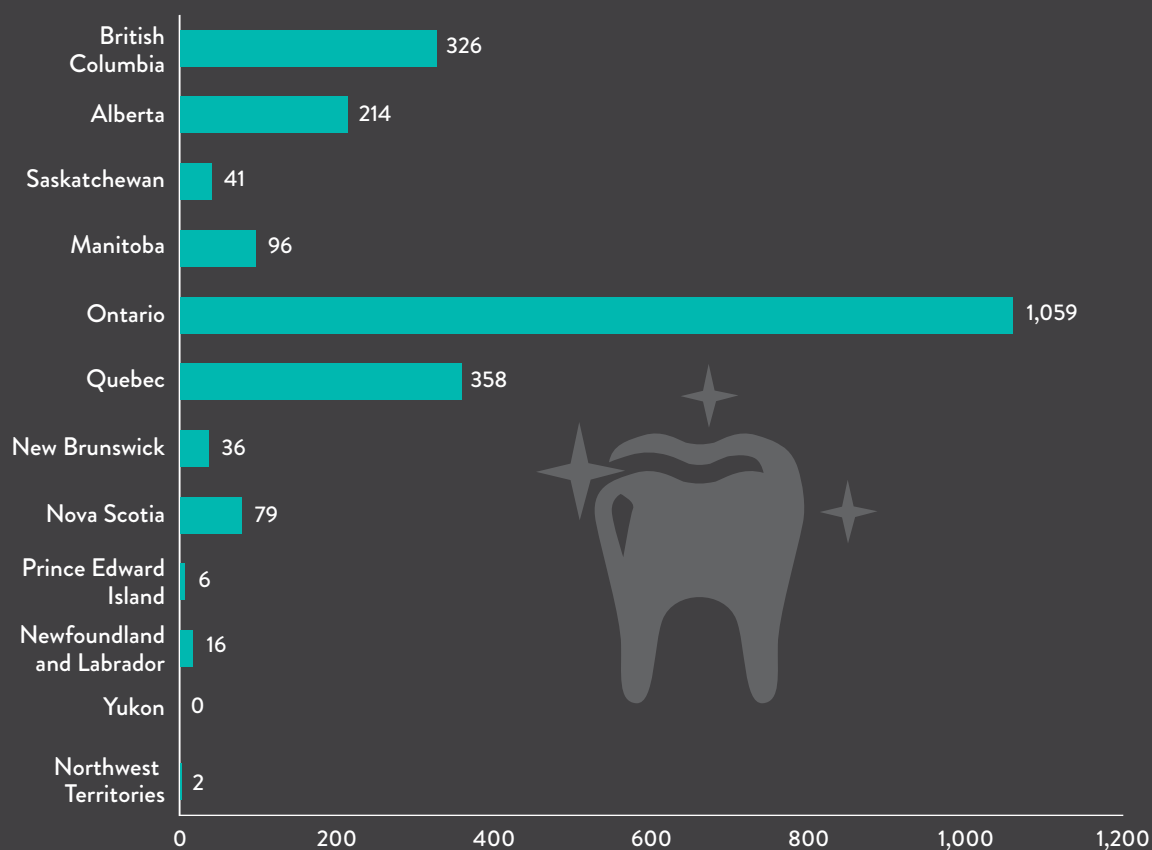
Dental specialties in Canada are regulated by both the RCDC and the Commission on Dental Accreditation of Canada (CDAC), which reviews and accredits dental and allied oral health-care education programs. To date, the CDAC has accredited nine nationally recognized dental specialties in Canada. The National Dental Specialty Examination is offered for all nine specialties in Canada.

