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Managing care of individuals taking oral bisphosphonates

Non carious tooth surface lesions

Algonquin College, Ottawa, ON, 46

THE OFFICIAL JOURNAL OF THE CANADIAN DENTAL HYGIENISTS ASSOCIATION

If saliva was red; the effect

Jacki Blatz,
RDH

The educational video *If saliva was red* proved groundbreaking many years ago for dental professionals on cross contamination. I have watched this video on YouTube several times, and it never ceases to amaze me how clear its message is, even though other aspects of it are now outdated; it was, and still is, relevant in the area of cross contamination.

I believe the first decade of this century will be considered one of the most progressive in the history of our profession in Canada. 2010 will bring to a close this remarkable decade of change and influence. We have had our groundbreaking moments. In 2010, our count of dental hygiene degree programs in Canada is four in total. We, as dental hygienists, are an engaged voice in the provision of dental hygiene and oral health care. In the last decade, almost every province in Canada has looked at its legislation regarding the regulation of dental hygienists in its provinces, and we now have private practice legislated in four provinces.

When was the pivotal moment for dental hygiene? I cannot pinpoint that moment nor do I know the answer to that question, but I believe that the movement to provide degree education to dental hygienists is an integral part of that pivotal moment. Education is the key to the advancement of our profession. Research will give us the means to move our profession forward combined with vision, determination, and advocacy.

Every dental hygienist has a role in the advancement of our profession. It is our collective voice that strengthens us, and like the video *If saliva was red* on YouTube, the voice of the Canadian Dental Hygienists Association has been instrumental in promoting the profession of dental hygiene through advocacy and research, and *is* relevant to the membership of the association.

Years ago, that simple video started a ripple effect of change in the awareness of cross contamination. The profession of dental hygiene is in its own ripple right now. The change is ongoing. The change is pervading and influential. Can you sense the change? Are you part of this change? Can you carry it forward?

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If saliva was red; *L'effet*

La vidéo éducative If saliva was red *s'est avérée, il y a plusieurs années, pour les professionnels dentaires, une véritable percée sur la contamination croisée. J'ai regardé cette vidéo sur YouTube plusieurs fois et la clarté du message m'étonne toujours, même si ses autres aspects sont maintenant dépassés; le message était, et demeure, pertinent.*

Je crois que la première décennie du présent siècle sera considérée parmi les plus progressistes de l'histoire de notre profession au Canada. L'an 2010 terminera cette remarquable décennie d'évolution et d'influence. Nous y avons accompli de véritables percées. Nous comptons, en 2010, quatre programmes d'hygiène dentaire au Canada. En tant qu'hygiénistes dentaires, nous nous sommes engagées à promouvoir la prestation de soins d'hygiène dentaire et de santé buccale. Dans la dernière décennie, presque chaque province canadienne a revu sa loi sur la réglementation des hygiénistes dentaires sous sa juridiction, et nous avons maintenant des lois sur la pratique privée dans quatre provinces.

Quand le moment crucial est-il survenu pour l'hygiène dentaire ? Je ne saurais le préciser pour le moment car je ne le sais pas, mais je crois que le mouvement pour donner aux hygiénistes dentaires accès aux grades universitaires fait partie intégrante de ce moment crucial. La formation est la clé de la progression de notre profession. La recherche donnera à celle-ci les moyens d'aller de l'avant avec vision, détermination et intervention.

Chaque hygiéniste dentaire a un rôle à jouer dans la progression de la profession. C'est notre voix collective qui nous fortifie et, comme la vidéo If saliva was red *sur YouTube, la voix de l'Association canadienne des hygiénistes dentaires a contribué à promouvoir la profession de l'hygiène dentaire par l'intervention et la recherche, et elle* est *pertinente pour les membres de l'association.*

Il y a longtemps, cette simple vidéo avait amorcé discrètement une prise de conscience de la contamination croisée. La profession de l'hygiène dentaire en est aujourd'hui à ses propres ondulations. L'évolution suit son chemin. Elle domine et influence. Sentez-vous le changement ? En faites-vous partie ? Pouvez-vous le faire avancer ?

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Fox or hedgehog?

The start of the New Year is a perfect time to start a stop doing list.
– Jim Collins

Dr. Susan A. Ziebarth

The entire CDHA staff met for two days on 7 and 8 December to review what has transpired in 2009, and to make plans for the coming year. The work of Jim Collins, author of *Good to Great: Why Some Companies Make the Leap...and Others Don't*, contributes to how we critically think about our work. To prepare for the strategy session, conversations were held with individual staff members, and some staff surveys were conducted. The key questions to the staff were based on the hedgehog concept that Collins advocated. The concept is somewhat akin to the tortoise and hare fable. Collins suggests that the fox rushes around scurrying from one great idea to another as a fox would do as he is easily distracted, and operates without a long term vision. On the other hand, the hedgehog becomes an expert at what he does, keeps the focus to steadily move towards his goal, and is very selective about what he does.

Collins suggests that there are three elements that comprise this hedgehog concept. Picture three overlapping circles, as in Figure 1, with the first representing what the organization is passionate about, the second it what you can be the best in the world at, and the third is what drives your economic engine. The centre sweet spot of the circles is the hedgehog. CDHA is very well positioned with respect to the hedgehog as we have a Board of Directors that sets a vision based upon the owners', our members, needs. We have a staff committed with incredible passion to deliver that vision, and we have members who exhibit passion in their careers. The feeling of passion is even expressed graphically in the CDHA brochures and posters available to members as a prominent image links the heart, hand, and tooth, shown here in Figure 2.

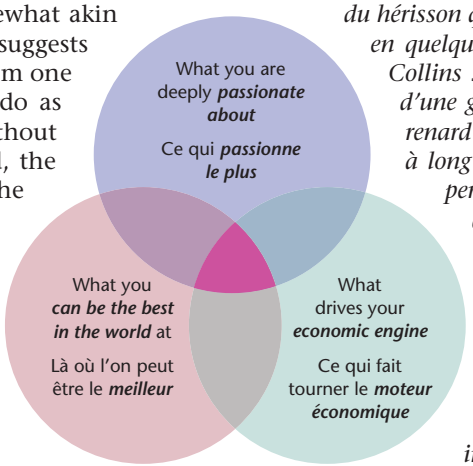

Figure 1: Three circles of the hedgehog concept. Source: Chapter 5 in *Good to Great* by Jim Collins. Les trois cercles du concept du hérisson. Source : Chapître 5 de *De la performance à l'excellence*, par Jim Collins.

So what does CDHA aspire to be the best in the world at? We are the national voice of dental hygiene in Canada, and we aspire to advance the profession and support you in contributing to the oral health and well being of the public. The third circle of the hedgehog concept is what drives our economic engine. In addition to your membership fees, our engine is driven by forming alliances with industry and government to develop programs to extend the value of your membership dollar.

