Evolution

by Patty Wickstrom

The face of oral health care is changing rapidly—are we ready for it? I think so. Here are some of the areas in which we are actively involved.

Scaling modules for dental assistants
As I am sure you are aware, there has been a move to increase the scope of practice for dental assistants so they can carry out limited scaling in some jurisdictions. As I discussed in the January/February issue of Probe, the education and practice of a dental hygienist incorporates so much more than scaling teeth. Scaling cannot be looked upon as an isolated act. CDHA continues its efforts to educate health and dental care providers about the benefits of a well-educated dental hygienist providing the full range of oral hygiene care, one element of which is scaling.

Aging population
With public awareness, education, and, in many cases early diagnosis of and intervention for dental disease, more people are retaining their dentition longer. With that comes more long-term maintenance and further disease prevention, a key area in which dental hygienists are invaluable. Periodontal disease remains a very considerable threat to the long-term health of a person’s oral cavity.

The need to educate the public
and gain their support for
unrestricted access to dental hygiene
services for all people of Canada.

Evidence-based practice
Along with the changes in oral health, the profession has a responsibility to remain current and anticipate dental hygiene services for the future. Salme Lavigne and Judy Lux have gathered and interpreted data concerning the links between oral health and general health— their paper is included in this edition of Probe. I encourage you to read this article and incorporate the information into practice. You are welcome to give your feedback and comments to the CDHA office. As we continue our move toward evidence-based practice, we need more research and data to support evidence-based practice.

Évolution

par Patty Wickstrom


La nécessité d’éduquer le public
et d’obtenir son appui pour travailler
à assurer un libre accès aux
services d’hygiène dentaire pour
tous les habitants au Canada.

Modules de détartrage pour les assistantes dentaires
Vous savez, j’en suis sûre, qu’on a progressé pour élargir la portée de la pratique des assistantes dentaires afin de leur permettre d’effectuer un détartrage limité, dans certaines provinces. Comme j’en ai discuté dans le numéro de janvier/février de Probe, l’éducation et la pratique de l’hygiéniste dentaire intègrent tellement plus d’éléments que le détartrage des dents. On ne peut considérer le détartrage comme un acte isolé. L’ACHD poursuit ses efforts pour éduquer les dispensateurs de soins de santé et de soins dentaires relativement aux bénéfices d’une hygiéniste dentaire diplômée qui dispense la gamme complète des soins d’hygiène bucco-dentaire, dont le détartrage constitue un des éléments.

Vieillissement de la population
Davantage de personnes conservent leur dentition plus longtemps, suite à la sensibilisation du public, de l’éducation et, dans bien des cas, du diagnostic précoce d’une maladie dentaire et de l’intervention conséquente qui s’ensuit. Ce qui entraîne un entretien à plus long terme et une meilleure prévention de la maladie, domaine clé dans lequel les hygiénistes dentaires rendent des services inestimables. La parodontopathie demeure une menace très grave à la santé à long terme de la cavité buccale d’une personne.

Pratique fondée sur des données probantes
Parallèlement aux changements qui surviennent en santé buccale, la profession se doit de maintenir ses connaissances...
CONTENTS

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RESEARCH ARTICLES

Your Mouth: Portal to Your Body
by Judy Lux and Salme Lavigne ................. 115

DENTAL HYGIENE PRACTICE

The Dental Hygienist and Access to Care:
Interview with Pat Spencer
by Dennis Jones ......................... 108

101

DEPARTMENTS

President’s Message
Evolution / Évolution .............................. 99

Executive Director’s Message
Not just a collection of parts / Beaucoup plus que la somme des parties .............. 103

Notice of special meeting ....................... 105

News ............................................. 106

Advertisers’ index ............................... 134

Letters to the editor ............................ 136

Classified advertising ........................... 142
The cleaning lady deals with the patient on a human level. She’s scrubbing the floor in the room and the patient says, “My son didn’t come to visit me today.” The cleaning lady smiles and says, “I know how you feel. I know how I’d feel if my son didn’t come to visit me if I was sick.” The cleaning lady doesn’t see the patient as a renal failure or an ileostomy. She just sees a poor lady who’s sick.

— Kitty Scanlan, U.S. occupational therapist, as quoted in Working, Book 8, by Studs Terkel (1973)

The two feature articles in this issue of Probe seem unrelated at first glance. One explores the literature on the linkage between oral health and overall health; the other is an interview with Pat Spencer who has worked collaboratively with other health professionals to enhance clients’ oral and general health for close to 40 years. However, the connection between these two articles—and the new and exciting possibilities they hold—came strongly to mind when I attended a National Stakeholders’ Workshop on Interprofessional Education for Collaborative Patient-centred Practice. The premise for this workshop is captured in the above quotation, that people are more than a collection of body parts or diseases.

People are more than a collection of body parts or diseases.

Health care and access to it for all Canadians have been in the forefront of the news for a few years now, thanks to the work of the Romanow and Kirby commissions. Based on these commissions’ findings, the First Ministers’ Health Accord on Health Care Renewal in 2003 has stressed the need for Canadians to have access to health care providers, both now and in the future. One result is the National Health

MESSAGE DE LA DIRECTRICE GÉNÉRALE

Beaucoup plus que la somme des parties... 

par Susan Ziebarth, BSc, MHA, CHE

La femme de ménage traite avec la patiente à un niveau humain. Elle frotte le plancher de la chambre et la patiente lui dit : « Mon fils n’est pas venu me voir aujourd’hui ». La femme de ménage sourit et dit : « Je sais ce que vous ressentez. Je sais ce que je ressentirais si j’étais malade, si mon fils n’était pas venu me voir ». La femme de ménage ne voit pas la patiente comme une insuffisance rénale ou une iléostomie. Elle ne voit qu’une pauvre femme malade.

— Kitty Scanlan, ergothérapeute américaine, telle que citée dans Working, Book 8, par Studs Terkel (1973)

Au premier coup d’œil, les deux articles de fond de ce numéro de Probe ne semblent pas avoir de rapports l’un avec l’autre. L’un explore la documentation sur le lien existant entre la santé bucco-dentaire et la santé en général; et l’autre est une entrevue avec Pat Spencer qui a travaillé pendant une quarantaine d’années, en collaboration avec d’autres professionnels de la santé, à l’amélioration de la santé bucco-dentaire et de la santé en général. Toutefois, la connexion entre ces deux articles, — et les nouvelles possibilités excitantes qu’ils renferment —, me sont soudées à l’esprit avec force alors que j’assistais à un atelier national des intervenants sur l’éducation interprofessionnelle en vue d’une pratique centrée sur le patient. La prémisse de cet atelier est captée dans la citation ci-dessus, soit que la personne humaine représente davantage que la somme des parties du corps ou des maladies.

NOT JUST A COLLECTION OF PARTS ... continued on page 139

BEAUCOUP PLUS QUE LA SOMME DES PARTIES ... suite page 139
NOTICE OF SPECIAL GENERAL MEETING OF MEMBERS OF CANADIAN DENTAL HYGIENISTS ASSOCIATION (CDHA)

NOTICE is hereby given that the special meeting of the members of CANADIAN DENTAL HYGIENISTS ASSOCIATION will be held at the Fairmont Newfoundland, at 115 Cavendish Square, St. John’s, Newfoundland and Labrador, on Sunday the 27th day of June, 2004, at the hour of 8:00 o'clock in the forenoon, to:

I. Consider for ratification the amendments to the corporate bylaws.

Copies of the proposed amended bylaws are available for review at the corporation's head office during normal business hours and on-line at www.cdha.ca/members/content/policy&action/proposed_bylaw_revisions.asp

DATED the 15th day of May, 2004.

BY THE ORDER OF THE BOARD OF DIRECTORS

Executive Director

AVIS DE CONVOCATION DE L’ASSEMBLÉE EXTRAORDINAIRE DES MEMBRES DE L’ASSOCIATION CANADIENNE DES HYGIÉNISTES DENTAIRES (ACHD)

Les membres de l’ASSOCIATION CANADIENNE DES HYGIÉNISTES DENTAIRES sont par le présent AVIS convoqués à une assemblée extraordinaire qui aura lieu au Fairmont Newfoundland situé au 115, Cavendish Square, à St. John's (Terre-Neuve-et-Labrador) le dimanche 27 juin 2004, à huit heures. À l’ordre du jour :

I. L’examen des modifications des règlements de l’Association aux fins de ratification.

Les règlements modifiés qui sont proposés peuvent être examinés au siège social de l’Association pendant les heures de bureau ou en ligne à l’adresse suivante

www.achd.ca/content/~fr_salle_des_nouvelles/proposed_bylaw_revisions_fr.asp

Des exemplaires des états financiers et du rapport des vérificateurs peuvent être examinés au siège social de l’Association pendant les heures d’affaires ordinaires.

FAIT le 15 mai 2004.

PAR DÉCRET DU CONSEIL D’ADMINISTRATION

Directrice générale
Announcing the First-Ever Listerine Gingivitis Week

Toronto, ON, April, 2004 – Today, Pfizer Canada and the Canadian Dental Hygienists Association (CDHA) are proud to announce their partnership for the first-ever Listerine Gingivitis Week, to take place this June 7–13, 2004. Seventy-five per cent of Canadians have gingivitis—the earliest and mildest stage of gum disease—yet only six per cent of us believe we are personally affected by this condition. The goal of Gingivitis Week is to educate Canadians on the personal relevancy of this condition and prompt patients to talk to their dental hygienists.

The first step to eliminating gingivitis—the precursor to periodontal disease—is making patients aware of the condition, their options, and available solutions.

“Contrary to popular belief, bleeding, red gums are not normal,” says Susan Ziebarth, Executive Director of the Canadian Dental Hygienists Association. “It’s an odd perception, as bleeding from other parts of the body such as the nose or ear, would naturally be a cause for concern. Yet red, puffy, or bleeding gums—which are a warning sign for gingivitis—seem to be readily accepted by Canadians. Our hope is Listerine Gingivitis Week will shed some light on gingivitis as a condition, starting with its symptoms and potential health implications. But most importantly, we want to encourage a dialogue between patients and their dental hygienists.”

The week will be launched nationally on Monday, June 7, in Toronto at a special kick-off event. A mix of interactive education and awareness activities are planned, including on-site sampling, prizes, and charitable contributions. Events have also been planned for Vancouver (Wednesday, June 9) and Montreal (Friday, June 11).

For more information, please contact:
Amy Stork/Sarah Lewis
Environics Communications
416-969-2737/416-969-2759
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New edition of Clinical Practice of the Dental Hygienist, by Esther Wilkins

This definitive text on dental hygiene has been significantly revised and updated. The ninth edition, published by Lippincott Williams & Wilkins, will be available in June 2004. The publisher’s web site states that this edition provides “even more focused guidance on all aspects of dental hygiene in the clinical environment.... Six comprehensive sections address orientation, preparation for appointments, patient assessment, treatment, and patients with special needs. New features include a significantly revised art program, case-based exercises to reinforce understanding, procedure boxes to enhance technique, and ethics boxes. New ancillaries include a study guide (sold separately) and instructor’s Website.”

New Health Professional’s Guide to Pediatric Oral Health Management

This new guide, prepared by the U.S. Maternal and Child Health Bureau, contains “seven self-contained online modules designed to assist health professionals in managing the oral health of infants and young children.” The modules provide information on “performing an oral screening to identify infants and children at increased risk for oral health problems, offering referrals to oral health professionals, and providing parents with anticipatory guidance.” The guide can be viewed at <www.mchoralhealth.org/PediatricOH/index.htm>.

