

Invited Review Paper Dental Implants

Where can I learn how to place dental implants? Perspectives from Scandinavia and Canada

A. Jokstad

University of Toronto, Faculty of Dentistry,
Ontario, Canada

A. Jokstad: Where can I learn how to place dental implants? Perspectives from Scandinavia and Canada. Int. J. Oral Maxillofac. Surg. 2008; 37: 593–596. Crown Copyright © 2008 Published by Elsevier Ltd on behalf of International Association of Oral and Maxillofacial Surgeons. All rights reserved.

Abstract. An overview is presented of the educational opportunities that exist for dentists in Canada and in the five Nordic countries who wish to learn how to implement implant dentistry in clinical practice. This theme is discussed in the context of the demographic and educational realities in these countries. Data related to dental demographics, implant dentistry educational aspects, advertisement of postgraduate education courses, and demographic and geographic facts were collected from various databases and compared. The educational philosophies and approach to patient care differ between Canada and the five Nordic countries, which make it questionable whether one teaching model for a global implant training program will fit all. Despite these differences, if one is to proceed, a competency-oriented education model seems to be the way forward. The challenge to construct courses in implant dentistry within this competence-oriented education model remains.

Keywords: clinical competence; competency-based education; dental implantation/education; education; dental; continuing; prosthodontics.

Accepted for publication 20 December 2007
Available online 4 March 2008

There are many similarities between Canada and the five Nordic countries, from both geographical and demographic perspectives¹¹ (Table 1). The Arctic Circle runs through all six countries (except Denmark). Canada, as the second largest country in the world, stretches between the N42nd and the N85th latitudes. The most southern part of the Nordic countries (Denmark) is on N55th and the most northern mainland part (Norway) is located on the N72nd latitude. The two islands Spitsbergen and Greenland, by many also regarded as part of the Nordic countries, are both sparsely popu-

lated and reach almost to the North Pole. The inhabitants of Canada and the Nordic countries are in general widely dispersed and, statistically, the population densities in these countries are amongst the lowest in the world. One difference is that while the 10 largest metropolitan areas in Canada account for half of the population (17 of 33 million) and six of these areas have more than 1 million inhabitants, there are only two such areas in the Nordic countries. Stockholm (Sweden) and Copenhagen (Denmark) have populations of barely over 1 million, and the 10 largest metropolitan areas account for only one

third of the total population (7 of 24 million).

The age composition varies slightly, with a relatively young Iceland population having a median age of only 34 years and 12% being above 65 years, while comparable data from Sweden are 41 years and 18% above 65 years. Canada has a comparatively low proportion of its population above 65 years, only 13%. The age expectancies in the six countries rank amongst the best in the world, from 77.8 years (Denmark) to 80.5 years (Sweden). In terms of growth rate, Iceland (0.87%) and Canada (0.88%) are comparable,

Table 1. Geographic, demographic and dental demographic data for Canada and the five Nordic countries

	Canada	Denmark	Finland	Iceland	Norway	Sweden
Population (millions)	33.1	5.5	5.2	0.3	4.6	9.0
Area (x1000 km ²)	9984	43 + 2166*	338	103	323 + 61*	450
>65 years (%)	13	15	16	12	15	18
Median age	39	40	41	34	38	41
Age expectancy	80.2	77.8	78.5	80.3	79.5	80.5
Growth rate (%)	0.88	0.33	0.14	0.87	0.38	0.16
GDP/capita x1000	\$35	\$37	\$33	\$38	\$48	\$32
Dentists: total	18340	4900	4590	272	4300	7500
Patients/dentist	1805	1100	1132	1068	1070	1250
Graduates/year	520	125	50	6	140	150
Dentists/new graduates	35	30	92	45	31	50
Specialities	OMSurg Perio Pros	OMSurg -	OMSurg Clin.Dent.	OMSurg Perio Pros	OMSurg Perio Pros	OMSurg Perio Pros

OMSurg = oral & maxillofacial surgeon, Perio = periodontist, Pros = prosthodontist, Clin.Dent. = clinical dentist.

*Denmark + Greenland, Norway + Spitzbergen.

while the growth rate in Finland (0.14%) and Sweden (0.16%) points to a gradually aging population.