One of the key factors in becoming a hedgehog is to stop doing things so that you can be free to focus on

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Renard ou hérisson ?

Le début d'une Nouvelle Année est un moment tout désigné pour commencer une liste de choses à ne plus faire.
– Jim Collins

Le personnel entier de l'ACHD s'est réuni pendant deux jours, les 7 et 8 décembre, pour revoir les événements de 2009 et prévoir la nouvelle année. L'œuvre de Jim Collins, auteur de De la performance à l'excellence - Devenir une entreprise leader,* *nous a aidées à revoir d'un œil critique notre travail. Pour nous préparer à une session stratégie, nous avons eu des entretiens individuels avec les membres du personnel et mené certains sondages auprès du personnel. Les questions étaient fondées sur le concept du hérisson que préconise Collins. La notion ressemble en quelque sorte à la fable du Lièvre et la Tortue. Collins suggère que le renard saute constamment d'une grande idée à une autre, comme ferait un renard facilement distrait et agissant sans vision à long terme. Par contre, le hérisson devient expert dans ce qu'il fait en se concentrant pour avancer constamment vers son but et choisir attentivement ce qu'il fait.

*Collins avance que le concept du hérisson se compose de trois éléments. Il présente ceux-ci sous forme de trois cercles qui se chevauchent, comme dans la Figure 1 : le premier représente ce qui passionne l'organisation; le second indique ce en quoi on peut être le meilleur au monde; le troisième, ce qui fait tourner le moteur économique. Au centre, là où les cercles se recoupent, niche le hérisson. L'ACHD est très bien positionnée en regard du hérisson, car elle a un conseil d'administration qui fonde sa vision sur les besoins de ses propriétaires, nos membres. Nous avons un personnel passionnément engagé à réaliser cette vision et nous avons des membres qui se passionnent pour leur carrière. Ce sentiment passionné s'exprime même graphiquement dans les brochures et affiches de l'ACHD, accessibles aux membres, où l'image principale lie le cœur, la main et la dent, présentée ici dans la Figure 2.

*Ainsi, en quoi l'ACHD aspire-t-elle à devenir la meilleure ? À l'échelle nationale, nous sommes la voix de l'hygiène dentaire au Canada et nous souhaitons faire progresser la profession et vous soutenir dans votre contribution à la santé buccale et au bien-être de la population. Le troisième cercle du concept du hérisson comprend ce qui fait tourner le moteur de notre économie. En plus de votre cotisation de membres, notre moteur est actionné par les alliances que nous formons avec l'industrie et les gouvernements pour élaborer des programmes visant à élargir la valeur de votre cotisation.

Un autre facteur clé dans la poursuite du concept du hérisson consiste à ne plus faire certaines choses et à nous concentrer

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Figure 2: The heart, hand, and tooth together symbolize care and passion. Le cœur, la main et la dent symbolisent ensemble les soins et la passion.

what matters. The CDHA staff is working through our processes to see how we can streamline our efforts in meeting the ends or goal defined by the Board. As we enter this New Year and the traditional resolution season, I am wondering if we can consider the hedgehog concept in our personal lives? Do you know what you are passionate about? What do you feel you were born to do? How can you support yourself economically to live your passion? To answer these questions, have you given yourself the time to think and create your own *stop doing* list so you can focus on the things that bring you peace, love and joy?

Warmest wishes for the happiest of new years.©CDHA

librement sur ce qui est important. Le personnel de l'ACHD examine notre procédure pour voir comment nous pourrions rationaliser nos efforts dans la poursuite des buts et objectifs définis par le conseil. En abordant cette Nouvelle Année et les traditionnelles résolutions saisonnières, je me demande si nous pouvons aussi appliquer le concept du hérisson à nos propres vies. Savez-vous ce qui vous passionne ? Quelle est, selon vos sentiments, votre destinée ? Comment pouvez-vous pourvoir à votre propre soutien économique pour vivre votre passion ? Pour répondre à ces questions, avez-vous pris le temps d'y penser, de créer votre propre liste de choses à ne pas faire afin de vous concentrer sur les choses qui vous apporteront la paix, l'amour et la joie.

Mes vœux les plus chaleureux pour la plus heureuse des nouvelles années.

***** *Version française de* Good to Great: Why Some Companies Make the Leap... and Others Don't. *Édition Village Mondial.*©CDHA

The water wheel that powers the profession

Judy Lux, MSW

The Canadian Dental Hygienists Association recently published two new policy documents: the *CDHA Education Agenda: Pathways to Oral Health* (referred to as the Education Agenda), and *Dental Hygiene at a Crossroads: Knowledge Creation and Capacity Building in the 21st Century* (referred to as the Research document). These documents describe CDHA's position on the issues around inconsistencies in dental hygiene education across Canada, and the steps needed to expand dental hygiene research. Dental hygiene education is the most substantive challenge impacting on dental hygiene research. Research takes place primarily at the graduate level and without educational programs at a least at the bachelors level, dental hygienists have limited ability to develop a body of knowledge specific to their profession. The majority of dental hygiene education in Canada remains at the diploma level while many other health professions (nursing, occupational therapy, physiotherapy, and speech-language pathologists) have moved to a bachelor or master's degree level.

These two documents demonstrate how CDHA takes a leadership role in the evolution of the dental hygiene profession. Policy documents allow CDHA to advocate for policy changes in education and research, at various levels within government, dental hygiene organizations and research funding organizations. Picture the large "water wheel" that is the national body of dental hygiene. The dental hygiene profession is the flowing water spilling down the wheel. CDHA harnesses this flow by bringing together the profession through committees and leadership events, and also through online consultations that allow members to provide input for these documents. Each of these documents represents a separate bucket of knowledge on the water wheel. Just as each bucket scoops up water and moves it along, each document gathers the ideas and vision generated by CDHA members. The documents then serve to provide direction and inspiration to the dental hygiene profession as it evolves.

Two committees advise CDHA on research and education matters. The Education Advisory Committee's mission is to support CDHA by providing the expertise and guidance that will cultivate the development of dental hygiene education, fostering the profession's evolution.

The Research Advisory Committee mission is to advise CDHA in the creation of a vision for research within the dental hygiene profession that contributes to the health of Canadians. The committee will also assist CDHA to operationalize CDHA's vision for research and guide CDHA's involvement in creating, supporting, disseminating, and in translating dental hygiene research, and enhancing research capacity and uptake within the dental hygiene profession.