The RCDC (2015) describes the nine recognized dental specialties in Canada as follows:

- **Dental public health** is the branch and specialty of dentistry concerned with the diagnosis, prevention and control of dental diseases and the promotion of oral health through organized community efforts.
- **Endodontics** is the branch and specialty of dentistry concerned with the morphology, physiology and pathology of the dental pulp. Its study and practice encompass the basic clinical sciences, including biology of the normal pulp, and etiology, diagnosis, prevention and treatment of diseases and injuries of the pulp and associated periradicular tissues.
- **Oral and maxillofacial surgery** is the branch and specialty of dentistry concerned with the diagnosis and surgical and adjunctive treatment of disorders, diseases, injuries and defects. It also involves the functional and aesthetic aspects of the hard and soft tissues of the oral and maxillofacial regions and related structures.
- **Oral medicine pathology** is the branch and specialty of dentistry concerned with the diagnosis, nature and primarily non-surgical management of oral, maxillofacial and temporomandibular diseases and disorders, including dental management of patients with medical complications.
- **Oral and maxillofacial radiology** is the branch and specialty of dentistry concerned with the prescription, production and interpretation of diagnostic images for the diagnosis and management of diseases and disorders of the craniofacial complex.
- **Orthodontics and dentofacial orthopedics** is the branch and specialty of dentistry concerned with the supervision, guidance and correction of growing or mature dentofacial structures, and the diagnosis, prevention and treatment of any abnormalities associated with these structures.
- **Pediatric dentistry** is the branch and specialty of dentistry concerned with providing primary and comprehensive preventive and therapeutic oral health diagnosis, care and consultative expertise for infants and children through adolescence, including those of all ages with special care needs.
- **Periodontics** is the branch and specialty of dentistry concerned with the diagnosis, prevention, and treatment of diseases and conditions of the supporting and surrounding tissues of the teeth or their substitutes, and the maintenance of the health, function and aesthetics of these structures and tissues.
- **Prosthodontics** is the branch and specialty of dentistry concerned with the diagnosis, restoration and maintenance of oral function, comfort, appearance and health by the restoration of the natural teeth, and/or the replacement of missing teeth and contiguous oral and maxillofacial tissues with artificial substitutes.

In 2010, approximately 11% of dentists in Canada were dental specialists. The speciality with the highest number of specialists was orthodontics, with approximately 735 orthodontists. The speciality with the fewest number of specialists was oral radiology, with only 12 specialists nationwide (CDA, 2010). Table 2 outlines the specialty training programs at Canadian dental schools. Figure 2 details the number of certified dental specialists by province/territory in 2009.

**Figure 2: Number of certified dental specialists by province/territory, Canada, 2009**



Source: CIHI, 2011.

Notes: This table represents a summary of dental specialists certified in endodontic, oral and maxillofacial surgery, orthodontics, pediatric dentistry, periodontics, prosthodontics, dental public health, oral pathology and oral radiology.

**TABLE 2: Specialty programs at Canadian dental schools**

School	Specialties
University of British Columbia	6 Endodontics, Orthodontics, Pediatric dentistry, Periodontics, Prosthodontics, Oral medicine and oral pathology
University of Alberta	2 Orthodontics, Oral medicine and oral pathology
University of Saskatchewan	0
University of Manitoba	4 Oral and maxillofacial surgery, Orthodontics, Pediatric dentistry, Periodontics
University of Toronto	9 Dental public health, Endodontics, Oral pathology and oral medicine, Oral and maxillofacial radiology, Oral and maxillofacial surgery, Orthodontics, Pediatric dentistry, Periodontics, Prosthodontics
University of Western Ontario	2 Orthodontics, Oral and maxillofacial surgery
McGill University	1 Oral and maxillofacial surgery
Université de Montréal	2 Orthodontics, Pediatric dentistry
Université Laval	2 Oral and maxillofacial surgery, Periodontics
Dalhousie University	2 Oral and maxillofacial surgery, Periodontics

Source: Usama Nassar, Connor Fairbanks; Carlos Flores-Mir, Alan Kilistoff, Rick Easton, J Can Dent Assoc 2016;82:g19 <https://jcda.ca/g19>