Federal government enhances the Education Tax Credit in response to CDHA request

CDHA members requested that we lobby the federal government to obtain tax credits for continuing education expenses. Since CDHA firmly believes in “strength in numbers,” we assembled a group of six like-minded organizations, including the Canadian Nurses Association and the Canadian Counselling Association. As a result of our combined efforts, the latest federal budget announced that employed individuals can now claim the education tax credit for education related to current employment when costs are not reimbursed by employers. This will give dental hygienists a tax credit amount of $400 per month for full-time students and $120 per month for part-time students.
PRESS RELEASE

The Canadian Dental Hygienists Association Celebrates Federal Government Investment in Public Health

March 24, 2004, Ottawa: The Canadian Dental Hygienists Association (CDHA) gives a hopeful thumbs up to the federal budget. The creation of a new position—Secretary of State (Public Health)—$1 billion for public health and the new Canadian Public Health Agency are significant positive steps forward.

There is abundant evidence that a sizeable portion of the population does not have access to oral health services. In addition, in the last 24 years, the numbers of dental hygienists working in public health have decreased threefold from 13% in 1977 to 3.8% by 2001. Susan Ziebarth, Executive Director of CDHA, says, “Canada needs to do a better job addressing the inequalities in oral health and improving access to oral health care. Some of this public health money must be directed to an oral health safety net.”

The Canadian Dental Hygienists Association calls for a Canadian oral health strategy that monitors oral health status and gives direction to new oral health programs. There is a particularly pressing need for oral health programs for seniors in long-term care facilities, low-income families, and Aboriginal peoples both on- and off-reserve.

There is now a large body of evidence indicating a possible link between periodontal disease and systemic diseases, such as diabetes, heart and lung disease, and pre-term low birth weight babies. Given these new connections, there is a key role for dental hygienists to play in decreasing the incidence and severity of these systemic diseases and also a stronger argument for an oral health system that is accessible to all. The mouth-body connection also highlights the need for collaborative work between oral health professionals and general health professionals, and public health is the logical place for this collaboration to begin.

For more information, please contact:
Judy Lux
Health Policy Communications Specialist

CDHA Board - Highlights of Meeting

February 2004, Ottawa – The CDHA Board of Directors welcomed many new board members and received orientation by Jannice Moore. The new provincial representatives are Susan Vogt (SDHA), Carol Yakiwchuk (MDHA), Evie Jesin (ODHA), Alison MacDougall (PEIDHA), and Palmer Nelson (NLDHA). Bonnie Blank began her term as the DHEC representative.

The Ends were reconfirmed using information gathered from the Board members, as representatives of the CDHA members. The Board, with the coaching of Jannice Moore, also reviewed and amended the policies on Governance, Executive Limitations, and Board-Executive Director Linkage. (The complete Mission/Purpose Ends Statement can be viewed on-line at www.cdha.ca, Members Only section, CDHA Priorities area, under Inside CDHA.)

Karen Wolf will chair the Town Hall Organization Committee for the conference in St. John’s, Newfoundland and Labrador. Palmer Nelson, Evie Jesin, Carol Yakiwchuk, and Bonnie Blank will round out the committee. The committee’s mandate is to plan the Town Hall Meeting for June 2004, guided by Governance Process Policy, and to brainstorm for ownership linkage ideas for the upcoming year.

The Board agreed to extend the term of office for the next two presidential terms in order to bring this term of office in line with the board of directors’ terms so that they will align by October 2006.

Post-meeting news: Early in March, Lynn Smith was elected to the position of CDHA Director for the British Columbia Dental Hygienists’ Association for the 2004-2007 term.
The Dental Hygienist and Access to Care: 
Interview with Pat Spencer, DipDH, BA

by Dennis Jones

When Pat Spencer received her dental hygienist’s diploma in 1966, she was one of a relatively small number of dental hygienists—fewer than 300—who were practising in Ontario. Since then, the dynamic Ms. Spencer has acquired a BA, served as the sole oral-care participant in the advisory group for the provincially sponsored Elder Abuse Initiative, served as President of the Ontario Dental Hygienists’ Association and as a member of its executive, instructed in dental hygiene and management subjects at the local campus of Fanshawe Community College, and has lobbied her local MPP, government committees and numerous organizations to gain support for amending dental hygiene legislation.

As an entrepreneur, Ms. Spencer established her own practice, Mobile Oral Health Services, in 1996. Through her business, she provided mobile dental hygiene care to residents in several long-term care facilities and to the homebound who cannot obtain access to traditional office settings. Her experience in dealing with these clients and their families has made her especially sensitive to the problems they experience in obtaining adequate oral health care.

We talked with Ms. Spencer about her long career and about the ways in which she believes her profession can help improve Canadians’ access to dental hygiene services.

Q: You’ve been a dental hygiene professional since 1966. Can you tell us something about the influences that led you to enter the profession?

The thing that helped lead me in that direction, I think, goes right back to when I was seven or eight years old and needed to have a dentist remove teeth to alleviate crowding. I thought this was quite something, so I guess I had an interest in oral health right from the time I was a child.

But in the early 1960s, when I was thinking about a profession, nobody knew about dental hygienists. I don’t think that high school guidance counsellors, for example, were even aware of the possibility of dental hygiene as a career. At that time, most young women who wanted a profession were advised to go into nursing or teaching.

However, I knew I didn’t want to be either a nurse or a teacher. I considered training as a dental technician, but was told by a lab that no one would take me on as an apprentice—they believed that women usually got married and then stayed home, so the training would be wasted. However, the president of the dental technicians’ association, to whom I had written, advised me to look into the dental hygiene program at the University of Toronto. I was accepted into the program in January 1964 for a fall start, and I received my diploma in May 1966.

Q: How did the University of Toronto go about training dental hygienists in the 1960s? And how was it different from today’s approach?

From the time we entered the University of Toronto, we were fully involved in the university program. The emphasis was on training us to be well-rounded, responsible professionals, so we had classes with a wide range of other students—premed students, physiotherapy and occupational therapy students, sociology majors and so on. In that way especially, it was very good preparation for the work world.

Later on, of course, dental hygiene programs were shifted from the universities into the community college system. When that happened, these programs stopped being a direct entry into the profession. You first had to train as a dental assistant in a community college, then work in this capacity, and only after that could you reapply to train as a full-fledged dental hygienist.

What they needed most was someone like me to come in and show the caregivers how to provide dental care for her.
In my opinion, which is based on information I acquired in my cultural studies program, this approach socialized dental hygienists to be dependants of the dentist rather than full professionals in their own right. Now, however, with the change back to a direct-entry program in the community colleges and in private dental hygiene schools, that socialization pressure has fortunately been removed.

Q: Tell us about your first job, when you were employed by the city of Hamilton.

There was a part-time dentist I reported to, and I reported directly to the city's Medical Officer of Health as well. At that time, I was the only dental hygienist employed by the city, and I was responsible for visiting schools, providing oral health education, screening for oral diseases, and making reports on what I found out about the oral health of the children. The data from these surveys formed part of the research for the World Health Organization, which was comparing children's oral health in cities of a similar size among various countries. Another major part of my role was to be an oral health resource for the community. I was very comfortable with my position in this work world because the education I'd received was so well-rounded.

Q: What directions did your career take after that?

Because I was one of the early dental hygienists, dentists would hire me to set up the dental hygiene practices they needed for their offices. Also, like many of my classmates, I took several years off for childrearing but worked as dental hygienist for the majority of my working years. Eventually, I became an entrepreneur and established my own dental hygiene practice.

Q: You've indicated that you started your independent practice because you were concerned about access to care in institutional settings. What situations did you encounter that led you to concentrate on this problem?

I'd realized that large numbers of seniors had an acute need for preventive oral health services, and that a similar need existed among the homebound and among people who couldn't afford or get access to the kind of oral care delivered in traditional dental offices.

Families would complain to me that they couldn't get help for their loved ones. One particular lady was in home care, with her family providing round-the-clock caregivers, but she was unable to get access to a dental office. What they needed most was someone like me to come in and show the caregivers how to provide dental care for her.

There were lots of other situations that made me realize how great the need was. People with broken hips, for example, have great difficulty sitting in a chair and often need to be treated in their beds. People with advanced dementia and people with Parkinson disease are other instances. I chose to focus on the elderly population who were institutionalized or homebound, but people don't have to be older to need help, of course. Individuals who are developmentally compromised can have severe difficulties, as well.

Q: Preventive care is clearly a good strategy for averting serious oral health problems. How does this strategy fit into your vision of better access to care?

There's no end of examples that show the need for preventive care. One man I treated had his infected first molar extracted by a priest while hiding from the enemy during the war, when he was about seven years old. As a result, he was terrified of dental care. By the time I saw him, he was at the point where he would lose his job if he didn't have oral care to deal with the bad mouth odour. I worked with him to clean up the periodontal problems and watched as his self-esteem and his health slowly came back. Over and over, you see people come in with problems, and as their oral health disorders clear up, their poise and confidence returns.

It's hard to quantify the benefits of any kind of preventive program. However, you can go into opportunity costs, and there have been studies in the United States on this, such as how many work hours are lost to oral health problems. Unfortunately, there isn't a lot of Canadian literature on the subject yet. But the Federal, Provincial and Territorial Dental Directors Working Group is now working on a project called the National Oral Health Strategy, which will eventually provide a database of information about the status of oral health in this country and will establish a set of strategies and goals toward which we can work. I've provided input from my own research toward this project.
With regard to background, continuing education is extremely valuable to any practitioner.

Dental hygienists will certainly have a large part to play in preventive oral health strategies, whatever these strategies turn out to be. We provide more than half of oral health services billed, according to reports, and our delivery of these services is extremely flexible and portable.

Q: You established your independent dental hygiene practice in 1996. Could you describe the regulatory changes in Ontario that allowed you to do this?

The key regulatory change was when the Dental Hygiene Act went into force in December 1993. The Act recognized dental hygiene as being separate and distinct from dentistry. After it was proclaimed, dental hygienists were able to practise in the community without needing the presence of a dentist.

Under this legislation, however, dental hygienists require an order from a member of the Royal College of Dental Surgeons of Ontario in order to perform the controlled acts of scaling and of restorative and orthodontic services in the community. While this is understandable for restorative and orthodontic services, it is unnecessary for preventive scaling services. Dental hygienists know when to refer and when to proceed with the provision of scaling services; unfortunately, this need for an order for scaling means that the public needs a dentist of record to provide the order.

Unfortunately, some members of the public cannot afford this because they have no dental benefits and a low income; others cannot obtain access to a dental office because of distance, transportation problems or illness; and others simply choose to avoid the intervention of a dentist. As a result, the public is denied ready access to the cost-effective options in preventive oral care that mobile and flexible dental hygienists can provide.

Q: What kind of qualifications and background contribute to setting up a successful dental hygiene practice?

To begin with, obviously, you have to meet the requirements of being registered to practise in Ontario. It’s also very wise to think as a business person and to meet business standards and practices by using proper accounting and record-keeping procedures, by marketing your services effectively, by purchasing commercial liability insurance, and so on. As an aside, I have found that the best insurance rate is available through our professional associations.

With regard to background, continuing education is extremely valuable to any practitioner. On the clinical side, some obvious educational choices are studies in dementia and palliative care. But I’ve found that what really prepared me for running my own business was having gone through a liberal arts degree program. For example, by studying environmental law, I learned how to read legislation and about the ways legislation can be amended. Cultural studies helped me appreciate that different cultures have different approaches, so I learned to be much more sensitive to differences. Education in counselling is also excellent—I did a counselling program that significantly changed how I thought and how I approached people.

Q: In your experience, what are the advantages of being self-employed? And how do you ensure a balance between work and personal life?

The great advantage of being self-employed was being my own boss—I could choose my working hours and how I spent them. When I was employed by someone else, I’d have only so much time with a client and would be expected to generate a specific amount of income during that time. But when I was in charge, I could choose how to manage things. Some people wanted me to help with dietary analysis, some with smoking cessation. Or they just wanted counselling and information, and counselling is very much a part of being a dental hygienist.
As for maintaining a balance, it’s important to realize that no one will be as concerned about your health, your family, and your financial planning as you are, so you have to make time to address these needs. Small-business owners frequently find that the business will gobble up any time that is not scheduled. Consequently, you must be sure that you make regular “appointments” for dealing with personal needs.