All six countries are blessed with some of the highest GDP/capita in the world, ranging from \$32,000 (Sweden) to \$48,000 (Norway). Thus, none of the countries would have any problems whatsoever to fund dental faculties, postgraduate training, and dental treatment for segments of the population or even for the whole population. The only country where the national politicians have decided to do so is Sweden, where patients for many years have been substantially subsidized by their National Board of Health and Welfare. Several epidemiological studies suggest that the oral health state of Swedish citizens is markedly better than that of their Danish neighbours, where the system is entirely based on fees for services.

While Canada has 10 dental schools from which 520 new dentists graduate every year¹, about 470 graduates from 12 dental schools enter the profession in the five Nordic countries³. There are no reliable statistics on how many actually remain in these countries, and how many set up practices elsewhere, in the USA or European Union. The ratio of new graduates to the population of dentists varies between 1:92 in Finland, indicating a clear ambition to reduce the number of dentists in the country, to 1:30 in Denmark and Norway. The ratio of patients to dentist is markedly higher in Canada (1:1800) than in the five Nordic countries (1:1100).

All undergraduate programs in the Nordic schools are free or at a minimal cost, while schooling in Canada varies between \$27,000/year (**Université Laval, Québec**) to \$40,000 (University of British Columbia, Vancouver) in annual tuition fees.

The Nordic countries share a common social and cultural background, and there is cooperation across the borders with regard to most issues in society, even including dental education⁴. The dental faculty deans, as well as many of the clinical discipline academic groups, meet regularly and discuss formal and informal harmonization of curriculums. One such group, the Scandinavian Society for Prosthetic Dentistry (SSPD), has met regularly over the last 30 years to establish consensus on prosthodontic teaching practices. From personal experience, it is apparent that the success in bringing best practices back for implementation has varied within the realms of curriculum disagreements between faculties⁶. Until recently, the only schools to mandate their undergraduate students to complete implant-supported prosthetics were the two schools in Denmark (Aarhus and Copenhagen). There are no common implant curriculums being taught in the dental schools in Canada, and education ranges from none to elective clinical experience in the clinics.

One area where there is a large variation amongst the six countries is in the recognition of dental specialists. Four of the countries have specialist recognition of oral maxillofacial surgery, periodontology and prosthodontics. Both in Denmark and Finland, oral maxillofacial surgery is a specialty, but in Denmark periodontology and prosthodontics are not recognized, and in Finland the relevant specialty is 'clinical dentistry' which encompasses multiple disciplines. The ratio of specialists to dentists varies markedly also. In Sweden, the ratio of specialists to dentists is much higher than in the other countries, especially for oral and maxillofacial surgeons (1:30). Canada has a low ratio of

prosthodontists to dentists (1:107), but a very high number of denturists, or clinical dental technologists as they are titled in Denmark.

Eight of the 10 schools in Canada offer postgraduate programs in the disciplines involved with implant dentistry. Six offer a program in oral maxillofacial surgery, 4 in periodontology and currently 2 in prosthodontics. The University of Toronto is the only university in Canada that offers all three postgraduate programs¹. Iceland has no postgraduate programs. Two of the three faculties in Norway offer all three programs. Both faculties in Denmark offer a maxillofacial surgery program (also referred to as 'hospital dentistry'). All four faculties in Sweden organize a broad range of postgraduate programs. The two dental faculties in Finland both offer specialty programs in oral maxillofacial surgery and clinical dentistry. A special feature in these two last countries is that such programs are also set up in so-called competency dental centres. The most well known internationally are the postgraduate centres in Turku, Finland, and Halmstad, Jönköping and Örebro, Sweden. A large number of excellent research studies have emerged over the years from these centres, which may perhaps indicate that decentralized postgraduate centres are a good model to follow.

All postgraduate programs in the Nordic schools are free or at a minimal cost, while the training in Canada ranges between \$30,000 and \$40,000 per year in tuition fees.

Dentists who wish to partake in continuing dental education (CDE) courses can choose from different providers, such as (i) university-affiliated centres, (ii) manufacturer production facilities, (iii) manufacturers and distributors: organized

or sponsored seminars, and events organized by (iv) interest associations or (v) private enterprises. One of the pitfalls of such courses is that the objectives of the learner may not be satisfied for various reasons. A good strategy for prospective participants is to select courses offered by providers that adhere to good educational practices. Guidance in this respect is offered by the course quality approval concepts organized by the Academy of General Dentistry (AGD) or the American Dental Association (ADA). Both parties have identified a set of criteria associated with best practices and invited course providers in North America to be accredited according to these. Once accredited, the providers may advertise with either the AGD PACE logo (Program Approval for Continuing Education)⁸ or the ADA CERP (Continuing Education Recognized Provider)⁹ logo. The two programs are fairly similar, and contain requirements regarding, e.g. educational methods, instructors, record keeping, conflict of interest rules, etc.