**TABLE 3:** National associations for dentistry specializations

Specialization	National association	Website
<b>Dental public health</b>	Canadian Association of Public Health Dentistry	<a href="http://www.caphd.ca">www.caphd.ca</a>
<b>Endodontics</b>	Canadian Academy of Endodontics	<a href="http://www.caendo.ca">www.caendo.ca</a>
<b>Oral and maxillofacial surgery</b>	Canadian Association of Oral and Maxillofacial Surgeons	<a href="http://www.caoms.com">www.caoms.com</a>
<b>Oral medicine and pathology</b>	Canadian Academy of Oral and Maxillofacial Pathology and Oral Medicine	No website available
<b>Oral and maxillofacial radiology</b>	Canadian Academy of Oral and Maxillofacial Radiology	No website available
<b>Orthodontics and dentofacial orthopedics</b>	Canadian Association of Orthodontics	<a href="http://www.cao-aco.org">www.cao-aco.org</a>
<b>Pediatric dentistry</b>	Canadian Academy of Pediatric Dentistry	<a href="http://www.capd-acdp.org">www.capd-acdp.org</a>
<b>Periodontics</b>	Canadian Academy of Periodontology	<a href="http://www.cap-acp.ca">www.cap-acp.ca</a>
<b>Prosthodontics</b>	Association of Prosthodontists of Canada	<a href="http://www.prosthodontics.ca">www.prosthodontics.ca</a>

Source: CIHI, 2011.

## REGULATION OF THE PROFESSION

The National Dental Examining Board of Canada (NDEB) is responsible for establishing and maintaining a national standard of competence for dentists in Canada. Graduates of accredited dental programs or accredited qualifying/degree completion programs and individuals who have completed the NDEB Equivalency Process must pass the NDEB's written examination and Objective Structured Clinical Examination to be eligible for licensure as a general dentist in Canada.

Dentistry is a provincially regulated health profession. The regulatory body is typically called a college and is generally responsible for:

- Setting the education and other qualifications necessary to enter the profession;
- Setting standards of professional practice;
- Setting ethical standards;
- Investigating complaints from people who feel the standards have not been met;
- Taking appropriate disciplinary action as necessary;

- Protecting the public's right to quality dental services; and
- Providing leadership to the profession in self-regulation. (Canadian Dental Regulatory Authorities Federation, 2014)

In addition to a dental regulatory college, each jurisdiction also has a dental association. In most provinces, the college is separate from the professional association (this is mandated, for example, in Ontario), but sometimes they are joined (as in Alberta). Membership in the provincial/territorial and national dental associations is mandatory for licensure in all provinces except Ontario and Quebec. None of the territories require membership in the professional associations for registration and licensing.

Upon successful completion of the NDEB exam, prospective dentists must register with the professional college of dentists in their jurisdiction of practice to become fully licenced. Moreover, regulatory authorities in some provinces (such as Ontario and Alberta) require applicants to complete an examination that tests knowledge of local law, ethics and regulation of the profession in that jurisdiction. Table 4 presents each jurisdiction's college and association.