The Education Agenda differs from CDHA's 2000 Education Agenda document, as it is grounded in complex oral health issues and factors impacting the oral health of Canadians. It includes an analysis of the abilities deemed important for health professionals in the 21st century and relates these to the alignment of dental hygiene education to meet these abilities. In order for dental hygienists to become involved in the transformation of oral health care delivery, CDHA has adopted the following educational outcomes. It will work towards the establishment of:

1. Bachelor degree programs in dental hygiene for entry-to-practice that articulate with masters' programs;
2. Master degree programs with a dental hygiene focus to advance dental hygiene knowledge, research, and practice; and
3. Doctoral and post doctoral degree programs with a dental hygiene focus to advance dental hygiene knowledge, research, and practice.

There is still a strong lobby by some health human resource specialists and policy makers to prevent what they call "credential creep", a term which implies that health professionals are requesting higher levels of education out of self interest. However, the CDHA Education Agenda and Research documents highlight a number of cogent arguments to support higher levels of education, which are not based in self interest, but in benefits to the client and the health system.

The standard of excellent client care has changed significantly over the last twenty years. Discussions around the need for improvements in client safety have become prominent in health care, focusing on effective patient safety policies and specific strategies to reduce errors, both in hospital and community care settings. An increased emphasis on client safety is reflected in the work of the Canadian Patient Safety Institute, Accreditation Canada, and the Health Council of Canada.

There is an increasing drive to use research to inform practice, particularly given the growing body of research suggesting links between oral and general health. The body of knowledge in oral sciences is much larger than it was twenty years ago; information on dental hygiene practice is not only found in dental hygiene journals, but also in a large number of oral health journals and journals outside of oral health. Educators work diligently to incorporate this vast new content into curriculum; however, 2 and 3 year diploma programs have a fixed amount of time to work with the new content, and they are now struggling with "curriculum crunch" — a term describing a curriculum that has become excessively compressed with critical material. Enhanced pathways to dental hygiene education are needed to accommodate the program hours required for this expanding knowledge base.

Interprofessional practice and research is a major theme in health policy documents as a method for improving quality of care and client safety. In order for dental hygienists to successfully collaborate in interprofessional teams and contribute substantively as a critical team member, educational course work needs to include more depth of content in the interprofessional approach, enable greater opportunities for shared coursework and interaction with other health care disciplines. There is a also a need for

dental hygiene education to be on par with other members of the interprofessional team, in order for dental hygienists to be perceived as equitable team members.

The Research document provides a history of the dental hygiene profession within the context of research, education, oral health, and access to care. It also delves into emerging issues, challenges, and opportunities for research within the dental hygiene profession. The document re-examines the CDHA Research Agenda, published in 2003, and adds one more key principle to the existing list of five Guiding Principles for Research: "Vulnerable populations should be considered as cutting across themes wherever possible." This is a gentle nudge to researchers to consider incorporating an analysis of vulnerable populations into the design of the project. The Research document also strengthens the Research Agenda by identifying thirteen key research themes that must be pursued to improve the oral health and well being of Canadians. These themes, which are based upon information in the Canadian Oral Health Strategy, expand upon the four pillars of dental hygiene research: biomedical; clinical; health services; and social, cultural environmental and population health.

The power of a document lies in its utilization. I anticipate that these two documents will stimulate a dialogue among practitioners, educators, researchers, students, policy makers and oral health advocates, as the ideas in these documents will be far reaching when they are implemented. For example, the Canadian Foundation for Dental Hygiene Research and Education takes the ideas in the Research document, and applies them to the review criteria for grant proposals. These two documents contain important messages for practitioners, and they act as tools supporting an evidence based practice philosophy, and reinforcing the importance of research in a dental hygiene value system. Practitioners are called upon to ground their daily decisions in research and clinical experience and to become consumers of scientific literature. I look forward to hearing from you about these issues. Stay tuned for this dialogue, as CDHA is planning a leadership event in 2010 based upon the educational pathways highlighted in these two documents.

To read these two CDHA documents, please visit:

http://www.cdha.ca/pdfs/Profession/Policy/Education-Agenda.pdf

http://www.cdha.ca/pdf/DentalHygieneAtACrossroads_ResearchReport.pdf

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Dear editor:

4 Life Saving Minutes: Extraoral and intraoral examination

Oral cancer ranks 13 among cancers commonly diagnosed in Canada, higher than the incidence of cervical, ovarian and Hodgkin Lymphoma[1] (Table 1). Oral cancer has an incidence of almost three times that of cervical cancer accompanied by a mortality rate of the same percentage. Approximately 1 out of every 2 people diagnosed today with oral cancer will not be alive in 5 years.

It is suggested that Canadians are increasingly at risk for oral cancer partly due to extremely low awareness levels regarding risk factors and prevention behaviours, as well as gaps both in knowledge and practices on the part of the health care network. This has contributed to not only an increased incidence of oral cancer but also to late stage diagnosis often resulting in the needless loss of a life[2] (Figure 1).

Table 1: Estimated New Cases and Deaths for Cancers by Sex, Canada, 2009

	New Cases 2009 Estimates			Deaths 2009 Estimates		
	Total*	M	F	Total*	M	F
All Cancers	**171,000**	**89,300**	**81,700**	**75,300**	**39,600**	**35,700**
Prostate	25,500	25,500	–	4,400	4,400	–
Lung†	23,400	13,800	10,700	20,500	11,200	9,400
Breast	22,900	100	22,700	5,400	50	5,400
Colorectal	22,000	13,100	8,900	9,100	4,900	4,200
Non-Hodgkin Lymphoma	7,200	3,900	3,300	3,200	1,700	1,600
Bladder†	6,900	5,100	1,750	1,850	1,300	550
Melanoma	5,000	2,700	2,300	940	580	360
Thyroid	4,700	900	3,700	100	70	100
Leukemia†	4,700	2,700	1,950	2,500	1,400	1,000
Kidney†	4,600	2,900	1,800	1,800	1,000	810
Body of Uterus	5,400	–	5,400	800	–	800
Pancreas	3,900	1,900	2,000	3,900	1,850	2,000
Oral	3,400	2,200	1,150	1,150	770	380
Stomach	2,800	1,800	1,000	1,850	1,150	720
Brain	2,600	1,400	1,150	1,750	1,000	750
Ovary	2,500	–	2,500	1,750	–	1,750
Multiple Myeloma†	2,200	1,250	950	1,400	750	640
Liver†	1,700	1,100	610	700	540	160
Esophagus	1,600	1,200	420	1,000	1,000	440
Cervix	1,300	–	1,300	380	–	380
Larynx	1,100	940	220	310	810	95
Hodgkin Lymphoma	910	500	410	110	65	45
Testis	900	900	–	10	10	–
All Other Cancers	14,500	7,000	7,500	9,400	5,000	4,500
Non-melanocytic skin	75,100	41,100	34,000	370	180	190

– Not applicable

* Column totals may not sum to row totals due to rounding

† Definitions for these cancers have changed; see Table A7

Note: 'All Cancers' excludes the estimated new cases of non-melanoma skin cancer (basal and squamous) but includes the estimated deaths with underlying cause of other malignant neoplasms of skin (ICD-10 code C44).