Q: Can there be a frustrating side to running an independent dental hygiene practice?
There can be. If I could have provided scaling services without needing an order, I probably wouldn’t have felt quite so frustrated. I was offering a package of preventive oral services—screening for oral disease and swallowing disorders, developing oral protocols, giving referrals, providing in-service training, and so on. But because the Dental Hygiene Act required me to have an order from a dentist to provide scaling services, and because many of my clients didn’t have a dentist of record or couldn’t afford a dentist, I wasn’t completely free to offer all the services I could provide. In other words, I was restricted from providing my full scope of practice, and this created some frustration.

Q: Turning again to education, you’ve pursued learning throughout your career. In the context of your profession, why is continuing education so important?
Because clients rely on dental hygienists as a source of accurate information, continuing education is necessary to better understand the client, to know the best approach to an oral health problem, and to have the most accurate and current data about available options. Continuing education also increases your professional credibility and offers more career paths, including obtaining a PhD in dental hygiene.

And as I’ve already suggested, continuing education is important if you decide to set up an independent dental hygiene practice. There’s a lot to learn about organizational behaviour, marketing, customer relations, taxation, and accounting.

Q: In your experience, which segments of the Canadian population most need better access to oral health care? How can we provide this care?
More and more individuals are losing dental benefits because they’re working on contract. Older adults are retaining more of their natural dentition but have limited income. Young people are looking longer for their first permanent job and their income is also limited. Also, there are many who are frail or medically compromised and who need continuing care but who cannot afford or get access to a traditional dental office.

As a result, there’s a growing need for cost-effective alternatives in oral-care delivery. One approach for a dental hygienist might be to share an office with other health care providers, such as a denturist, chiropractor, or physiotherapist, with a 60/40 income split—you keep 60 per cent of your income and allocate 40 per cent of it to overhead and administration costs. Then, depending on your community and your overhead, you can choose how much revenue you need to earn and where and for whom you’d provide care. As another possibility, you might work with a group of dental hygienists and share the hours as it suits the members of your group.

Q: What do you think will happen if we don’t find viable, cost-effective ways of providing oral health care for people who need it?
If we don’t, the situation will only get worse. Right now, there is a terrible disparity between the haves and the have-nots. Eventually, it will be a very tiny minority who can afford oral health care if these alternatives are not provided—especially as more and more jobs become low-paying ones or turn into contract positions with no benefits. I think it’s going to be a major issue; my particular topic of research right now is globalization, simply because I think that within 20 years we’re going to be very vulnerable in this area.

There’s a growing need for cost-effective alternatives in oral-care delivery.

Q: What measures could institutions, governments, and the oral health care professions take to provide Canadians with the oral health care they need?
First, if primary care reform included the dental hygienist as a provider recognized by Medicare, many institutionalized people could have regular preventive care. Second, removing the need for an order for scaling would give dental hygienists opportunities for providing preventive services in remote communities, through health units or community centres.

Third, other professions and the public need to understand the importance and role of good oral care to overall health. Dental hygienists can help promote such measures. The Canadian Medical Association, for example, is lobbying to raise awareness of the financial and legislative challenges that medical professionals face. Dental hygienists also have to recognize that, just as they take personal responsibility for their lives and their personal futures, they must also take responsibility for their profession and use the political process to secure its advancement and its future.
Q: From your perspective, what concrete steps can your profession take to meet Canadians’ oral health care needs?

I think that dental hygienists could adopt a nursing home and make their services available once a month or every six months, as the need arises. We can also examine partnering with other health practitioners, for example, by providing a team approach to holistic care. In this sort of care, the dental hygienist is one of several professionals, a team of people who look at the whole person and help him or her gain the optimum quality of life. However, a team wouldn’t be made up exclusively of health care professionals; it would include other specialists such as social workers. Each team member would learn what the others’ strengths were, so they could refer clients to each other according to the client’s needs.

Q: You’ve mentioned that the provision of counselling and information is a very important part of dental hygiene services. How can dental hygienists best help people obtain the information they need and want?

We can develop partnerships to make oral health care information more accessible. One way to do this is through health fairs. Health fairs inform people about what may be available to them through organizations such as the Department of Veterans Affairs, their local Alzheimer Association, the Diabetes Association and so on. As other examples, we can take courses with other health care practitioners and share our knowledge with them, and we can offer ourselves as resources to those associations that support people whose ill health puts them in need.

Getting our clients into educational situations is important. When I graduated, it was assumed that when you, a member of the public, had a health problem, you’d go to a professional who would then own the problem. Now, the emphasis is on people being responsible for their own health care, so they need access to teams of professionals who can give them the information they need to take charge of their health. In these educational situations, it’s important to use language that’s familiar to the public—and to other kinds of health care providers—and not lapse into dental jargon.

Q: Given what you’ve just said, do you feel that your profession might be wise to evolve a larger counselling and educational role that would complement its clinical role? And if so, how could this be done?

Because of their education, dental hygienists already have an excellent basis for providing oral health information, but we need better opportunities to offer this service. Dental appointments are scheduled to provide the scaling services that generate the most income for the dental office, and the limited time available for each appointment makes it hard for the dental hygienist and the client to fully discuss the client’s oral health.

Self-employment, on the other hand, allows dental hygienists to schedule the amount of time the client needs. You don’t use a one-size-fits-all approach—you might have a child coming in for the first time, so you’d do everything very gradually. Or you could have someone who was very fearful of oral health care, and you’d adapt your approach to alleviate their anxiety. If you were treating somebody who was tube-fed, you’d go in when the principal caregiver was there because that would provide a much more supportive environment for your client.

Q: How do you see your profession’s future in dealing with the access-to-care problem, and what advice do you have for dental hygienists who want to be part of the solution?

Dental hygienists can screen clients who need care and can make appropriate referrals. They can also provide information on the options that are available in health, nutrition, smoking cessation, personal care and so on. More education will open up more possibilities.

Dental hygienists can also explore the alternative delivery settings and multidisciplinary approaches I mentioned earlier and look for opportunities to help the public gain access to preventive oral care services. Building bridges with other organizations, professions, and providers is also essential.

The focus in dental practices has long been on the dental hygienist’s scaling services, but the possibilities for dental hygienists as health care providers are in fact unlimited. The negative impacts of a globalized economy will dramatically increase the need for affordable and safe alternatives in oral care, and the effective and increased use of dental hygienists will be a major contributor to those alternatives.

Q: As you look back on your long career, could you tell us what things about it have given you the most pride and satisfaction?

It’s a combination of things. I’m really proud of the fact that every dental hygiene practice I set up grew and thrived, and that preventive oral health care from dental hygienists is now regarded as the industry standard by the public. I’m proud that I had a chance to serve my provincial association on the Board of Directors, including a term as president, and that I took advantage of legislative changes to make my mobile dental hygiene practice a reality. And finally, I’m very proud to have known wonderful mentors and pioneers such as the late Barbara Heisterman and my many other colleagues across Canada, and that I chose to become a dental hygienist way back in 1964.
Your Mouth
- Portal to Your Body

by Judy A. Lux, BA, MSW, and Salme E. Lavigne, RDH, BA, MS(DH)

Canadian Dental Hygienists Association
Position Paper on the Links between Oral Health and General Health: Part I

This paper discusses four aspects of systemic health and their association with periodontal disease. Two diseases, diabetes mellitus and heart disease, are examined in this issue of Probe. The last two sections of the paper, respiratory disease and preterm low birth weight infants, will appear in the July/August 2004 issue of Probe.
EXECUTIVE SUMMARY

A large body of research indicates a striking association between oral health and systemic health. Heart disease, preterm low birth weight babies, diabetes mellitus, and respiratory disease are being linked to periodontitis.

- Periodontal disease may exacerbate diabetes mellitus. Mechanical periodontal therapy combined with systemic antibiotics may provide better metabolic control of type 2 diabetes, with a 0.8% to 11% reduction in glycated hemoglobin.
- Persons with periodontal disease have a 1.04 to 2.8 fold greater risk of incurring cardiovascular disease than persons without periodontal disease. Of the different types of cardiovascular disease, stroke shows the most robust association.
- Women with periodontal disease may have 4 to 7.9 times the risk of having a preterm birth than women with good oral health—this is considered a moderate to high risk. Early identification and treatment of periodontal disease during pregnancy may reduce the risk of premature birth and low birth weight.
- A moderate association may exist between oral health and respiratory disease, with an average odds ratio of 3.04 for those at risk of developing respiratory disease.

A number of possible biological pathways link oral disease to systemic disease:

- oral biofilm that harbours biological pathogens
- transient or chronic bacteremia
- immunologic injury caused by endotoxins
- direct injury by lipopolysaccharides

Since periodontal disease is a potentially modifiable risk factor, being both preventable and treatable in most cases, dental hygienists may have an opportunity to play a key role in decreasing the incidence and severity of these systemic diseases. This research opens the door for dental hygienists to work more closely with physicians and to take more direct responsibility for overall general health. These findings can create opportunities for an integrated model of oral and general health and will strengthen the argument for an oral health system that is accessible to all citizens.

INTRODUCTION

A mid-16th century English proverb states that “the eyes are the window to the soul.” A 21st century proverb could well read, “the mouth is the portal to the body.”

A large body of research indicates a striking association between the multifactorial etiology of oral and systemic diseases. Heart disease, preterm low birth weight babies, diabetes mellitus, and respiratory disease are being linked to periodontitis.

The purposes of this position paper are to (1) gather comprehensive research information to offer a critical look at the relationships between oral health and systemic health outcomes; and (2) to present recommendations supporting clinical practice, policy making, and self-care decisions. This paper was posted on CDHA’s website for comments. Members’ feedback was incorporated into the document to help establish a consensus among the association’s members on the recommendations. Several experts in the oral health field were also consulted. This paper will be reviewed at regular intervals to ensure that it includes the current research.

Although increased attention has lately been paid to the mouth-body connection, this area of research has actually existed for 100 years. In 1909, Dr. William Hunter devised the “focal infection” or “focal sepsis” theory, stating that dental (septic) infection was the most important cause and complication of medical diseases. More recently, the term “periodontal medicine” has been used to describe a new oral health field that examines how periodontal infections interact intimately with the morbidity and mortality of individuals with certain systemic conditions.

For example, diabetes mellitus is currently considered a risk factor for periodontal disease. This is supported by large epidemiologic studies using multifactorial statistical analysis to ensure the results are not skewed by confounding co-risk factors.
This paper examines the other side of the coin—the ways in which oral disease affects systemic health, specifically, chronic heart disease, respiratory disease, diabetes mellitus, and preterm low birth weight babies. Each of these diseases is examined separately below. Due to space considerations, the suspected associations between oral health and Helicobacter pylori infection, nutrition, rheumatoid arthritis, stress, osteopenia, and Kindler syndrome will be considered in a later position paper.

The oral-systemic disease link is important because of the high occurrence of oral disease—approximately 10% to 15% of the world's population is affected by advanced periodontal disease4 and more than 50% of adults 55 or older have periodontitis.5 If periodontal disease is associated with systemic disease, then its prevention may have a significant positive impact on the general health of Canadians and thus limit the human and financial costs of systemic health issues.

The following literature reviews will look at the research that explores oral and general health associations as well as the intervention studies that show how dental hygiene treatment affects systemic health. Appendix A contains the definitions of terms as they are used in this paper. 