**TABLE 4:** Dental regulatory colleges and associations by province/territory

Province/territory	Year of mandatory registration	Dental regulatory college	Dental association
British Columbia	1886	<a href="#">College of Dental Surgeons of British Columbia</a>	<a href="#">British Columbia Dental Association</a>
Alberta	1906	<a href="#">Alberta Dental Association and College</a>	
Saskatchewan	1906	<a href="#">College of Dental Surgeons of Saskatchewan</a>	
Manitoba	1883	<a href="#">Manitoba Dental Association</a>	
Ontario	1868	<a href="#">Royal College of Dental Surgeons of Ontario</a>	<a href="#">Ontario Dental Association</a>
Quebec	1869	<a href="#">Ordre des dentistes du Québec</a>	<a href="#">Association des chirurgiens dentistes du Québec</a>
New Brunswick	1890	<a href="#">New Brunswick Dental Society</a>	
Nova Scotia	1891	<a href="#">Provincial Dental Board of Nova Scotia</a>	<a href="#">Nova Scotia Dental Association</a>
Prince Edward Island	1891	Dental Council of Prince Edward Island	<a href="#">Dental Association of Prince Edward Island</a>
Newfoundland and Labrador	1893	Newfoundland and Labrador Dental Board	<a href="#">Newfoundland &amp; Labrador Dental Association</a>
Yukon	1958	Registrar's Office	Yukon Dental Association
Northwest Territories	1988	Government of Northwest Territories	<a href="#">Northwest Territories &amp; Nunavut Dental Association</a>
Nunavut	1999	Nunavut Registrar's Office	<a href="#">Northwest Territories &amp; Nunavut Dental Association</a>

## DEMOGRAPHICS

The CDA has released data on the age, sex and provincial distribution of dentists in Canada. The data revealed that the majority of dentists are concentrated in Ontario and Quebec (see Table 5). Data from 2018 revealed that there were approximately 24,731 dentists practising in Canada (CIHI, 2020). Roughly 20% of dentists are over the age of 60.

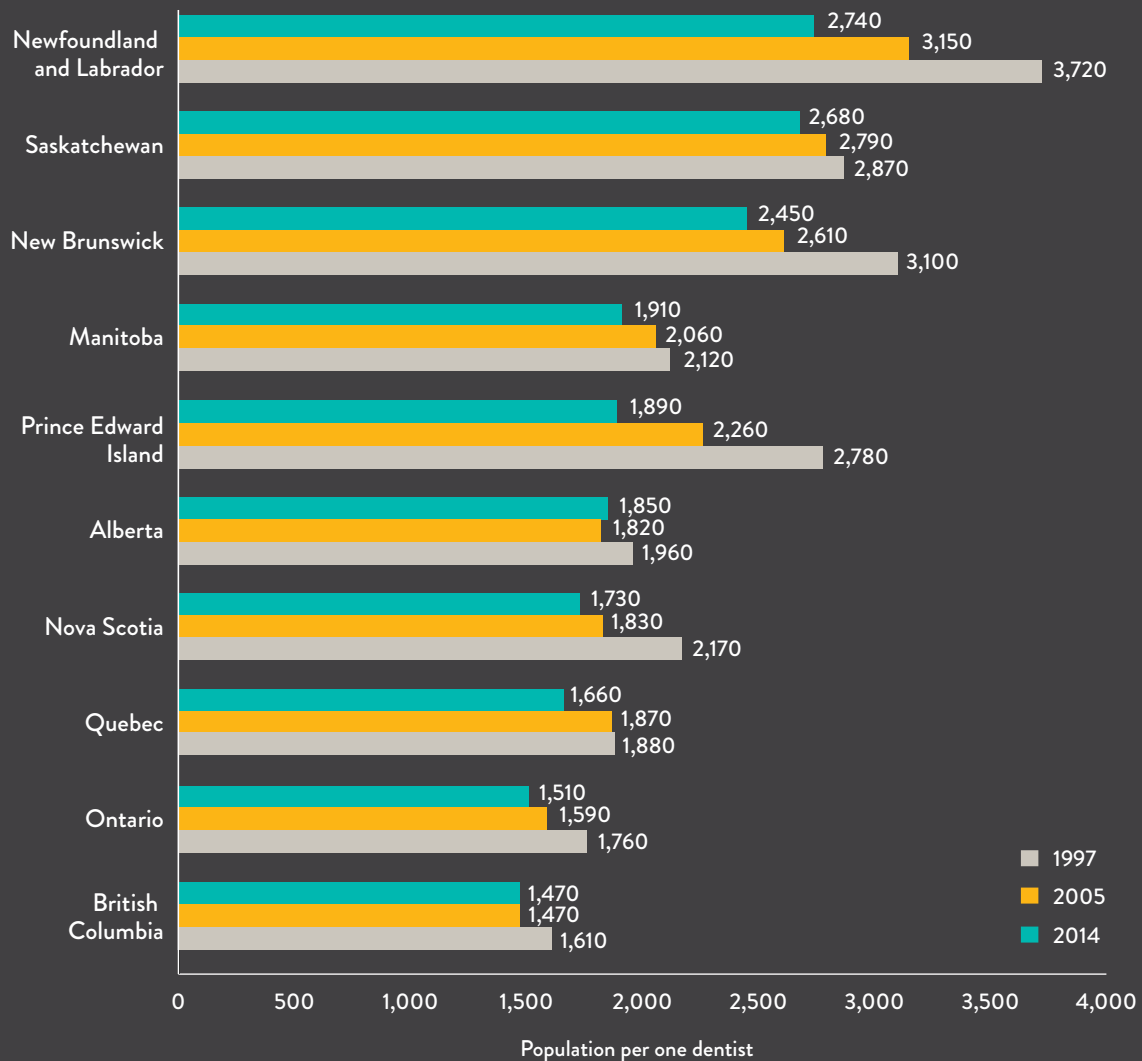
Currently, there is widespread debate regarding the “over-saturation” of dentists in Canada (Blackwell, 2013). Some reports suggest that there is a growing per-capita pool of dentists in some jurisdictions, particularly in large urban centres like Toronto, Montreal and Vancouver, while rural and remote communities remain underserved. One result of the “over-concentration” of dentists in urban centres has been a trend toward bidding wars; many young dental professionals would rather buy an office that already has a full patient load (Blackwell, 2013).