Analysis by: Chronic Disease Surveillance Division, CCDPC, Public Health Agency of Canada

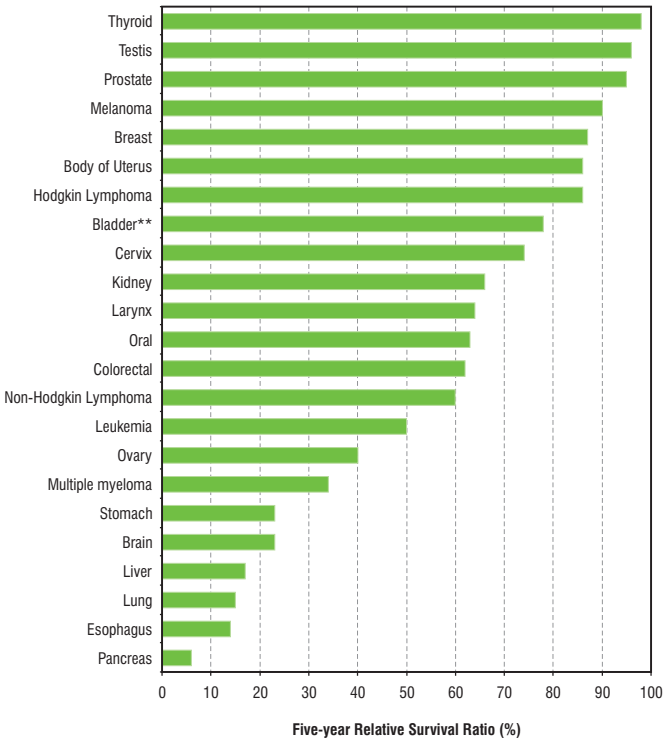
Data sources: Canadian Cancer Registry and Canadian Vital Statistics Death database at Statistics Canada

As a profession, we have for many years felt we could identify those of our client population who may be placed at risk for oral cancer. The traditional risk factors that we are familiar with have included but are not limited to:

- Age
- Gender
- Tobacco products including recent surge in popularity of smokeless tobacco products
- Alcohol consumption
- Combined use of tobacco and alcohol consumption
- Prolonged exposure to ultraviolet light
- Dietary factors
- Immunosuppression
- Previous history of oral or oropharyngeal cancer

The medical and dental communities have now been alerted to the emergence of an atypical profile. No longer can we assume that those members of our client population who possess the typical risk factors such as tobacco usage and alcohol are at a much greater risk. The cause for concern is a rapid spread of the human papilloma virus, HPV 16 and 18. According to the Centers for Disease Control (CDC), between 60–80% of the population will be infected with some form of HPV within their lifetime;[3] the same virus that is responsible for 95 per cent of all cervical cancers.

Figure 1: Estimated Five-year Relative Survival Ratio (%) for the Most Common Cancers, Both Sexes Combined, Canada excluding Quebec*, 2001-2003



* Data from Quebec have been excluded, in part because the method of ascertaining the date of cancer diagnosis differs from the method used by other registries and because of issues in correctly ascertaining the vital status of cases. Please refer to *Appendix II: Methods* for further details.

** Excluding data from Ontario, which does not currently report in situ bladder cases.

Source: Health Statistics Division, Statistics Canada

HPV has been identified as being the most likely causative factor behind the increasing numbers of young, non smoking and non drinking individuals diagnosed with oral cancer. The transmission of the virus is through sexual contact. The HPV group is the fastest growing segment of the oral cancer population.[1] The proportion of HPV DNA-positive tonsil tumors has increased from 28% in the 1970s to 68% in the 2000s suggesting a dominant role for HPV in the increasing incidence of oropharyngeal cancers.[4] In the broadest terms, the incidence of HPV positive oral cancer is primarily found in the oropharyngeal area, base of the tongue, tonsils and tonsillar pillar area.[1,4] This supports the further emphasis on examination of our entire adult client population of the oropharynx and the tongue as sites of increased incidence.

One of the real dangers of oral cancer is that in its early stages it can go unnoticed. It can be painless, and there may be little in the way of any physical changes that may be obvious. This is one of the greatest contributory factors to late stage diagnosis. About 82% of persons with oral and oropharyngeal cancer survive one year after diagnosis.[4] The overall 5 year survival rate for oral and oropharyngeal cancer is ~63% in Canada. However, when oral cancer is found early, this survival rate can be as high as 80–90%. The general consensus in all studies is that the earlier the cancer is detected at pre malignant stage, the greater the chance the patient has for a cure and an improved quality of life.

Tremendous inroads have been made with reducing the mortality rate of other well known cancers such as cervical, breast, and prostate cancer through the employment of opportunistic screening.

In the late 1940s, cervical cancer was a major killer of women in North America. Less than a decade later, the mortality rate was significantly lowered with a reported 70% reduction by the 1990s. How did this occur? Was there an introduction of a miracle cure or drug? Quite the contrary; it was due to employment of both opportunistic screening and public campaigns designed to elevate awareness.

The dental hygiene appointment serves as a prime opportunity to employ opportunistic screening with the implementation of a visual and tactile extraoral and intraoral examination. Our profession is strategically positioned on the front lines of early discovery. Oral cancer is both preventable and screenable, and with a concerted effort we can have a powerful impact on reducing the incidence and severity of this horrific disease.

CDHA is aware of this need for increased public and professional awareness. With this in mind, an online course as well as a wealth of valuable resources are being developed for elevating awareness within the public community, and for supporting the efforts of the dental hygienist in clinical practice and education.

Sincerely,
Jo-Anne Jones, RDH
E-mail: jjones@rdhconnection.com

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Update on recommendations and issues for managing care of individuals with a history of taking oral bisphosphonates

Frieda Atherton Pickett, RDH, MS

ABSTRACT

Osteonecrosis of the jaw has recently been reported as a possible adverse drug effect from bisphosphonate therapy. The reports are worldwide and the morbidity for the condition is significant. The exact mechanism of action of bisphosphonate effects leading to osteonecrosis of the jaw is unclear but research is identifying hypotheses of anti angiogenic effects, and that bisphosphonate causes soft tissue toxicity resulting in poor wound healing of mucosa, thereby promoting infection of associated underlying bone. Most bisphosphonate associated ONJ cases developed following oral surgical procedures, but some cases develop spontaneously, unassociated with dental treatment. Clinical practice guidelines for management of care have recently been published by a Canadian task force organized by the Canadian Association of Oral and Maxillofacial Surgeons, and in the United States, by an expert panel invited by the American Dental Association.