**DIABETES MELLITUS**

**Diabetes mellitus** is a systemic disease characterized by hyperglycemia and it affects approximately 2 million people in Canada, about 6.4% of the population.6 There are two types of diabetes: type 1, formerly called insulin-dependent diabetes, is caused by the complete or almost complete destruction of the pancreatic beta cells that produce insulin. Type 2, formerly called non-insulin-dependent diabetes, is the result of the body’s inability to effectively use insulin so that glucose levels remain elevated. Risk factors for diabetes include a family history of diabetes, dyslipidemia, infertility, hirsutism, obesity, and smoking. Persistent poor glycemic control can lead to atherosclerosis, with complications such as retinopathy and nephropathy that may progress to blindness and end-stage renal disease.7 It is important to determine what factors disrupt glycemic control in diabetics, given that the annual cost of diabetes is estimated at almost $9 billion,8 costs attributed to health care, disability, work loss, and premature death.

**METHODOLOGY**

The methodological approach in this paper is a review of the literature. The primary focus centres on periodontal health status measures and their associations with systemic diseases. The researchers conducted a detailed search of relevant international English language epidemiological evidence from 1996 to 2003 using MEDLINE, EMBASE, and the Cochrane controlled trials register. The search also included “gray” literature—information not reported in the scientific periodical literature—and web sites known to contain publications on this topic. In addition, references cited in the articles were manually searched, as opposed to computer data base search. Lastly, we asked recognized experts in the topic area for other possibly relevant articles that may have otherwise not been identified.

In vivo and human studies identified in the literature search were included in this review; in vitro and animal studies were excluded. The research was classified according to the Canadian Task Force on the Periodic Health Examination Evidence Classification Scheme (see Appendix B).

**Biological pathways**

The following outlines the biologically based hypotheses to the link between periodontal disease and diabetes:9-13

1. There is a subgingival microbial infection of the periodontium and pocket epithelium.
2. The periodontium is a gateway to the systemic circulation.
3. The cell wall of the micro-organism releases endotoxins such as lipopolysaccharide and other products that increase insulin resistance.
4. The host responds to such products by releasing pro-inflammatory cytokines such as tumor necrosis factor-α (TNF-α), interleukin-6 (IL-6), and interleukin-1 beta (IL-1β) that interfere with lipid metabolism and insulin action.
5. The periodontal infection provides a source of micro-organism products such as lipopolysaccharides, which may amplify the magnitude of the advanced glycation end product-mediated cytokine upregulation.
6. When insulin is suppressed and the body becomes resistant to insulin, the increased level of glucose in the blood stream results in hyperglycemia.
7. Hyperglycemia results in the formation of advanced glycation end-products. The accumulation of advanced glycation end-products is linked to the development of the pathogenic complications of diabetes. (See Figure 1).
Substantial evidence supports diabetes as a risk factor for periodontal disease. Taylor in Teng et al. (2002) conducted a MEDLINE literature review and found that 44 of the 48 primary reports on studies provided consistent evidence of greater prevalence, incidence, severity, extent, or progression of periodontal disease in diabetic patients, including those with either type 1 or type 2 diabetes mellitus.

A relatively new finding is that a history of chronic periodontal disease can disrupt glycemic control, suggesting a possible adverse two-way interrelationships between periodontal disease and diabetes mellitus. The following three studies support this link. First, Taylor et al. (1996) studied the Pima Indian Tribe, a population having a prevalence of type 2 diabetes mellitus of about 50%. This is the highest reported prevalence of type 2 diabetes mellitus in the world, and 1992-94 data that support an association between periodontal infection and glycemic control problems in people with diabetes mellitus.

A considerable body of research shows that periodontal therapy has a positive effect on glycemic control. Three researchers conducted literature reviews. Grossi and Genco (1998) and Grossi (2001) reached the same conclusion in their reviews—that a beneficial effect on glycemic control is found when mechanical periodontal therapy includes the use of systemic antibiotics and that no significant improvement occurs when only mechanical therapy is used. Taylor (December 2001) reviewed 10 studies and concludes that treating periodontal infection may have an important role in establishing and maintaining glycemic control. However, he calls for additional rigorous clinical investigations in diverse populations.

making this community ideal for studying periodontal disease and diabetes mellitus. Taylor et al. analyzed data collected in a longitudinal study of the Gila River Indian Community who are primarily Pima Tribe members. The data showed that those with severe periodontitis were up to six times more likely to have poor glycemic control, measured by glycated hemoglobin, at two- to four-year follow-ups.

Second, Collin et al. (1998) conducted a longitudinal study of seniors with type 2 diabetes mellitus that showed glycemic control in patients with advanced periodontitis deteriorated during a follow-up of two to three years. However, the glycemic control improved in those having a better periodontal condition. Third, Taylor (July 2001) analyzed cross-sectional data from NHANES III, using both the 1988–91 and 1992–94 data that support an association between periodontal infection and glycemic control problems in people with diabetes mellitus.

A number of other studies suggest that metabolic control of diabetes, measured by lower glycemic levels, is influenced by periodontal therapy, confirming the interrelationship between periodontal disease and diabetes mellitus. Table 1 contains a summary of the research.

Rodrigues et al. (2003) conducted a randomized study with 30 type 2 diabetes mellitus subjects. Subjects had chronic periodontal disease, assessed by at least one site having a probing depth ≥5 mm and two teeth with attachment loss ≥6 mm. Subjects were randomly assigned to two treatment groups. Group 1 (G1) received full-mouth scaling and root planing in combination with amoxicillin/clavulanic acid (FM SRP & AC). Group 2 (G2) received FM SRP alone. Three months following therapy, both treatment groups showed statistically significant improvements in periodontal
parameters (including number of sites with biofilm, and bleeding on probing). Although the G1 and G2 groups showed improvements in levels of glycated hemoglobin (HbA1c), only the HbA1c reduction in G2 was statistically significant at 11% (P < 0.05). There were minimal alterations to the changes in fasting glucose levels in both groups. In addition, this study showed that subjects with an elevated degree of diabetes mellitus severity and periodontal disease had the greatest reduction in HbA1c levels. A drawback to this study was a lack of significant change in attachment levels after therapy. The researchers suggest that the lack of additional benefit for Group 1 from the amoxicillin may be due to non-sensitive microorganisms in the periodontal pockets.

Although most of the intervention studies do not explore the details of the biological mechanism by which improved periodontal health leads to better glycemic control, Iwamoto et al. (2001)21 attempt to define this mechanism. They examine the role of the proinflammatory cytokine, tumor necrosis factor α (TNF-α), which is produced by periodontal infections. They conducted a study with 13 type 2 diabetes patients with periodontal disease who were given periodontal treatment consisting of antimicrobial therapy (local minocycline) and mechanical plaque debridement once a week for one month. Following periodontal treatment, they found an average reduction of 0.49 pg/ml of circulating TNF-α (P< 0.015) and an improvement in metabolic control of diabetes, measured by an average of 0.8% reduction in HbA1c (P< 0.007). A drawback to this study is that the change in periodontal status showed only a 0.48 mm average reduction in probing depth one month after periodontal therapy—a result that was not statistically significant. This may be due to the fact that a one-month re-evaluation period is a relatively short time for changes in clinical attachment levels to occur.

The strongest research evidence comes from randomized controlled trials. However, our search uncovered only three randomized controlled trials that show the impact of periodontal treatment on glycemic control. Aldridge et al. (1995)22 conducted the first single-blind randomized controlled trial with 31 subjects and showed that periodontal treatment consisting of oral hygiene instruction and scaling has no effect on glycated hemoglobin.

Grossi et al. (1996)23 conducted a randomized controlled trial with 85 Pima Indians with type 2 diabetes mellitus. All subjects received subgingival ultrasonic debridement of the teeth and were then assigned randomly to one of the following four groups for treatment:

<table>
<thead>
<tr>
<th>Study</th>
<th>Study design</th>
<th>DM type</th>
<th>Number subjects</th>
<th>F/U</th>
<th>Periodontal therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rodrigues et al. 200320</td>
<td>Randomized clinical study; no control</td>
<td>Type 2</td>
<td>30</td>
<td>3 mths</td>
<td>GI - full-mouth scaling and root planning (FM SRP) in combination with amoxicillin/clavulanic acid G2 - FM SRP only</td>
</tr>
<tr>
<td>Iwamoto et al. 200121</td>
<td>Clinical study; no control</td>
<td>Type 2</td>
<td>13</td>
<td>1 mth</td>
<td>Anti-microbial treatment (local minocycline) and mechanical therapy</td>
</tr>
<tr>
<td>Aldridge et al. 199522</td>
<td>RCT</td>
<td>Type 1</td>
<td>31</td>
<td>2 mths</td>
<td>Oral hygiene instruction and mechanical therapy</td>
</tr>
<tr>
<td>Grossi et al. 199623</td>
<td>RCT</td>
<td>Type 2</td>
<td>85</td>
<td>3, 6 and 12 mths</td>
<td>Ultrasonic therapy and one of the following four: Group 1: systemic doxycycline and subgingival irrigation with water Group 2: systemic doxycycline and subgingival irrigation with chlorhexidine Group 3: systemic doxycycline and subgingival irrigation with povidone iodine Group 4: subgingival irrigation with water alone (placebo)</td>
</tr>
<tr>
<td>Grossi et al. 199724</td>
<td>RCT</td>
<td>Type 2</td>
<td>113</td>
<td>3 mths</td>
<td>Mechanical therapy combined with: 1. topical water and systemic doxycycline 2. topical chlorhexidine and systemic doxycycline 3. topical povidone-iodine and systemic doxycycline 4. topical CHX and placebo 5. control - topical water &amp; placebo</td>
</tr>
<tr>
<td>Christgau et al. 199825</td>
<td>Prospective parallel treatment study</td>
<td>Type 1 and 2</td>
<td>a. 20 b. 20</td>
<td>4 mths</td>
<td>Phase one: oral hygiene instructions, mechanical therapy. Phase two: mechanical therapy and irrigation of pockets with chlorhexidine</td>
</tr>
</tbody>
</table>

*A DM is diabetes mellitus

A considerable body of research shows that periodontal therapy has a positive effect on glycemic control.
The results indicated that subjects treated with doxycycline all experienced a significant reduction in glycated hemoglobin (1% reduction, \( P < 0.04 \)), suggesting that ultrasonic debridement plus systemic antimicrobial therapy has the potential to reduce the level of glycated hemoglobin in diabetic subjects.

Finally, Grossi et al. (1997)\(^{24}\) conducted a randomized controlled trial with 113 subjects from the Gila River Indian Community, all of Pima or Pima/Papago heritage, with poorly controlled type 2 diabetes mellitus and severe periodontal disease. The examiner was blinded to the assigned treatment group. Researchers report that periodontal treatment consisting of scaling and curettage combined with antimicrobial treatment (systemic doxycycline) for two weeks resulted in a statistically significant reduction of nearly 10% (\( P < 0.04 \)) in glycated hemoglobin levels after three months and a 17% to 23% improvement in periodontitis. The glycated hemoglobin returned to basal level after six months when periodontal therapy was stopped.