**TABLE 5:** Registered dentists by province/territory, Canada 2014-2018

Province	2014	2015	2016	2017	2018
British Columbia	3,196	3,261	3,379	3,371	3,591
Alberta	2,318	2,430	2,461	2,518	2,694
Saskatchewan	434	438	442	489	533
Manitoba	675	697	718	711	730
Ontario	9,216	9,452	9,737	9,939	10,417
Quebec	4,980	5,055	5,173	5,175	5,350
New Brunswick	319	327	337	321	326
Nova Scotia	534	528	539	553	565
PEI	74	77	80	80	84
Newfoundland & Labrador	198	205	206	223	235
Territories	190	195	189	176	206
<b>Canada</b>	<b>24148</b>	<b>24680</b>	<b>25277</b>	<b>25573</b>	<b>26749</b>

Source: CIHI 2020

**Figure 3: Population to dentist ratio in Canada in 1997, 2005 and 2014, by province**



Source: Population to dentist ratio in Canada by province 2014, John Elflein, Mar 13, 2017, <https://www.statista.com/statistics/686403/population-to-dentist-ratio-in-canada-by-province/>

This statistic shows the population to dentist ratio in Canada in 1997, 2005, and 2014, by province. In 2005, there were some 1,590 people per every dentist in Ontario. Nine years later, this ratio decreased to 1,510 persons per every dentist.

Figure 3 shows two trends. First, although the bulk of dentists are in Ontario and Quebec, the density of dentists is the second and third lowest in those provinces. Second, it shows a trend towards a decreasing population to dentist ratio, which supports the ‘over-saturation’ hypothesis.

The CDA also highlighted the increase of women entering the profession. In 2019, 38.5% of dentists were female. The proportion of women in the profession ranges from a low of 28.7 in Alberta to a high of 48.3 in Quebec (CIHI 2020).

The recent influx of women into dentistry has led researchers and health workforce planners to consider the potential impact of feminization<sup>1</sup> on the profession. In 2005, Dr. Tracey Adams conducted a case study on the Ontario dental profession to analyze the possible ripple effects of this demographic shift.

While Adams found little evidence that women are transforming the dental profession, she did find some key gender differences in practice (2005).