RÉSUMÉ

On a signalé récemment que l'ostéonécrose de la mâchoire pouvait être un effet secondaire indésirable de la thérapie au bisphosphonate. On en fait état partout dans le monde et elle présente une morbidité importante. On ne connaît pas encore de façon précise le mécanisme d'action du bisphosphonate entraînant l'ostéonécrose de la mâchoire, mais la recherche avance l'hypothèse d'effets anti-angiogénétiques selon lesquels le bisphosphonate causerait une toxicité des tissus mous, entraînant une faible guérison de la muqueuse, mais favorisant ainsi une infection associée aux os sous-jacents. La plupart du temps, les cas d'ONB surviennent à la suite d'une chirurgie buccale, mais certains cas se développent spontanément, sans association avec un traitement dentaire. Un Guide de pratique clinique sur la gestion des soins pertinents a été publié récemment par un Groupe de travail canadien, créé par l'Association canadienne des spécialistes de la chirurgie buccale et maxillo-faciale, et, aux États-Unis, un groupe d'experts invités par l'Association dentaire américaine.

Key words: osteonecrosis, malignancy, bisphosphonate, osteoporosis, bisphosphonate-associated osteonecrosis of the jaw

INTRODUCTION

Bisphosphonates are a class of drugs that have become the treatment of choice for the prevention of skeletal complications of malignancy, namely to reduce metastatic bone disease, and to prevent hypercalcemia commonly associated with malignancy.[1,2] The most widely used agents—zoledronic acid (Zometa®) and pamidronate (Aredia®)—are administered intravenously every three to four weeks to treat various cancers. Another common use for bisphosphonates is in the prevention and treatment of osteoporosis where an oral doseform of bisphosphonates is given in low doses and effectively reduces the risk for vertebral and non vertebral fracture.[3] The cost of osteoporosis is $17 billion annually in the United States.[4] As the population ages, the number of hip fractures and associated expenditures both could triple by 2020. It is estimated that oral bisphosphonates will prevent 50% of vertebral (250,000) fractures and 35–50% of non vertebral fractures (350,000–500,000), which include hip and extremity fractures, each year.[4] In Canada, the most widely used oral doseforms of bisphosphonates are alendronate (Fosamax®) and risedronate (Actonel®). In the United States intravenous doseforms are approved for treatment of osteoporosis to be used once yearly for zoledronic acid (Reclast®), and quarterly for ibandronate (Boniva®). All of the drugs listed above are nitrogen containing bisphosphonates. They can remain in the bone for many years after therapy is completed. The use of these agents has led to reports of a possible adverse side effect of osteonecrosis of the jaw (ONJ).

BACKGROUND

The first report of orally related problems in an individual who reported taking a bisphosphonate involved a health history of osteoporosis treated with oral alendronate (Fosamax®).[5] In this case report, five fully integrated dental implants failed six months after initiation of bisphosphonate therapy. Was this coincidental or does this class of medications produce adverse effects on alveolar bone? The authors of this case report attributed the implant failures to bisphosphonate therapy, and suggested that prolonged use of the medication may represent a contraindication to implant placement. The first report of ONJ secondary intravenous administration of bisphosphonates during cancer treatment appeared in 2003.[6] As more reports began to be published, it appeared that bisphosphonate associated ONJ (BON) was mainly attributed to the use of potent intravenous administered bisphosphonates.[7–9] However, reports of ONJ continue to be seen with use of oral doseforms of bisphosphonates, mainly that of alendronate.[9–13] The Canadian Association of Oral and Maxillofacial Surgeons in association with national and international multidisciplinary societies recently developed a consensus document of practice guidelines for BON.[14] Guidelines will be pilot tested in Ontario, Canada, by oral surgeons to obtain feedback regarding practicality and usefulness of the recommendations. A similar report was authored by an expert panel assembled by the American Dental Association in 2008.[15] The Canadian consensus task force[14] addressed management of both oncology and osteoporosis patient populations who receive both intravenous

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doseforms and oral doseforms of bisphosphonates, whereas the American Dental Association Expert Panel[15] addressed only management for individuals taking oral doseforms of bisphosphonates. There are other differences between the two reports. The Canadian task force document[14] reports it includes representatives from a wide variety of professional associations interested in finding answers to this problem; when one looks at the disclosures at the end of the document one finds that twelve of the twenty-nine authors have strong to very strong ties to industry.[14] The American Dental Association Council on Scientific Affairs[15] selected panelists based on their expertise in the relevant subject matter, and on their respective dental or medical specialties. All panelists were required to sign a disclosure stating that neither the panelist nor his or her spouse or dependent children had a significant financial interest that would reasonably appear to affect the development of the recommendations.[15] The need to identify factors increasing the risk for developing BON, which has significant morbidity, has led to an urgent need in both medical and dental communities to further understand this complicated condition. The condition has been called many names but the 2008 American Dental Association Expert Panel report[15] termed the condition "bisphosphonate associated ONJ" or BON.

Definition

There are several different definitions of BON with three groups defining a history of receiving bisphosphonate medications.[15–17] The definition from the American Association of Oral and Maxillofacial Surgeons (AAOMS) was verified recently.[16] It states that patients may be considered to have BON if all of the three following characteristics are met:

- Current or previous treatment with a bisphosphonate
- Exposed bone in the maxillofacial region that has persisted for more than 8 weeks
- No history of radiation therapy to the jaws

In 2007 the task force of the American Society for Bone and Mineral Research[17] defined ONJ as "an area of exposed bone in the maxillofacial region that did not heal within 8 weeks of identification by a health care provider, in a patient who was receiving or had been exposed to a bisphosphonate and had not had radiation therapy to the craniofacial region."

The Canadian task force document[14] defines bisphosphonate associated ONJ as "a condition diagnosed clinically in the presence of exposed bone in the maxillofacial region for more than 8 weeks in the absence of radiotherapy to the jaw…and soft tissues do not close [*sic*] overexposed bone." One can see the main difference is that a bisphosphonate, as a factor in the disease process, is not included in the latter definition.

ASSOCIATION OR CAUSALITY

The Canadian task force report[14] states that it is likely the potent and frequently administered intravenous doseforms of bisphosphonates lead to the potential development of BON; however the report stresses that causation is not implicated in this effect with oral doseforms. Conversely, the American Dental Association Expert Panel[15] states that although it is early in the investigative stage, the relationship between bisphosphonate exposure and the occurrence of ONJ appears to be consistent with Bradford Hill's[18] criteria for causality:

- *strength of association*—individuals on bisphosphonate therapy appear to present a higher incidence of BON than non users;
- *temporal association*—bisphosphonate exposure precedes the occurrence of BON;
- a *biologic gradient*—with higher doses of bisphosphonates resulting in more rapid and serious presentations of BON;
- *consistency*—the effect of BON has been observed by several investigators;
- *specificity*—BON is seen in cancer and in bone and mineral metabolism disease, for example, osteoporosis and Paget's disease of the bone; and
- *biologic plausibility*—the event is defined by the mechanism of action of the drug.