<table>
<thead>
<tr>
<th>Metabolic control outcome</th>
<th>Evidence level</th>
</tr>
</thead>
<tbody>
<tr>
<td>G2 – Statistically significant 11% reduction in HbA(_1c) (( P &lt; 0.05 ))</td>
<td>II-3</td>
</tr>
<tr>
<td>Average reduction of 0.49 pg/ml of circulating TNF-( \alpha ) (( P &lt; 0.015 )) and an average of 0.8% reduction in HbA(_1c) (( P &lt; 0.007 ))</td>
<td>II-3</td>
</tr>
<tr>
<td>No effect on glycated hemoglobin</td>
<td>I</td>
</tr>
<tr>
<td>Ultrasonic therapy and doxycycline significantly reduced glycated hemoglobin (1% reduction ( P &lt; 0.04 ))</td>
<td>I</td>
</tr>
<tr>
<td>Groups receiving doxycycline showed nearly 10% reduction in glycated hemoglobin</td>
<td>I</td>
</tr>
<tr>
<td>No change in HbA(_1c)</td>
<td>II-1</td>
</tr>
</tbody>
</table>

**Table 1.** Treatment studies examining the impact of periodontal therapy on diabetes

1. systemic doxycycline and subgingival irrigation with water
2. systemic doxycycline and subgingival irrigation with chlorhexidine
3. systemic doxycycline and subgingival irrigation with povidone iodine
4. subgingival irrigation with water alone (placebo)

The results indicated that subjects treated with doxycycline all experienced a significant reduction in glycated hemoglobin (1% reduction, \( P < 0.04 \)), suggesting that ultrasonic debridement plus systemic antimicrobial therapy has the potential to reduce the level of glycated hemoglobin in diabetic subjects.
Although all of the studies listed above, with the exception of Aldridge et al., indicate that periodontal therapy has a positive impact on glycemic control, two other studies refute this evidence. Christgau et al. (1998)25 conducted a prospective parallel study comparing groups of well-controlled diabetics with healthy controls and found no connection between non-surgical periodontal therapy and diabetic control, measured by HbA1c, at four-month follow-up. Periodontal therapy for moderate-to-advanced periodontitis consisted of two phases: the first included client motivation, oral hygiene instructions, supragingival scaling, emergency restorations, removal of overhanging margins, extractions of hopeless teeth, and splinting of mobile teeth. The second phase provided non-surgical periodontal therapy with subgingival scaling, root planing, and irrigation of all pockets with chlorhexidine. Hagiwara et al. (2002)26 conducted a similar study and found no correlation between periodontal improvement and metabolic diabetes control. Rodrigues et al.20 suggest that the lack of impact on glycemic control in these two studies may be because the subjects had only moderately controlled or well-controlled diabetes mellitus and that the study results may be different with subjects with a more severe degree of diabetes mellitus.

The evidence overall ... supports the recent recognition of periodontal disease as the sixth complication of diabetes.27

Discussion
The evidence overall shows that periodontal disease may contribute to poorer glycemic control in people with diabetes mellitus and supports the recent recognition of periodontal disease as the sixth complication of diabetes.27 This review also highlights a considerable body of research showing that periodontal therapy may be associated with improved glycemic control and that the mode of therapy affects the outcome. The balance of evidence from the treatment studies suggests that mechanical periodontal therapy together with systemic antibiotics should be part of the standard of care of the diabetic client with periodontitis, since mechanical periodontal therapy by itself did not generally result in improvements in glycemic control. Also, the randomized controlled trial studies provide an argument for the inclusion of periodontal treatment in diabetes preventive measures.

Although some important information arises from this research, a few of the studies are somewhat limited by the small number of subjects and a heterogeneity in design, conduct, and results that restrict the ability to compare the studies. A further difficulty in comparing studies arises from the different ways in which periodontal disease is defined. A wide range of measurement parameters is used, including gingivitis, probing depths, clinical attachment level scores, and radiographically assessed alveolar bone loss. The most striking limitation is the low number of randomized controlled trials as this type of trial has the potential for providing the best evidence for the presence or absence of a causal relationship. In addition, the randomized controlled trials examining periodontal treatment interventions were carried out with only one population, Pima Indians. The ability to generalize to a larger population was therefore limited.

The lack of emphasis on Canadian Aboriginal peoples also limits the impact of these studies. The effect of diabetes on Canadian Aboriginal people is more pronounced than in the general population. For First Nations people living on reserves, the incidence of diabetes is three to five times higher than that of the Canadian population;28 for the off-reserve Aboriginal population, it is twice as high as the non-Aboriginal population.29 Of particular concern is the increasing incidence rate of type 2 diabetes mellitus that is now occurring in children on reserve 5 to 8 years of age, although it was previously limited to the adult population.30,31

Recommendations
Clinical
Some general suggestions for dental hygienists follow; however, all clinical decisions should be based on the needs of the specific client:

- Incorporate the bi-directional relationship of diabetes and chronic periodontitis into diagnostic and treatment decisions.
- Implement three levels of prevention, including primary, secondary, and tertiary. (See Appendix C.) The prevention and control of periodontal disease should be considered an integral part of diabetes control and prevention.
- Treat periodontitis in diabetic clients the same as in non-diabetic patients; however, diabetic clients with poor metabolic control should be seen more frequently and mechanical periodontal therapy combined with systemic antibiotics should be part of the standard of care.
- Assess glycemic control of diabetic clients by asking about their blood glucose self-monitoring practices and test results, including HbA1c tests.
- Provide oral health promotion and disease prevention services for persons with diabetes in community health centres, health units, and public health programs.

Suggestions for other health professionals with clients with glycemic difficulties:
- Consider the periodontal status of clients with diabetes who have difficulty controlling glycemic levels.
- Refer clients to an oral health professional to reduce the prevalence of periodontal infection and inflammation.
Research

- Develop uniform study criteria for measuring periodontal disease.
- Further research is needed in the following areas:
  - studies to show that long-term periodontal care contributes to the long-term management of diabetes mellitus;
  - randomized controlled trials with more diverse populations and populations that are particularly susceptible to diabetes mellitus, such as Aboriginal peoples;
  - studies on health promotion initiatives to prevent the development of periodontal disease and diabetes mellitus.

HEART DISEASE

CARDIOVASCULAR DISEASES (CVD) (E.G. ATHEROSCLEROSIS, CORONARY THROMBOSIS, ISCHEMIC HEART DISEASE, CORONARY HEART DISEASE, AND PERIPHERAL VASCULAR DISEASE) AFFECT A SIGNIFICANT PROPORTION OF THE CANADIAN POPULATION AND COMprise ONE OF THE MAJOR CAUSES OF DEATH.32 Atherosclerosis, which involves plaque-containing cholesterol, builds up in arteries and results in coronary thrombosis, ischemic heart disease (coronary artery disease), and stroke.

Infective endocarditis occurs when there is microbial infection of damaged heart valves or endocardium. Acute bacterial endocarditis has a rapid onset and death is usually the outcome unless antibiotic therapy is prescribed following the criteria of the American Heart Association. Subacute bacterial endocarditis has a more chronic course, where the problem may not be obvious until the onset of a low-grade fever, anemia, and debility. It is well accepted that dental procedures predispose susceptible patients to infectious endocarditis through transient oral bacteremias33 and that antimicrobial prophylaxis should be administered prior to certain oral health procedures.34 However, due to ethical considerations, it has not been possible to perform controlled clinical trials in humans to establish their effectiveness. The estimated frequency of infectious endocarditis varies from between 1 and 5 cases/100,000 population/year.34

Biological pathways

The current theory around this issue is that micro-organisms in infected gums may dislodge, enter the bloodstream, and spread throughout the body, inflaming coronary arteries and causing changes in blood pressure, heart rate, heart function and promoting blood clots, which can lead to heart attacks and strokes. Periodontal micro-organisms may also cause an infection in the lining or valves of the heart called infective endocarditis.

Authors propose three pathways linking oral infections to cardiovascular disease:

1. Infection theories35,36
   - This involves the direct negative effect of bacteremia from a periodontal inflammation. Subgingival biofilms associated with periodontitis may act as reservoirs of gram-negative micro-organisms and create transient bacteremia that enter the bloodstream and have access to the lining of blood vessels. Bacteremia associated with Porphyromonas gingivalis may result in platelet aggregation that contributes to some atheroma formation and acute thromboembolic events.37,38

2. Distant injury (focal sepsis) theory35,36
   - Injury results from the effects of circulating oral microbial toxins. Three mechanisms are involved:
     a. Endotoxins from the cell wall of oral micro-organisms are released and circulate throughout the body, causing the release of inflammatory mediators and clotting factors such as C-reactive protein and fibrinogen. These in turn increase platelet aggregation, damage endothelial cells, induce smooth muscle proliferation, and result in the formation of atheromas and subsequent atherosclerosis and thrombosis.39,40 Some proof for this comes from a growing body of evidence showing periodontal microorganisms are found in atheromas.40
     b. Products associated with bacteremia, such as micro-organism–derived lipopolysaccharides, trigger hyperreactive leukocyte responses. Infections produce changes in lipid metabolism that may promote atherosclerosis.
     c. Periodontal microbial infections may cause an immune response that results in a hyperinflammatory macrophage response. Macrophages release inflammatory mediators/proinflammatory cytokines, such as interleukin 18 (IL-18), tumor necrosis factor-? (TNF-?), TxA2, IL-1, MCP-1,38 and PGE2. The cytokines produced by the macrophages play a critical role in the formation of the atheroma in atherosclerosis.39,41 This hypothesis is supported by recent findings that total cholesterol, low-density lipoprotein, and triglycerides are significantly higher in subjects with periodontitis than in controls.41

3. A link to glucose tolerance
   - Periodontal infection can reduce glucose tolerance, leading to an atherogenic serum lipid profile.40

Research evidence

There has been a proliferation of research on the link between cardiovascular disease and periodontal disease and tooth loss, focusing specifically on coronary heart disease, cerebrovascular ischemia, fatal cardiovascular disease, stroke, myocardial infarction, cerebrovascular accident, and the preclinical signs of cardiovascular disease. A brief description of the research showing a link is organized under categories of heart diseases. The research refuting this link is then presented. The research is also summarized in Table 2, and a discussion of the research follows.

Coronary heart disease, fatal coronary heart disease, and stroke

Beck et al. (1996)36 conducted a prospective, longitudinal, cohort study with 1,147 men who received a dental examination and radiographs at approximately 3-year intervals for...
Some data indicate that periodontal diseases, as assessed by bone loss and worst probing pocket depth scores per tooth, increased the odds ratio (OR) of coronary heart disease by 1.5 (95% CI: 1.06 - 2.15), of fatal coronary heart disease by 1.9 (95% CI: 1.10 - 3.34), and of stroke by 2.8 (95% CI: 1.45 - 5.48). They used multiple logistic regression to control for the effects of age, smoking, diabetes mellitus, family history, body mass, blood pressure, and alcohol use. 

**Cerebrovascular accident and fatal cerebrovascular accident**

Loesche et al. (1998) conducted a cross-sectional study with 401 veterans who were at least 60 years of age. The researchers found that in the dentate group of 232 seniors, the presence of 15 to 28 teeth and an increased proportion of teeth with attachment loss >6 mm were significantly related to a cerebrovascular accident odds ratio of 1.04. Wu et al. (2000) examined data from a cross-sectional study, the First National Health and Nutrition Examination Survey (NHANES I) and its follow-up study (NHEFS), a representative sample of 9,962 U.S. adults. The exposure variable was periodontal disease and the outcome variables were incident and fatal events of cerebrovascular accident, instead of coronary heart disease, which is more often studied. First, they showed a significant association (relative risk 2.11, 95% CI, 1.3-3.42) between periodontitis and cerebrovascular accident—specifically nonhemorrhagic stroke but not hemorrhagic stroke—compared with no periodontal disease. Second, they demonstrated significant associations between periodontitis and fatal cerebrovascular accident. They used multivariate analyses and adjusted for a number of confounding factors and concluded that periodontal disease is a significant risk factor for cerebrovascular accident. One of the strengths of this study is that it included not only white men, but also white women and African Americans.

Elter et al. (2003) conducted a study using the Dental Atherosclerosis Risk in Communities (ARIC) study data with 9,415 persons and found that attachment loss and edentulism were weakly associated with stroke/transient ischemic attack (OR 1.3, CI 1.02-1.7) and (OR 1.4, CI 1.5-2.0). Logistic regression analysis controlled for confounders. Joshipura et al. (2003) analyzed the Health Professionals Follow-Up Study (HPFS) composed of 44,119 men, 40 to 75 years of age, and found increased relative risk (RR) for coronary heart disease for people with both periodontal disease and tooth loss (RR 1.7) and periodontal disease and no tooth loss (RR 1.7). This was a 6-year follow-up study of subjects who reported no diagnosed coronary disease at baseline. A number of coronary risk factors, such as smoking and physical activity, were accounted for in the study.