Among other things, 55% of male dentists worked in a solo practice, compared to 35% of female dentists (2005). The most striking demographic characteristic difference, however, was “the extent to which [female dentists] are foreign born and foreign-trained” (Adams, 2005). Adams found that more than one third (36%) of Ontario female dentists were trained outside of Canada in 2002, compared to 15% of male dentists (2005).

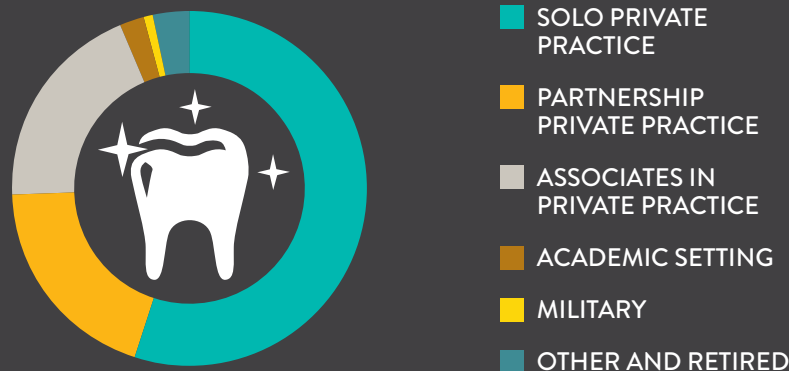
There were also differences in practice hours per week, with women working slightly fewer hours per week than men, as well as practice type, both of which

profession but rather taking part in a previously male-dominated field as professionals socialized within a predetermined operational model.

### PRACTICE SETTING

Dentists practise in a variety of settings. Most dentists (approximately 54%) are in solo private practice. About 19% are in partnerships, and another 19% are associates in a private practice. In partnerships, dentists share clinic management and revenue more or less equally. An associate is more akin to an employee with a stake in managing, creating and distributing clinic revenues. A very small percentage of dentists (just over 2%) work in academic settings. Dentists may also work in the public health sector or in the military (see Figure 4).

**Figure 4: Practice setting for Canadian dentists, 2010**



Source: CDA, 2010.

appeared to be influenced by family roles and career goals (Adams, 2005). It seems, then, in the case of dentistry, women are not significantly altering the

<sup>1</sup> According to Adams (2005): “In the sociological literature, two definitions of feminization can be found. One definition describes feminization as simply involving the movement of women into an occupation or field [Abercrombie, Hill, & Turner, 2000]. The other depicts a more fundamental transformation whereby women not only become more numerically dominant in an occupation, but the occupation itself undergoes a fundamental shift in sex-typing, and comes to be seen as ‘women’s work’ [Jary & Jary, 1995]. While male-dominated professions like dentistry, medicine and law, are clearly experiencing the first dimension of feminization—an increased participation of women—there is less evidence that the second kind of feminization is occurring.”

## COVERAGE OF SERVICES

In 2014, the Canadian Academy of Health Sciences (CAHS) released a report concluding a three-year evaluation into the issue of access to oral health care among vulnerable groups in Canada. The report found that there are significant income-related inequalities in oral health and inequity in access to oral health care. It also found that income-related inequalities in oral health are greater in women than in men (CAHS, 2014).

According to a Canadian Association of Public Health Dentistry (CAPHD) study, 17% of Canadians had avoided going to a dental professional in the last year because of the cost, and 16% of Canadians had avoided having the full range of recommended treatment due to cost. In addition, 32% of Canadians have no dental insurance (CAPHD, 2014). This is significant because the CAHS report emphasized that oral health is part of general health, with the same social, economic and behavioural determinants, and with direct links between poor oral health and poor general health (2014).

Despite these findings, most dental services are not covered by the Canadian public health-care insurance system. Approximately 55% of all private expenditures on dental care are covered by private insurance sources and 45% by out-of-pocket payments (CAPHD, 2014).