The 2009 AAOMS Update reports that although current evidence does not fully support a cause-and-effect relationship between bisphosphonates exposure and ONJ, and that causality might never be proven, emerging experimental and epidemiologic studies have established a firm foundation for a strong association between monthly intravenous bisphosphonate therapy and the development of BON.[16] The causal association between oral or intravenous bisphosphonates in the treatment of osteoporosis is much more difficult to establish.

Incidence

The potential for this adverse drug effect from oral bisphosphonate doseforms is reported to be very rare.[14,15] The true incidence of BON from oral doseforms of bisphosphonates, however, is unknown as there are no studies that adequately address incidence data.[15] Manufacturer sponsored epidemiological studies reported the first estimates of the incidence of this toxic effect with intravenous doseforms ranging from 0.1% to 1.8%. By contrast, independent epidemiological efforts from clinicians and the International Myeloma Foundation reported incidence estimates between 5% and 12%.[1,16,19] Studies estimate that BON occurs in approximately 0% and 0.04% to <1 in 100,000 of those receiving oral doseforms, mainly for osteoporosis.[7,15,19–27] An Australian postal survey of oral surgeons and dentists[23] combined with drug adverse events data suggested the frequency of osteonecrosis of the jaw was 1:2,260 to 1:8470 in patients on weekly alendronate treatment for osteoporosis, and 1:56 to 1:380 in patients with Paget disease. Following dental extractions, this rose to 1:296 to 1:1,130 and 1:7.4 to 1:48 respectively.[23] This study design had multiple limitations in that there was a lack of an appropriate control group, the possibility of reporting bias, and a possibility of multiple reportings of the same patients. In another survey[28] of more than 13,000 Kaiser-Permanente members, the prevalence of BON in those receiving long term oral bisphosphonate therapy was reported to be 0.06% (1:1,700). Controlled scientific studies in osteoporosis and Paget disease of bone have not shown ONJ to emerge, even after years of treatment with bisphosphonates. More than 50,000 patients have

been treated with oral bisphosphonates—alendronate, risedronate and ibandronate—in clinical trials, and there was not a single case of BON in these studies.[29] In Canada, orders for oral bisphosphonates in 2008 exceeded 6 million prescriptions,[30] however fewer than ten per cent (1:10,000 treatment years) of reported BON cases are in those who took orally administered bisphosphonates.[23,31] These numbers may not reflect the true incidence as it has been speculated that there may be many unreported cases. Evidence for this was found when the first trial of litigation between complainants who developed BON, possibly from Fosamax®, went to trial in September 2008.[32] During the discovery process it was discovered that Merck, the manufacturer of Fosamax®, had received over 1000 reports of BON from people claiming to have the condition.[33] This magnitude of reported cases had not been known until the discovery process forced Merck to disclose reports of adverse effect reports. Zoledronic acid (Reclast®) was approved in the USA in 2007 for an annual, intravenously administered treatment for osteoporosis. A single, large prospective placebo controlled study[21] established its efficacy for this indication through three years of treatment. Two cases of ONJ were reported, one in the treatment group and one in the placebo group, suggesting a low risk of BON when taken no more than three years.

Clinical signs

The clinical sign of ONJ is exposed bone in the oral cavity which does not heal, that is the soft tissue does not cover the bone, by eight weeks, and there is no history of radiation to the jaw area. Oral bisphosphonates do not produce a lesion identical to intravenous BON. There is a greater predilection for the mandible, and for spontaneous exposure of the lingual mandibular ridge. One study of 30 patients taking oral bisphosphonates reported that 11 of the 30 patients resolved upon withdrawal of the drug with complete mucosal coverage, and only two patients required hospitalization for resection.[34] A common area of the jaw where ONJ develops is the mandibular lingual mylohyoid ridge, an elevated area adjacent to the root of the premolar and molar area (Figure 1). If the area becomes infected, pain will be present and antibiotics are required to eliminate the pain. Necrotic bone may detach from the vital bone and present as sequestrum. It is important to consider, in the differential diagnosis, a condition called spontaneous lingual mandibular sequestration with ulceration.[35] Spontaneous sequestration is a self limiting condition that can develop without an obvious cause and is characterized by exposed, necrotic bone involving the lingual mandible at the level of the mylohyoid ridge. This condition is distinguished from BON in that it resolves spontaneously with complete mucosal covering in 3 days to 12 weeks, and has no relationship to receiving a bisphosphonate. The symptoms of BON do not resolve with routine dental or periodontal treatment, although surgical procedures and hyperbaric oxygen therapy has been reported to resolve some cases.[36,37]

Mechanism of action

Bisphosphonates are powerful suppressors of osteoclastic activity resulting in increased bone mineral density with chronic use and decreasing the risk for osteoporotic fracture. How and why bisphosphonates damage the alveolar bone resulting in ONJ is unknown. A recent study[38] proposed that bisphosphonates could impair molecular signaling of osteoblasts, osteoclasts, fibroblasts, and keratinocytes. Such an impairment would result in impaired cell division of these cells affecting multiplication, proliferation and migration, and wound healing. The open wound would allow microbial infection of the underlying bone that has poor immune and metabolic properties when affected by bisphosphonates. This paper suggests that ONJ is influenced by bisphosphonate induced soft tissue toxicity. Soft tissue could affect the underlying bone damaged by bisphosphonates, or the underlying bisphosphonate affected bone could cause the overlying soft tissue to have poor wound healing if damaged.

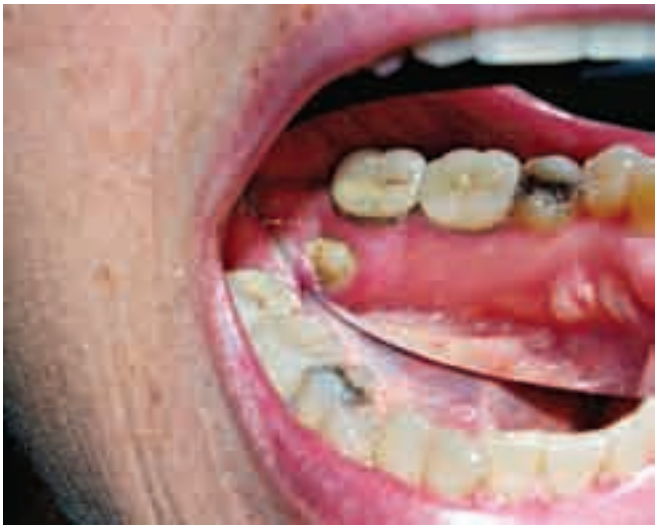

Figure 1: A common area of the jaw where ONJ develops is the mandibular lingual mylohyoid ridge.