Dental procedures predispose susceptible patients to Infectious endocarditis through transient oral bacteremias.

Dental procedures predispose susceptible patients to infectious endocarditis through transient oral bacteremias. They showed that periodontal diseases, as assessed by bone loss and worst probing pocket depth scores per tooth, increased the odds ratio (OR) of coronary heart disease by 1.5 (95% CI: 1.06 - 2.15), of fatal coronary heart disease by 1.9 (95% CI: 1.10 - 3.34), and of stroke by 2.8 (95% CI: 1.45 - 5.48). They used multiple logistic regression to control for the effects of age, smoking, diabetes mellitus, family history, body mass, blood pressure, and alcohol use.

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**Diagnosis of periodontitis in most studies is based on clinical or radiographic examination. However, it is also possible to diagnose serum antibodies to the primary pathogens responsible for periodontitis, Actinobacillus actinomycetemcomitans and Porphyromonas gingivalis. Some data indicate that the inflammatory and host responses, not the clinical signs of periodontitis, are associated with cardiac events and subclinical coronary artery disease. One study shows an association between levels of immunoglobulin G (IgG) antibodies to periodontal pathogens and coronary artery disease.**

Pussinen et al. (2003) conducted the first study using serum antibodies as a form of diagnosis and found a link between serum IgG-antibodies to the two periodontal pathogens and coronary heart disease. Using a multivariate linear regression model, they found that of the 1,163 subjects studied, those with a high combined antibody response had an odds ratio of 1.5 (95% CI, 0.95 to 2.50, P=0.077) for coronary heart disease.
<table>
<thead>
<tr>
<th>Reference</th>
<th>Study type</th>
<th>Logistic regression analysis</th>
<th># Subjects case/controls</th>
<th>PVD</th>
<th>CVD</th>
<th>CHD</th>
<th>CVI</th>
<th>Fatal CHD/CVA/CVD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beck et al. 199636</td>
<td>Prospective, longitudinal</td>
<td>Yes</td>
<td>1,147 men</td>
<td>1.5</td>
<td>1.9</td>
<td></td>
<td></td>
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<tr>
<td>De Stefano et al. 199345</td>
<td>Prospective cohort NHEFS</td>
<td>Yes, but did not control for smoking</td>
<td>9,760</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Men aged 29-49</td>
<td>1.72</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Pussinen et al. 200347</td>
<td>FPAIS</td>
<td>Yes</td>
<td>1,163</td>
<td>1.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Joshipura et al. 199646</td>
<td>HPFS</td>
<td>Yes</td>
<td>44,119 men</td>
<td>1.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Joshipura et al. 200340</td>
<td>HPFS</td>
<td>Yes</td>
<td>41,380 men</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Grau et al. 199748</td>
<td>Case/control</td>
<td>Yes</td>
<td>166/166</td>
<td>2.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morrison et al. 199951</td>
<td>NCS</td>
<td>Yes</td>
<td>10,368 without CAD; 11,251 with CVD</td>
<td>2.15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jansson et al. 200152</td>
<td>Epidemiological</td>
<td>Yes</td>
<td>393 men and women</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Significant correlation</td>
</tr>
<tr>
<td>Mendez et al. 199853</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hung et al. 20034</td>
<td>Prospective HPFS</td>
<td>Yes</td>
<td>45,136 men</td>
<td>1.88</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Beck et al. 200149</td>
<td>Prospective</td>
<td>Yes</td>
<td>6,017 African Americans</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loesche et al. 199842</td>
<td>Cross-sectional</td>
<td></td>
<td>401 senior veterans</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wu et al. 200043</td>
<td>Cross-sectional NHANES &amp; NHEFS</td>
<td>Yes</td>
<td>9,962 black, &amp; Caucasian men and women</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Significant associations fatal CVA</td>
</tr>
<tr>
<td>Desvarieux et al. 200340</td>
<td>Prospective</td>
<td>Yes</td>
<td>711</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tuominen et al. 200355</td>
<td>12-year follow-up MFHS</td>
<td>Yes</td>
<td>6,527 men and women</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No association</td>
</tr>
<tr>
<td>Hujoel et al. 200056</td>
<td>NHANES follow-up study</td>
<td>Yes</td>
<td>8,032</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No association</td>
</tr>
<tr>
<td>Elter et al. 200344</td>
<td>Dental ARIC study</td>
<td>Yes</td>
<td>9,415</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2. The association of heart disease, the systemic outcome, with periodontal disease and tooth loss (Evidence Level)
Cardiovascular disease
Grau et al. (1997) conducted a case-control study where cases consisted of 166 subjects with cerebrovascular ischemia and controls consisted of 166 non-stroke neurological subjects. Dental status, which was blindly assessed, was determined by a total dental index (TDI) that reflects caries, periapical lesions, periodontitis, and other dental lesions. Using a multiple logistic regression analysis, the researchers concluded that chronic dental infection might be associated with an increased risk for cerebrovascular ischemia (OR = 2.6; 95% CI, 1.18 - 5.7), independent of current smoking, diabetes mellitus, and pre-existing vascular diseases.

Preclinical signs of cardiovascular disease
The two following studies are set apart from the above studies since they measure the relationship between periodontal disease and the preclinical signs, instead of the clinical signs, of cardiovascular disease. The intima-media wall thickness of the carotid artery is a measure of preclinical atherosclerosis and is associated with coronary heart disease and with incident stroke. First, Beck et al. (2001) conducted a prospective study with 6,017 black subjects and showed that periodontitis is associated with these preclinical signs of atherosclerosis. Using a multivariable logistic regression model, they found that individuals with severe periodontal disease, measured by attachment loss, had 1.3 times the odds of having thick carotid arterial walls (greater than and equal to 1 mm) compared with individuals with less severe disease (OR 1.31, CI 1.03 to 1.66). Second, Desvarieux et al. (2003) reports preliminary findings from 711 participants in a prospective study that shows a possible relationship between tooth loss (which is a marker of past periodontal disease) and subclinical cardiovascular disease/subclinical atherosclerosis, measured with a carotid scan using ultrasound. The cohort was free of baseline cardiovascular disease. Regression models were used to account for conventional risk factors. The prevalence of carotid plaque increased with the number of missing teeth, with an average of 44% of those missing zero to nine teeth having artery plaque, and 61% (P<0.05) of those with 10 to 19 missing teeth having artery plaque. The researchers found a significant relationship between tooth loss and periodontal disease and suggest that this is related to subclinical atherosclerosis.

Fatal cardiovascular disease
Morrison et al. (1999) conducted a cardiovascular mortality follow-up on 10,368 individuals without coronary artery disease and on 11,251 individuals with cerebrovascular and coronary heart disease from the Nutrition Canada Survey. Participants were followed retrospectively for assessment of cardiovascular mortality status from the National Mortality Database. They found an RR of 2.15 (95% CI: 1.25-3.72) for...
severe gingivitis; 1.37 (95% CI: 0.80-2.35) for periodontitis; and 1.90 (95% CI: 1.17-3.10) for edentulousness for fatal coronary heart disease.

Similar findings are reported in an epidemiological study by Jansson et al. (2001)52 with 1,393 men and women. Plaque and oral health scores, measured with missing teeth, apical lesions, caries lesions, and marginal bone loss, were adjusted for age, gender, smoking, and cardiovascular disease at baseline and showed a significant correlation to fatal cardiovascular disease.

Peripheral vascular disease and peripheral arterial disease

Studies of the link between oral health and cardiovascular disease and coronary heart disease are common. However, less common are studies showing the link between oral health and peripheral vascular disease, which can be divided into two areas, peripheral arterial disease and peripheral venous disorders, both of which can potentially lead to heart disease or stroke. Mendez et al. (1998)53 found an association between periodontal disease and peripheral vascular disease (OR = 2.27; 95% CI: 1.32-3.9) after controlling for several other risk factors. Hung et al. (2003)54 conducted a prospective study with 45,136 male subjects, 342 of whom were identified with peripheral arterial disease during a 12-year follow-up period. Periodontal disease and tooth loss were self-reported. The strongest association between cumulative incident tooth loss and peripheral arterial disease was found among men with periodontal disease (RR 1.88, 95% CI, 1.27 - 2.77, P=0.09).

Studies refuting association between periodontal disease, and cardiovascular disease and coronary heart disease deaths

There are many studies showing that various types of oral infections are possible risk factors for coronary heart disease and cardiovascular disease. Two studies that refute this connection follow. Tuominen et al. (2003)55 analyzed information from 6,527 men and women, aged 30 to 69, from the Mini-Finland Health Survey. They found that when the data, collected during a mean 12-year follow-up, were adjusted for established coronary heart disease risk factors, there was no statistically significant association between oral health indicators and coronary heart disease deaths. Oral health indicators included gingival inflammation, periodontal pocket depths, dental plaque status, and edentulousness. Hujoel et al. (2000)56 uses the same data set, NHANES I follow-up study, as did Wu et al. (2000) and DeStephano et al. (1993), but reached very different conclusions. Hujoel et al. did not find a significant association between cardiovascular disease and periodontitis and gingivitis after adjustment for known cardiovascular risk factors.

Discussion

The balance of the evidence suggests that periodontal disease and tooth loss may be independent risk factors for cardiovascular disease. The associations between oral conditions and cardiovascular disease are consistent across different population samples—including international studies from Canada, the United States, and Finland—and different measures of periodontitis, for example, bone loss and probing depth. However, there is insufficient evidence to show a definitive causal relationship between periodontal disease and tooth loss and cardiovascular disease. There is only minor opposition to the suggested association, since all but 2 of the 17 studies indicated that periodontal disease and tooth loss might be independent risk factors for cardiovascular disease. A summary of the strength of the associations follows, showing that persons with periodontal disease have a 1.04 to 2.8 fold greater risk of incurring cardiovascular disease than persons without periodontal disease. Of the different types of cardiovascular disease, stroke shows the most robust association.

- Cardiovascular accident, stroke
  OR 2.8 for periodontal disease
  HR 1.33 to 1.57 for periodontal disease and fewer than or equal to 24 teeth
  RR 2.11 for periodontal disease
  OR 1.04 for attachment and tooth loss
- Cardiovascular ischemia
  OR 2.6 for periodontal disease
- Peripheral vascular disease
  OR 2.27 for periodontal disease
  RR 1.88 for periodontal disease and tooth loss
- Coronary heart disease
  OR 1.5 for periodontal disease
  RR 1.7 to 1.72 for periodontal disease and tooth loss
- Fatal cardiovascular disease
  OR 1.37 to 2.15 for periodontal disease, severe periodontal disease and tooth loss
- Myocardial infarction
  RR 1.23 to 1.25 for periodontal disease and edentulousness
- Preclinical signs of cardiovascular disease
  OR 1.31 periodontal disease

Although the OR (odds ratio) and RR (relative risk) showed a low-to-moderate association of 1.04 to 2.8, modest associations may have a significant impact within the population since the prevalence of both periodontitis and cardiovascular disease is very high. There is a dose-response relationship to this association whereby the severity of periodontal disease influences the strength of the association, as shown in Beck et al. (1996)36 and Beck et al. (2001).49 The association is also characterized by the quality of the host response as the antibody response was related to a high incidence of coronary heart disease. In one of the studies, Beck et al. (1996)36 found that periodontal disease—compared with more established risk factors such as smoking, diabetes, hypertension, and elevated serum triglycerides—may be associated with excess risk of coronary heart disease/stroke.