Six of the 10 Canadian university faculties are CDE providers certified by PACE and/or CERP^{8,9} (Dalhousie, British Columbia, McGill, Toronto, Western Ontario and Montreal). In addition, the University of Victoria in British Columbia is a CERP provider that offers CDE courses, including on implant dentistry topics.

Many implant manufacturers have built training centres near their production facilities. Of the five manufacturers in Sweden (Astra Tech, Dentatus, Nobel Biocare and Ospol) and Finland (Osfix) only Astra Tech and Nobel Biocare have full-scale clinical and didactic educational facilities. Of the four manufacturers in Canada (Biohex Corp., Innova, Simpler Implants and Tenax) two are CERP and/or PACE certified (Innova and Tenax), although only Tenax can boast a clinical teaching environment. Also, Biomet 3i and Straumann Canada are recognized providers but have no clinical teaching environment. Finally, Nobel Biocare has a clinical and didactic training centre, but is not currently a recognized CDE provider^{8,9}.

The many manufacturers and distributors of dental implants present extensive course activity, and space does not allow description in detail. A practical problem may be in knowing whether or not an implant system is approved for use. This is regulated in Canada by Health Canada⁷, while in Europe all implant systems require a CE certificate to be sold. Currently, there are at least 130 dental implant

manufacturers and 375 dental implant systems. Just as the number of manufacturers and implant systems seem to be out of control, so are the educational programs that are being offered.

Interest associations such as implant societies and national dental associations have taken different proactive roles in the six countries. In Canada, several of the provincial dental associations and regulatory bodies have joined the Canadian Dental Association and become recognized CDE providers. The only association besides these is the Canadian Academy of Restorative Dentistry and Prosthodontics, which in contrast to the other groups arranges educational events that focus on implant dentistry. The different national implant societies under the umbrella of the ICOI (International Congress of Oral Implantologists) used to be very active, but their roles seem to have dwindled. Only the Danish society seems to be active. Of course, all the specialty associations in the various countries include implant dentistry themes in their annual meetings. In Norway, the national dental association has undertaken the educational responsibility to bring dentists up to a minimum competency level to receive patients covered by the national insurance scheme. This they accomplish by contracting employees from the dental faculties.

The last source of education possibilities is private enterprise. This avenue is more or less non-existent in the Nordic countries as there is a shared fundamental scepticism towards any form of enterprise based on making profits. Occasional attempts can be found in advertisements, but to date there are no economically prosperous private dental educational enterprises in any of the five Nordic coun-

tries. The closest one would come may be the national dental associations, which currently have the awkward role of looking after their members' interests while organizing economically sound CDE programs, combined with being responsible for accrediting dentists on the basis of their CDE documentation.

This scepticism towards for-profit educational courses seems not so apparent in Canada, where there are 69 CERP and/or PACE providers^{8,9}.

At least 16 providers offer courses on implant dentistry themes, of which 4 are manufacturers and 11 are private enterprises. One of these providers has both CERP and PACE accreditation (Implant Resource Centre, Vancouver).

There is increasing interest internationally in coming to some consensus on a core curriculum for implant dentistry. Differences in educational philosophies and approach to patient care, for example between Canada and the five Nordic countries, make it questionable whether one teaching model will fit all. Despite these differences, if one is to proceed, a competency-oriented education model seems to be the way forward¹⁰. A three-circle model for competency assessment of health personnel was introduced by Harden and colleagues in 1999⁵ (Fig. 1). This concept seems to have met with recognition and approval in both the dental and medical education systems². In brief, educational programs should ideally be planned to address dimensions of the work of the competent and reflective practitioner. Harden's model is to detail these by sets of criteria organized within three circles. The inner circle represents what the doctor is able to do ('doing the right thing' - that is tech-