Another paper[39] reported the primary lesion of BON results from oversuppression of bone turnover by bisphosphonate effects, and that the bisphosphonate that accumulates in bone is directly toxic to oral epithelium. This toxicity could result in failed wound healing after trauma to the mucosa overlying the bisphosphonate damaged alveolar bone.[40] So it appears to be a "two way street" effect with soft tissue affecting compromised bone, and compromised bone affecting the ability of overlying mucosa to heal. There are other theories of mechanisms, such as animal studies (rodent models), suggesting that receiving alendronate or zoledronate produced impaired angiogenesis and delayed bone formation, resulting in reduced healing after dental extraction.[41,42]

Prolonged bisphosphonate use in humans, for more than three years, may cause development of poorly functional, highly multinucleated osteoclasts with nuclear condensation and poor adhesion to bone surface.[43] A recent study in dogs[44] found that three years of daily oral bisphosphonate therapy significantly reduced bone turnover, and increased the incidence of matrix necrosis in the mandible. Alveolar bone was selectively affected over the three years with increased density, alterations in trabecular pattern, loss of blood supply and eventual necrosis.

Risk factors

Bisphosphonate agents that contain nitrogen (amino bisphosphonates) are more commonly implicated in the development of BON. A systematic review[22] reported finding ninety-nine cases from oral bisphosphonates, and all reports included the nitrogen containing doseforms. Periapical pathology, periodontal disease, and local trauma, e.g., denture irritation, have been proposed as risk factors for BON in individuals who have received bisphosphonates currently or in the past.[15] Two new sets of factors, genetic and preventive are available to report.[16]

- Drug related risk factors—The more potent bisphosphonates are implicated in most cases of BON. These include intravenously administered zoledronate (Zometa®), the most potent, followed by pamidronate (Aredia®). The oral bisphosphonates are the least potent. The intravenous route of administration is highly absorbed in bones versus oral doseforms that must be absorbed through the intestines. Longer duration of therapy increases the risk for BON.
- Surgery—Dentoalveolar surgery such as extractions, dental implant placement, periapical surgery and periodontal surgery involving osseous injury, are significant risk factors. Most cases of BON from the oral doseform were preceded by tooth extraction.[20]
- Local anatomy—Lesions develop in the mandible more commonly than the maxilla (2:1 ratio), and in areas with thin mucosa overlying bony prominences —tori, exostoses, mylohyoid ridge. There is no data to provide risk estimates for anatomic structures and BON.
- Concomitant oral disease—cancer patients exposed to intravenous bisphosphonates with a history of such inflammatory dental disease as periodontal disease or abscesses are at a 7-fold increased risk for BON. Oral doseforms have a much lower incidence and risk factors are not able to be measured at this time.
- Systemic diseases—Renal dialysis, low hemoglobin, obesity, and diabetes are variably reported to increase the risk for BON in bisphosphonate users.

In no case was restorative dentistry, oral prophylaxis, conventional endodontics, orthodontics, denture construction or other routine dental procedure associated with causing BON in the patient taking oral bisphosphonates. The precipitating event is often an invasive dental procedure that causes a wound in the overlying epithelium. If the mechanism as hypothesized recently[37,38] proves to be accurate, this explains the relationship to periodontal disease and denture irritation. There is still much to be learned about all potential risk factors and because of this, prevention of BON is unclear at this time. Logic leads one to believe that maintenance of oral health and elimination of chronic inflammation may be helpful. However a recent study was not able to detect a statistically significant association between oral hygiene and ONJ development.[45] Earlier in this paper, a reported incidence of oral bisphosphonates administration was 1 in 2,260 cases, however the risk of developing BON increased more than four fold when individuals underwent a dental extraction.[23] One study[46] that controlled for the effects of several known or potential confounders found that smoking and obesity were risk factors for developing BON in cancer patients receiving intravenous zoledronic acid but not for oral bisphosphonates. Users of alendronate who develop BON may present as soon as twelve months after initiating alendronate therapy[11] although most cases have occurred after prolonged therapy of more than five years.[15]

Clinical management recommendations with oral doseforms

Clinical management is based on expert opinion and consensus since there is a lack of randomized controlled trials verifying the efficacy of various preventive and treatment strategies. As more information becomes available, recommendations will be updated. The recommendations of the American Dental Association Council on Scientific Affairs[15] and the AAOMS 2009 updated position paper[16] are summarized below, and urge conservative surgical procedures, proper sterile technique, appropriate use of oral disinfectants, and use of effective antibiotic therapy when infection develops.

Preventive procedures: Before initiating intravenous or oral bisphosphonate therapy, all individuals should undergo oral or dental evaluations and receive necessary treatment to regain oral health. Given the long term biologic activity of bisphosphonates, one could hypothesize that different dosing regimens might be equally effective and decrease the risk of BON. The risk of developing BON with oral doseforms, although exceedingly small, appears to increase when the duration of therapy exceeds three years, or less than three years if chronic corticosteroids were taken during bisphosphonate therapy. No information is available to suggest that monthly dosing of oral bisphosphonates, ibandronate (Boniva®) or risedronate (Actonel®), is associated with a reduced risk of BON compared with weekly dosing regimens. If surgical procedures are needed, and an oral bisphosphonate is being taken, discontinuation of the oral bisphosphonate (drug holiday) for a 3-month period before and after elective invasive oral surgery may lower the risk for BON, osteoporotic conditions permitting. Long term, prospective studies are needed to establish the efficacy of a drug holiday in reducing the risk for BON.

General recommendations: Routine dental treatment generally should not be modified solely due to the use of oral bisphosphonates. When an oral bisphosphonate is initially prescribed, the medical prescriber should recommend the client receives a comprehensive oral examination with panoramic radiography. This should be followed by restoration of decayed teeth, root canal therapy as needed, resolution of active infection, removal of sites at high risk for infection such as partially impacted third molars, removal of non restorable teeth and teeth with extensive periodontal disease, and ill fitting denture injuries. A major goal in the prevention of BON is to limit the possibility of extensive or multifocal oral disease; and having an oral examination should promote this goal. Although there is no evidence to support a conservative clinical approach, it may be prudent to proceed conservatively. This may allow the practitioner to gain insight into the healing pattern of the patient before large areas are treated and before putting

multiple quadrants at risk. The patient's capacity for bone healing would be ascertained, then further procedures could be provided. Bisphosphonate users who have periodontal disease can receive non surgical therapy, which should be combined with the commonly recommended re-evaluation at four to six weeks. At this time there is no evidence that such periodontal procedures as guided tissue regeneration or bone replacement grafts increase or decrease the risk for BON, or whether they affect the success of implant treatment. Recommendations determined from strong clinical research designs are lacking for those taking oral bisphosphonates. As more information becomes available, and a better level of evidence is obtained, strategies will be modified as indicated.