Although almost all of the studies measured the clinical signs of cardiovascular disease, two studies by Beck et al. (2001)49 and Desvarieux et al. (2003)50 were different in that they found an association between periodontal disease and tooth loss and preclinical signs of cardiovascular disease. These two studies established that oral health studies could successfully use ultrasound measurement of the intima-media wall thickness, a quick and non-invasive way to measure atherosclerosis.

Since periodontitis and atherosclerosis have many risk factors in common, including diet, smoking, and diabetes mel-
method that has been questioned as imprecise.

severity of infection and others used self-reporting, a

ries used clinical assessments, some did not measure level or

scores, and attachment loss. Furthermore, while most stud-

iations of measures were used: bone loss, pocket depth

periodontal disease. A wide variety of the following combi-

due to inconsistent quantitative assessments of oral health or

Study comparison was also difficult

Inconsistencies in the various study designs preclude a rig-

tional cohort studies and only one being a case-control

the majority being prospective longitudinal or cross-sec-

The majority of the studies were classified as level 11-2, with

ject with the majority (nine) using between 1,000 and

11,000 subjects and three studies using over 40,000 subjects.

This makes it possible to generalize to a larger population.

Although most of the studies had a large number of subjects, some studied only segments of the population, such as men, African-Americans, and veterans. This made it difficult to
generalize to the larger population.

There are several other limitations to the research. Most of

the associations had a small-to-medium magnitude or a

weak association. It therefore may be possible that the asso-
ciations are due to various types of bias in the studies: adi-
tional confounders not accounted for, such as genetic and

environmental factors that increase susceptibility to both

chronic oral infection and cardiovascular disease; or the fact

that good oral health is an indicator of good general health

care practices.

The study type also presented limitations. Unfortunately,

none of the studies were classified as having level 1 or level

11-1 evidence (see Appendix B for Evidence Classification

Scheme). Therefore a causal role for periodontal disease and

tooth loss in cardiovascular disease cannot be established.

The majority of the studies were classified as level 11-2, with

the majority being prospective longitudinal or cross-sectional cohort studies and only one being a case-control study, therefore suggesting an association only. Another limi-
tation is the total absence of intervention studies.

Inconsistencies in the various study designs preclude a rig-

gorous systematic review. Study comparison was also difficult
due to inconsistent quantitative assessments of oral health or

periodontal disease. A wide variety of the following combi-
nations of measures were used: bone loss, pocket depth

scores, and attachment loss. Furthermore, while most stud-

dies used clinical assessments, some did not measure level or

severity of infection and others used self-reporting, a

method that has been questioned as imprecise.

Furthermore, a number of the studies were secondary analy-
ses from data that were not gathered specifically to investi-
gate an association between oral health and heart disease.

Therefore, to confirm the risk factor more clearly, it would

be helpful to have studies designed specially for this purpose.

Periodontal disease may some day be considered next to

smoking and diabetes as having a strong association with

cardiovascular disease. Before this occurs, however, more

extensive interventional, longitudinal research is needed to

determine to what extent treatment of periodontal disease

will decrease the incidence of heart disease.

1. Establish and maintain good oral health:

• Apply antiseptic mouth rinses, such as chlorhexidine

gluconate and povidone-iodine, via gentle oral rinsing

for about 30 seconds immediately before dental proce-

dures.

• Frequent home use of antiseptic rinses is not recom-

mended due to the potential for developing resistant

microorganisms.

• Frequent dental hygiene treatments are recommended
to maintain periodontal health.

• Encourage clients to make use of Pre-medication Alert

Wallet Cards. These cards are completed by cardiolo-

gists to alert the dental hygienists to a client's risk fac-

tors and required protection from bacterial endocarditis, so that antibiotic treatment may be

administered immediately prior to any invasive treat-

ment. (For a copy of the card, visit <www.american-

heart.org/presenter.jhtml?identifier=11086>.)

2. Educate clients concerning periodontal health:

• Emphasize the importance of maintaining good peri-

odontal health through frequent dental hygiene treat-

ment and appropriate home care methods.

• Ensure that clients who have other risk factors for car-

diovascular disease or who may already have cardio-

vascular disease are informed about the potential

correlation between periodontal disease and cardio-

vascular disease.

Research

There is a need for additional research in intervention lon-

gitudinal studies and health promotion and its impact on peri-

dontal disease and cardiovascular disease.

The next two areas to be discussed, respiratory disease and

preterm low birth weight infants, will appear in the next issue

(July/August 2004) of this journal.
APPENDIX A
Definitions
This section defines terms as they are used in this report.

**Bacteremia:** the presence of micro-organisms in the bloodstream. Transient bacteremia can be caused by oral microorganisms entering the bloodstream through chewing, toothbrushing, flossing, periodontal infections, and some dental procedures.

**Case-control study:** a retrospective study in which people with a condition are compared with people without it, but who are similar in other characteristics.

**Causality:** a cause for systemic diseases can be determined only by means of a randomized controlled trial (RCT). This study design allows the potential causal factors to be controlled by the investigator, who assigns persons randomly to the experimental and control groups.

**Confidence interval (CI):** the range within which the true size of effect lies with a given degree of assurance. A 95% confidence interval is the interval that includes the true value in 95% of cases.

**Cross-sectional study:** a study in which the health conditions of a group of people who are, or are assumed to be, a sample of a particular population are assessed at one time.

**Gingivitis:** an infectious inflammatory process limited to the gingiva.

**Infection:** invasion and proliferation of micro-organisms or other pathogenic microorganisms in body tissues and the reaction of the tissues to their presence.

**Logistic regression:** statistical analysis that allows the separation and measurement of the relative contributions of a number of factors from among many risk factors that are present at the same time. For example, logistic regression can be used to describe how periodontal infection independently contributes to preterm low birth weight in infants, when other risk factors such as smoking are also present. Multiple/multivariate/multifactorial/multivariable logistic regression is the relationship between the dependent variable and more than one independent variable. Conditional logistic regression is used to investigate the relationship between an outcome and a set of prognostic factors in cohort and matched case-control studies.

**Longitudinal study:** a study in which the same group of people is studied on two or more occasions.

**Nosocomial pneumonia:** hospital acquired pneumonia

**Odds ratio (OR):** measurement of risk used in case-control studies where risks are examined retrospectively for those with and without disease. It is calculated by taking the number of people with a disease who were exposed to the risk factor over the number of people with the disease who were not exposed. It is a way of comparing whether the probability of a certain event is the same for two groups. An odds ratio of 1 implies that the event is equally likely in both groups; an odds ratio greater than one implies that the event is more likely in the first group. An odds ratio less than one implies that the event is less likely in the first group. Case-control studies use OR.

**P value:** when statistical analysis of the study data differs between the control and experimental group or the before-and-after treatment group finds a P value greater than .05 (5%), the difference is considered non-significant. In order to have significant results, the P value must be less than 5% (.05) meaning the results were not just due to chance.

**Periodontal disease:** periodontal diseases are caused by chronic gram-negative micro-organisms that accumulate in plaque biofilms and result in the inflammatory destruction of the structures of the periodontium, including the periodontal ligament, cementum, alveolar and supporting bone. These diseases result from exposure of the periodontium to dental plaques, biofilms that accumulate on the teeth. The inflammation around the tooth may allow micro-organisms or their products, including lipopolysaccharides, peptidoglycan fragments, and hydrolytic enzymes, into the systemic circulation. The host response to periodontal infections results in the local production of cytokines and biological mediators including interleukins and prosta glandins as well as the introduction of serum antibodies.

**Prospective study:** a study where information on an exposure of interest is used to compare eventual outcomes.

**Randomized controlled trial (RCT):** the strongest experimental design in which subjects are randomly assigned to treatment groups, with one group being a control group. The RCT provides the most powerful research evidence and can show causality.

**Relative risk factor (RR):** measurement of how much a particular risk factor influences the risk of a particular outcome. A relative risk of 2 means that a person has a two-fold increased risk of having a particular outcome. Cohort studies use RR.

**Retrospective study:** a study that begins with an outcome and investigates back for exposure information.

**Systemic disease:** a disease that affects the whole body

**Therapeutic seeding:** within the context of a diabetic client, it refers to a clinician’s discussion with a pre-symptomatic client regarding his or her susceptibility to diabetes and suggestions for life style changes that include exercise, weight loss or control, and knowledge of risk factors.
APPENDIX B
Canadian Task Force on the Periodic Health Examination Evidence Classification Scheme

Levels of evidence*

I: Evidence obtained from at least one properly randomized controlled trial.

II-1: Evidence obtained from well-designed controlled trials without randomization.

II-2: Evidence obtained from well-designed cohort or case-control analytic studies, preferably from more than one centre or research group.

II-3: Evidence obtained from comparisons between times or places with or without the intervention. Dramatic results in uncontrolled experiments (such as the results of treatment with penicillin in the 1940s) could also be included in this category.

III: Opinions of respected authorities, based on clinical experience, descriptive studies, or reports of expert committees.


APPENDIX C
Three levels of oral disease prevention for the diabetic client

Hein* suggests the following three levels of prevention for clients with diabetes or at risk of developing diabetes:

- **Primary prevention**, which is aimed at pre-symptomatic yet susceptible individuals and includes health promotion and therapeutic seeding.
- **Secondary prevention** includes early diagnosis and screening for type 2 diabetes using glucometers at the chairside, for clients considered by history and clinical findings to be at risk for diabetes. This suggestion is of particular importance, given the suggestion by Lamster and Lalla** that some patients are seen in their dentist's office on a more regular basis than they are seen in a physician's office.
- **Third level prevention** (or tertiary prevention) is rehabilitation of the chronic diabetic client, including minimizing the loss of periodontal support.


APPENDIX D
Oral procedures creating risk of bacteremia58,59

The following is a list of oral procedures that create a risk for bacteremias: periodontal treatment and prophylactic cleaning of teeth or implants where bleeding is anticipated, periodontal surgery, scaling, root planing, probing, recall maintenance, initial placement of orthodontic bands but not brackets, intraligamentary local anesthetic injections, oral irrigators or air abrasive polishing devices, dental extractions, implant placement and tooth reimplantation, endodontic surgery or instrumentation beyond the root apex, and subgingival placement of antibiotic fibers or strips.

Cardiac conditions requiring prophylaxis for dental treatment59,60

High risk

- Prosthetic cardiac valves, including bioprosthetic and homograft valves.
- Previous infective endocarditis, even in the absence of heart disease.
- Complex congenital cardiac malformations (e.g., single ventricle states, transposition of the great arteries, tetralogy of Fallot).
- Surgically constructed systemic/pulmonary shunts.

Moderate risk

- Rheumatic and other acquired valvular dysfunction even after valvular surgery.
- Hypertropic cardiomyopathy.
- Mitral valve prolapse with valvular regurgitation and/or thickened leaflets
- Non-complex congenital cardiac malformations.
ENDNOTES


2. Miller WD. The human mouth as a focus of infection. Dental Cosmos 1891;33:689-713.


**Underserved populations**

As we continue to increase our body of knowledge and recognize the services of the profession, we also identify the underserved areas and populations. For many dental hygienists, the clients they see in daily practice have well-maintained dentition (or at least are well on their way) and relatively good oral health. However, there is a huge segment of the population who do not enjoy this level of oral health, for a variety of reasons. This brings us again to the need to educate the public and gain their support for unrestricted access to dental hygiene services for all people of Canada.

We encourage you to get involved in the promotion of our profession. I hope to see many of you in June 2004 at the CDHA Annual Conference—“Beyond the Tip of the Iceberg, a Sea of Opportunity”—in St. John’s, Newfoundland and Labrador.