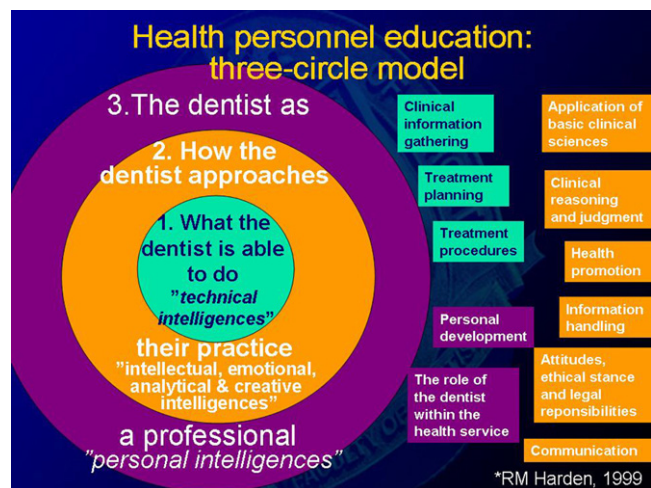


Fig. 1. Specification of learning outcomes according to the three-circle model introduced by HARDEN et al.⁵

nical intelligences). The next is how the doctor approaches their practice ('doing the thing right' - intellectual, emotional, analytical and creative intelligences). The third and outer circle details how the doctor should be as a professional ('the right person doing it' - that is personal intelligences).

The key tasks that represent the practical aspects of patient care, within the current theme of implant dentistry, can be identified as clinical information gathering, treatment planning and treatment procedures, but the dentist needs to bring more than practical skills to the patient encounter. 'How the dentist approaches their practice' or what they bring to the treatment of each patient should include application of basic clinical sciences, clinical reasoning and judgment, good communication, implementing optimal health promotion, appropriate attitudes, ethical stance and legal responsibilities, and proper information handling. The final dimension to the Harden outcomes model is 'the dentist as a professional'. This encompasses: the role of the dentist within the health service as well as acceptance of responsibility for personal, career and continuing professional development⁵. The challenge to construct courses in implant dentistry within this

competence-oriented education model remains.

References

1. Accredited dental education programs across Canada. [database on the Internet]. Ottawa (ON): Canadian Dental Association. [Cited 2007 April 5]. Available from: <http://www.cda-adc.ca/en/cda/cdac>.
2. Core Committee, Institute for International Medical Education. Global minimum essential requirements in medical education. *Med Teach* 2002; 24: 130–135.
3. Country Facts and Figures. [database on the Internet]. Ferney-Voltaire, France: FDI World Dental Federation. [Cited 2007 April 5]. Available from: http://www.fdiworldental.org/resources/3_ofacts.html.
4. FIEHN NE. Perspectives on dental education in the Nordic countries. *J Dent Educ* 2002; 66: 1374–1380.
5. HARDEN RM, CROSBY JR, DAVIS MH. AMEE Education Guide No. 14: Outcome-based education, Part 1: An introduction to outcome-based education. *Med Teach* 1999; 21: 7–14.
6. JOKSTAD A. Oral prosthetics from a Nordic Perspective. *Int J Prosthodont* 2002; 15: 145–152.
7. Medical Device Licence Listing. [database on the Internet]. Ottawa: Health Canada. [Cited 2007 April 5]. Available from: <http://cpe0013211b4c6d-cm0014e88ee7a4.cpe.net.cable.rogers.com/mdall/>.
8. PACE-approved continuing education providers. [database on the Internet]. Chicago (IL): Academy of General Dentistry. [Cited 2007 April 5]. Available from: <http://www.agd.org/cde/pace/providers.asp>.
9. Recognized CE Providers Approved by the ADA CERP. [database on the Internet]. Chicago (IL): American Dental Association. [Cited 2007 April 5]. Available from: <http://www.agd.org/cde/pace/providers.asp>.
10. SCHWARZ MR, WOJTCZAK A. Global minimum essential requirements: a road towards competence-oriented medical education. *Med Teach* 2002; 24: 125–129.
11. The World Factbook, [database on the Internet]. Washington DC: The Central Intelligence Agency (CIA). [Cited 2007 April 5]. Available from: <https://www.cia.gov/cia/publications/factbook/>.

Address:
 Asbjørn Jokstad
 University of Toronto
 Faculty of Dentistry
 124 Edward Street
 Toronto ON M5G 1G6
 Canada
 Tel.: +1 416 979 4930x4427
 Fax: +1 416 979 4936
 E-mail: a.jokstad@dentistry.utoronto.ca