The public funding envelope does cover some dental services provided in hospitals. However, these and other public dental services represent a very small proportion of the overall dental services in Canada. According to CDA (2010) data, approximately 5% of dental expenditures in 2009 were covered by public funding and provided treatment to individuals in the following groups:

- Military personnel;
- Indigenous people;
- Social assistance recipients and their dependants;
- Seniors;

- Individuals with developmental disabilities;
- Veterans;
- Federal prisoners; and
- Refugees.

Most public oral health programs that provide services to underprivileged groups fall under provincial or territorial jurisdiction. These include regional and municipal programs as well as university-provided programs. It is important to note that while some services are provided by public insurance, the majority of these oral health-care services are typically delivered by allied oral health-care professionals such as dental hygienists and dental therapists. Provincial/territorial public oral health programs tend to include:

- Surgical-dental services requiring hospitalization or associated with a congenital anomaly or medical need;
- Services for social assistance recipients and their dependants;
- Services for targeted child and adult populations (e.g., low-income families);
- Services for targeted populations with disabilities or living in institutions (e.g., those in long-term care); and
- Services for inmates of provincial prisons. (CDA, 2010)

# DENTAL TECHNICIANS/ TECHNOLOGISTS

## INTRODUCTION

Dental technologists and technicians design, prepare and fabricate dental devices as prescribed by dentists and other specialists (Human Resources and Skills Development Canada [HRSDC], 2013).

## HISTORY

Beginning in the mid-19th century, dental schools in the United States required students to learn prosthetic fabrication techniques. At that time, virtually all dental laboratories were attached to dentists' offices (College of Dental Technicians of British Columbia [CDTBC], 2008). By the 1950s, however, increasing demand for prosthetics required dentists to devote more skill and time to meet these needs.

In response, some dentists shifted their practices to focus solely on designing and fabricating dental prosthetics for other dentists.

The foundational partnerships between dentistry and dental technicians have persisted and, today, there is still significant collaboration between the two professions. Dentists rely on dental technicians' skills to provide well-constructed dental appliances to meet patient needs, while dental technicians rely on referrals from dental practitioners (e.g., dentists, dental surgeons, orthodontists) to drive their businesses.

## EDUCATION AND TRAINING

In some provinces, there are two pathways to fulfill educational requirements in dental technology. To register as a dental technician, students can either (1) graduate from an approved educational program or (2) complete four to five years (depending on provincial regulations) of on-the-job training (HRSDC, 2013).

### 1. Approved educational program

Admission requirements for dental technician/technologist programs may differ by jurisdiction but, in general, educational institutions require applicants to have Grade 12 English and math credits, as well as credits in science, chemistry, physics and social studies. A competitive entrance grade average in these courses is usually at least 70%. Student selection is usually competitive and

may also be based on non-academic achievements, such as community involvement. There are dental technician/technologist programs in almost every province across Canada. Table 6 provides information on educational institutions in Canada that provide training in dental technology.

After graduating, dental technicians and technologists in all provinces (except in Manitoba and the territories) must register with the relevant regulatory body.

**TABLE 6:** Dental technician/technologist educational programs in Canada

Province	Institution
British Columbia	<a href="#">Vancouver Community College</a>
Alberta	<a href="#">Northern Alberta Institute of Technology</a>
Ontario	<a href="#">George Brown College</a>
Quebec	<a href="#">College Edouard-Montpetit</a>

### 2. On-the-job training

In some provinces, dental technician educational requirements can be met outside the classroom. Dental technicians can qualify to register with their provincial regulatory college by providing dental technician services for at least five years. The on-the-job training must be completed under the supervision of a registered dental technician or technologist (HRSDC, 2013).

## REGULATION

The profession of dental technology is regulated in all provinces except Manitoba and is not regulated in the territories. Requirements for initial and continuing registration or licensure vary from province to province. Each provincial regulatory body sets its own education, competency and qualification requirements.