Patty Wickstrom can be reached at <president@cdha.ca>.
à jour et d’anticiper les services d’hygiène dentaire pour l’avenir. Salme Lavigne et Judy Lux ont recueilli et interprété des données concernant les liens entre la santé buco-dentaire et la santé en général — leur étude est d’ailleurs publiée dans l’édition d’aujourd’hui de Probe. Je vous encourage à lire cet article et à en intégrer l’information dans votre pratique. Vous êtes invitée à communiquer vos réactions et vos commentaires au bureau de l’ACHD. Alors que nous acheminons vers une pratique fondée sur des données probantes, nous avons besoin de plus de recherches et de données pour soutenir nos praticiennes. Si vous avez des idées de projets de recherche, nous vous encourageons à chercher des domaines où vous pourriez trouver des appuis dans votre province et votre collectivité. Nous devons faire en sorte que le public comprenne et appuie la poussée de la profession de l’hygiène dentaire vers l’utilisation de normes de pratiques fondées sur des données probantes.

Baccalauréat

L’accroissement de connaissances dont les étudiantes en hygiène dentaire ont besoin pour obtenir leur diplôme et pratiquer au meilleur de leurs capacités renforce le besoin, partout au pays, d’une reconnaissance au niveau du baccalauréat. En même temps, les hygiénistes dentaires en exercice peuvent maintenant plus facilement compléter leur diplôme. Le public a besoin de comprendre la pleine portée de la pratique des hygiénistes dentaires, de sorte que nous devons être conscientes des occasions offertes pour promouvoir notre rôle dans le domaine de la santé buco-dentaire.

Populations sous-desservies

Alors que nous continuons à augmenter notre corpus de connaissances et à reconnaître les services de la profession, nous identifions aussi les régions et les populations insuffisamment desservies. Pour beaucoup d’hygiénistes dentaires, les clients rencontrés dans leur pratique quotidienne ont une dentition bien entretenue (ou du moins en bonne voie de l’être) et une santé buco-dentaire relativement bonne. Toutefois, il y a un large segment de la population qui ne bénéficie pas de ce niveau de santé buco-dentaire, pour une variété de raisons. Cela nous ramène, une fois encore, à la nécessité d’éduler le public et d’obtenir son appui pour travailler à assurer un libre accès aux services d’hygiène dentaire pour tous les habitants au Canada.


On peut rejoindre Patty Wickstrom à l’adresse <president@cdha.ca>.
ACCESS ANGST
March 16, 2004
Dear Editor:
Thank you for your feature article in the Nov/Dec 2003 issue of Probe entitled "Access Angst," in particular the section dealing with rural, northern and Aboriginal communities. I was glad to see an article that discussed the incredible need for dental services in these areas and some of the difficulties faced when trying to provide those services.

Practicing in a general dentistry clinic in a community in northern Saskatchewan that is largely Aboriginal has been, and continues to be, very demanding. As your article indicates, the general state of oral health is not good. In fact, some days, the extent and severity of the dental and periodontal disease is very similar to what I have seen while working in rural Guatemala. To see third-world conditions here in Canada has been quite an eye-opening experience.

The need for dental services in remote northern communities is tremendous. I hope that making more dental professionals aware of this will translate into caring and concern, and a willingness to take on the challenges of providing care to people who really need it.

Sincerely,
Sheila Fujimagari, RDH, BSc

NUTRITION
March 26, 2004
Greetings:
I was thrilled to see Nutrition as the topic for the Jan/Feb issue of Probe as it is one of my favorite topics. I totally agreed with Linda Maschak in her editorial when she said, "dental hygienists need to keep current with nutrition research and policy" and "dental hygienists should attend interdisciplinary courses or conferences on nutrition." I was disappointed, however, when I read most of the articles.

With the exception of the "Herbal Medicine and Vitamin/mineral Supplements" article, most submissions were basic and didn't really inform hygienists about anything that they shouldn't already know. The article that troubled me the most, however, was the one entitled, "Adolescent Diets and Oral Health."

In this article, it was stated at least three times that with a shortage of vitamin D and calcium in the system, "teeth may soften and become more susceptible to decay." We were taught that following adolescence, the teeth are fully formed and a shortage of calcium in the diet does not affect the teeth (unlike the bones). Has there been recent research to support this notion? If so, please let me know where I can find it.

Thank you for your time and your reply:
Sincerely,
Rita Chu, DipDH, BDSc

AUTHOR'S RESPONSE
Patricia:
I can understand the confusion to some extent. I am not sure how extensively biochemistry and metabolism is covered in the dental hygiene curriculum.

First of all, I thought you did a fantastic job focusing all the articles on nutrition throughout the life span, and including more alternative topics such as herbal nutrition, trendy diet and eating disorder topics, which are big right now due to the prevalence of obesity in North America.

Teeth mineralization continues into late adolescence (and my article focused on adolescence). So, as we all know, vitamin D plays a crucial role in the absorption of calcium into the teeth, along with other minerals. Not having vitamin D and the proper minerals during the building stages would compromise the mineralization stages of the teeth (including roots), resulting in weak/soft teeth that is prone to decay.

The reader can go to <www.adha.org/CE_courses/course7/nutritional_factors.htm> [web site of the American Dental Hygienists' Association] to read the following paragraphs:

"The mineralization process begins as early as four months of gestation and continues into late adolescence as the root structures are completed. Once the teeth have erupted, diet and nutrient intake continue to affect permanent tooth development and mineralization, enamel development and strength….

Once teeth are fully formed [post-adolescent], there is little change in their composition throughout life. Unlike bone tissue, teeth do not readily release minerals, such as calcium or phosphorus, when the body’s need for these minerals are not met by the diet."

However, my article was dealing with adolescence, not post adolescence.

That is the context of the phrase in my article that "teeth may soften when there is a shortage of vitamin D and become more susceptible to decay and periodontal disease." It is within the context of adolescence, during the late building stages of teeth.

There is a new study in October 15, 2001 in American Journal of Medicine (Krall EA, et al) that shows correlations in adults between taking calcium and vitamin D and losing fewer teeth. This is fairly new and could indicate benefits of vitamin D past adolescence into late life stages.

Hope this helps,
Charlene Chen
Human Resources (HHR) Strategy, a collaboration of federal, provincial, and territorial governments. This Strategy aims to strengthen the evidence base for national HHR planning; to improve recruitment and retention; and to promote interprofessional education for collaborative patient-centred practice (IECPCP). The third goal is amplified in a quote from the National Stakeholders’ Workshop:

“Collaborative patient-centred practice is a way of health care professionals working together and with their patients. Two or more disciplines continuously interact in a common effort to explore or solve shared issues with the optimum participation of the patient. Collaborative patient-centred practice promotes the active participation of each discipline in patient care. It optimizes staff participation in clinical decision-making within and across disciplines, and fosters respect for all professionals. In addition, it enhances patient and family-centred goals and values and facilitates continuous communications among caregivers.”¹

Idealistic or workable? How can this actually come about? This is what the project will explore through its three objectives that aim to:

- promote and demonstrate the benefits of IECPCP;
- increase the number of health professionals trained for patient-centred interprofessional team practice at the levels of entry into practice, graduate education, and continuing education; and
- stimulate networking and sharing of best educational practices for collaborative patient-centred practice.

Although the following web sites were not yet active when I wrote this editorial, check <www.health_human_resources.ca> or <www.ressources_humaines_en_sante.ca> for more information on this initiative.

Dental hygienists have been known for many years in smaller interprofessional circles as committed partners in maintaining clients’ health. We will participate actively in this project to ensure that dental hygienists are respected for their contribution to the overall wellness of Canadian citizens.

Our conscientious author of “Probing the Net” over the past seven years is taking a well-earned rest from this column. Karen Wolf has been providing readers with all levels of computer literacy, clinical experience, academic and research focus with web sites of interest to the practicing dental hygienist, the educator, the public health worker. Karen’s hard work has helped us all improve our Internet skills and she is to be commended for her dedication.

Internet research is a strong area at CDHA with our information consultant assisting our health policy communications specialist with research for papers such as Access Angst, Fluoride Dialogue, and the position paper in this issue, Your Mouth – Portal to Your Body. We are on the Internet many hours a day and come across both general and specialized sites that would be thought-provoking for dental hygienists. We believe an annotated column such as this helps readers and we are pleased to be able to continue the column.

Here are some valuable portal sites that are good and reliable sources of information.

**Health Web**
www.healthweb.org/browse.cfm?subjectid=34

This site, supported by the U.S. National Library of Medicine, focuses on U.S. resources but could be a source of information for dental hygienists. There are many areas to explore such as consumer health resources, continuing education, educational resources, and electronic journals.

**Oral Health in America: A Report of the Surgeon General**
www.surgeongeneral.gov/library/oralhealth/

Many references are made to this prominent report of May 2000 by the U.S. Surgeon General. This link will enable you to access the executive summary and to download the entire report in HTML or PDF. It makes for enlightening and sobering reading.

**Intelihealth Dental**
http://www.simplestepsdental.com/SS/ihtSS/r.WSIHW000/st.31819/t.31819/pr.3.html?k=menux408x24724

This site, with information provided by the University of Pennsylvania, focuses on consumers and is a good site for your clients to look at. Sections and subsections include Preventing Problems (All about Cavities, Brushing and Flossing, Fluoride, Sealants), Conditions (Bad Breath, Cavities, Cold Sores, Dry Mouth, Tooth Discoloration), Treatments (Scaling, Whitening), General Topics (Controlling Pain, Dental Medications, Diseases and Oral Health, Kids and Teens).

**MEDLINEplus Health Information – Mouth and Teeth Topics**

A large, comprehensive, and respected site dealing with topics such as child dental cleft lip and palate, cosmetic dentistry, mouth disorders, oral cancer, gum disease, salivary gland disorders, tooth disorders — and that is before you get into the section on dental health with its information on nutrition, prevention and screening, research, specific conditions, treatment, as well as statistics, relevant organizations and directories.

**Hardin MetaDirectory (Hardin Library for the Health Sciences, University of Iowa)**
www.lib.uiowa.edu/hardin/md/dent.html

A portal site giving access to large and medium sized lists of dental resources plus a large selection of sites with pictures of oral diseases.

**NIDCR (National Institute of Dental and Craniofacial Research)**
www.nidcr.nih.gov

This institute, one of the U.S. National Institutes of Health, provides a wealth of information arranged in categories such as Health Information, Clinical Trials, Research, News and Reports. Under Health Information is an Oral Health Information Index with extensive listings of on-line information available from the Institute and other agencies. Topics include as AIDS/HIV, Cancer Treatment and Oral Health, Children’s Oral Health, Diabetes, Dry Mouth, Fluoride, Gum (Periodontal) Diseases, Oral Cancer, Saliva and Salivary Gland Disorders, Tooth Decay (Caries) and Cavity Prevention.

Other web sites for research and specific and general information are listed on CDHA’s web site at <www.cdha.ca/members/content/research/research.asp> and click on Research Resources. As Karen said, “Until next time...”

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NORTHWEST TERRITORIES FORT SMITH Fort Smith Dental Clinic is looking for a full-time dental hygienist to join our office. Offering an attractive compensation package including base salary, commissions, bonuses, and continuing education benefits, this position is well suited to a candidate with 1-2 years’ experience. Please contact Mr. Hill at 1-877-424-1029; fax 780-483-6098; e-mail <hillag@shaw.ca>.

ONTARIO CAMBRIDGE Part-time dental hygienist required to join our team. Hours are Thursday and Friday evenings, as well as Saturday and Sunday, 9 a.m. to 4 p.m. Great Earning Potential!!! If interested, please fax your résumé to 519-622-6553.

CDHA CLASSIFIED ADS

Classified job ads are posted on CDHA’s web site (www.cdha.ca) in the Career Centre (Members’ Only section). Complimentary ads will also be published, at no cost to the advertiser, in the issue of Probe that follows submission of the ad. These complimentary ads should be no longer than 70 words and are inserted in the order of submission to a maximum of one page. These ads reach over 10,000 CDHA members across Canada, ensuring that your message gets to the target audience promptly. Contact CDHA for more information at 613-224-5515 or at info@cdha.ca.