## SCOPE OF PRACTICE

Depending on province of practice, dental technicians and technologists may perform some or all of the following duties:

- Design, fabricate or repair dental devices, including full or partial dentures, orthodontic appliances, crowns, bridges, inlays, onlays, clasps and bands, and implants;

- Prepare plaster models and moulds from dental impressions;
- Prepare wax bite-blocks and impression trays;
- Cast gold or metal alloys for bridges and denture bases;
- Pack plastic material into moulds to form full or partial dentures;
- Mould wax over denture set-up to form full contours of artificial gums;
- Make orthodontic bands from gold, silver, stainless steel or other metals;
- Finish metal framework of dentures and polish and buff dentures to obtain natural finish;
- Consult with dentists or other specialists on problematic dental cases;
- Train and supervise other dental technicians and dental laboratory assistants in fabricating dentures and other dental devices; and
- Perform administrative functions for the dental laboratory (CDTO, 2012).

In recent years, the development of alternatives to removable dental devices and new materials for use in prostheses and orthoses has directly influenced dental technicians' and technologists' evolving scope of practice. In particular, while the demand for complete removable devices like dentures has diminished, the demand for partially removable devices, fixed prostheses (such as crowns and bridges), orthodontic prostheses and dental implants has risen (Service Canada, 2015). The rise in demand for complex oral prostheses has contributed to the increasing complexity of dental technicians' and technologists' scope of practice. Currently, there is some question as to whether or not the educational standards for technicians and technologists can keep pace with the accelerated rate of technological advancements and the ever-expanding scope of practice.

### PRACTICE SETTING

Dental technicians and technologists work in a variety of practice settings. Many experienced dental technologists operate their own commercial dental laboratories, while others are employed by dental laboratories as registered dental technologists-in-charge. Some professionals may work as consultants or hold positions in universities, community colleges and hospitals that offer dental technology services (CDTO, 2012).

**TABLE 7:** Dental technician/technologist regulatory authorities across Canada

Province	Regulatory body
British Columbia	<a href="#"><u>College of Dental Technicians of British Columbia</u></a>
Alberta	<a href="#"><u>College of Dental Technologists of Alberta</u></a>
Saskatchewan	Association of Dental Technicians of Saskatchewan
Ontario	<a href="#"><u>College of Dental Technologists of Ontario</u></a>
Quebec	<a href="#"><u>Ordre des techniciens et techniciennes dentaires du Québec</u></a>
New Brunswick	New Brunswick Dental Technicians Association
Nova Scotia	<a href="#"><u>Nova Scotia Dental Technicians Association</u></a>
Newfoundland and Labrador	<a href="#"><u>Newfoundland and Labrador Dental Board</u></a>

## CONCLUSION

Over the past hundred years, dentistry has evolved to reflect the changing needs of the Canadian population. Over the past decade alone, dentistry has undergone a demographic shift in gender makeup. The rising costs of dental education have led to dentists graduating with some of the highest student debt loads of any professional program in the country. Access to and coverage of services continue to be a significant issue for many people—particularly Indigenous communities, who see the highest rates of poor oral health in the country. It will be interesting to see how modern dentists continue to meet the evolving needs of both the dental health workforce as well as the patients served by that workforce.

## ACRONYMS

CAHS	Canadian Academy of Health Sciences
CAPHD	Canadian Association of Public Health Dentistry
CDA	Canadian Dental Association
CDTA	College of Dental Technologists of Alberta
CDTBC	College of Dental Technicians of British Columbia
CDTO	College of Dental Technologists of Ontario
CDAC	Commission on Dental Accreditation of Canada
CIHI	Canadian Institute for Health Information
DAT	Dental Aptitude Test
ITD	Internationally trained dentist
ODA	Ontario Dental Association
NDEB	National Dental Examining Board of Canada
RCDC	Royal College of Dentists of Canada





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