Patient information related to risks of development of BON should be provided, including:

- Oral bisphosphonate use places the patient at a very low risk for developing BON. The actual incidence is unknown.
- The low risk for developing BON may be minimized but not eliminated. All factors to minimize risk are unclear at this time, but oral health is considered to be important.
- An oral health program with effective biofilm removal practices and regular quarterly or semi annual oral care may be the optimal approach for lowering the risk for developing BON.
- Elective dentoalveolar surgery does not appear to be contraindicated in oral bisphosphonate users.
- Prosthetic appliances should be promptly adjusted for fit in order to avoid chronic irritation, ulceration and bone exposure.
- Discontinuing bisphosphonate therapy may not eliminate risks for developing BON as the drug stays in the skeleton for many years.
- BON can develop spontaneously, and unrelated to receiving oral care. This event often is related to dental disease or events secondary to dental therapy, such as trauma. Patients should contact their dentist if any problem develops in the oral cavity.

Patients should have all questions answered to the extent possible, based on current knowledge. Documentation of the discussion of risks and treatment options, as well as obtaining the patient's written acknowledgment of the discussion and consent for treatment should be completed and placed in the treatment record.

Implant placement

There is a paucity of data on the effects of implant placement when oral bisphosphonates are taken.[47,48] One study[47] found no adverse effects associated with implant placement in oral bisphosphonate users but a subsequent review of this study cited limitations regarding the total number of subjects enrolled and the duration of the study.[49] Another study[50] reported on a series of one hundred implants in 44 patients on oral bisphosphonates, none of whom developed BON. Ninety five of the 100 implants achieved osseointegration.[50] Since implant placement requires preparation of the osteotomy site, the potential for BON exists, although the risk is very small. The AAOMS suggests that if dental implants are placed, informed consent should be obtained, and information related to possible future implant failure and possible increased risk for BON provided, especially if the bisphosphonate therapy is continued. The degree of risk for BON is unknown when extensive implant placement or guided bone regeneration is necessary to augment the deficient alveolar ridge prior to implant therapy. When the patient has a history of receiving bisphosphonate therapy, the dentist and the patient should discuss the risks, benefits and treatment alternatives, which may include, but are not limited to, periodontal, endodontic or such non implant prosthetic treatments as placement of bridges and partial dentures. All treatment options and risks discussed should be documented in the treatment record, and written consent for the selected course of therapy should be obtained. Maintenance of implants should follow accepted methods and regular maintenance therapy scheduled. Peri-implantitis should be treated and, if necessary, modest bone recontouring may be considered. These strategies are based on the opinions of experts with significant clinical experience.

Oral surgery

Periapical pathoses, sinus tracts, purulent periodontal disease, and active abscesses that involve medullary bone all may exacerbate osteonecrosis. These areas should be treated immediately. The sextant by sextant conservative approach does not apply to emergency treatment. When dental pathoses are not evident, the trial sextant approach may be applicable. Patients receiving oral bisphosphonates, especially those in a higher risk category who need invasive surgical procedures, should be informed of the small risk of BON, and alternative treatment plans presented, which may include endodontic therapy, removal of the crown and allowing roots to exfoliate, instead of tooth extraction. Conservative surgical technique with primary tissue closure, when feasible, should be considered. Immediately before and after any surgical procedures involving bone, the patient should gently swish with a chlorhexidine containing rinse until healing is established. Prophylactic antibiotics are not indicated simply because a bisphosphonate is taken. There is no evidence that antibiotics will prevent BON. Consideration should be given to interrupting the bisphosphonate therapy during the healing period.[14] It has been suggested to use a C-terminal cross linking telopeptide collagen serum test (CTX) to determine the risk for BON following oral surgical procedures.[32] Higher levels of bone markers identified in this test were thought to pose a reduced risk. This test has not been validated for this risk reduction in randomized controlled clinical trials. It is felt that objective research studies must be completed documenting specificity, predictive value and reliability of such tests before a recommendation can be made to use the CTX test.

Orthodontics

There are no published studies examining the effect of oral bisphosphonates on orthodontia. Case reports have reported inhibited tooth movement when bisphosphonates are taken.[51,52] Patients should be advised of this potential complication.

Stages of bisphosphonate associated ONJ

The 4 stages of BON according to the AAOMS 2009 Update are:[16]

- Stage 0: signs and symptoms, but not exposed bone, that indicate a pre necrotic state
- Stage 1: exposed or necrotic bone but no evidence of infection or pain
- Stage 2: exposed or necrotic bone with pain and evidence of infection
- Stage 3: exposed or necrotic bone with pain, infection and one or more of the following: pathologic fracture, extraoral fistula, or osteolysis extending to the inferior border of mandible.

Most cases of BON with oral doseforms are in stages 0–2 and require only local management. Management for these stages includes rinsing with chlorhexidine, medication for pain, and antibiotics for infection.[53] Withdrawal of bisphosphonates should be discussed with the patient's physician. Stage 3 requires extirpation and reconstruction and removal of teeth in area of necrosis. At this time there are no radiologic modalities to identify the bone at risk for BON.[53]

CONCLUSION

There is still much to be discovered about the role of bisphosphonate medication in ONJ. If a practitioner suspects a patient to have BON, the case should be reported to the governmental body responsible for maintaining data on adverse drug effects. The patient should be managed by a team including the dental specialist, the oral and maxillofacial surgeon, the medical physician as well as the osteologist, as necessary.[14] The Canadian task force on ONJ recommends that a registry be maintained of all identified cases of BON,[14] as this will provide valuable information regarding the strength of association of risk factors and prevalence for BON. The registry will also serve as a basis for obtaining prospective data regarding the effects of interventions. The information regarding how to report BON cases in Canada is currently in development.

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News

THE CANADIAN DENTAL HYGIENISTS ASSOCIATION
L'ASSOCIATION CANADIENNE DES HYGIÉNISTES DENTAIRES

Highlights of the Board of Directors meeting, 15–17 October 2009

The CDHA Board of Director's met in Ottawa at the CDHA premises from October 15–17, 2009. Past President, Wanda Fedora, passed on her congratulations to the new President Jacki Blatz. The Board welcomed new directors, Mary Bertone and Sandra Lawlor from Manitoba and Ontario respectively.

The Board follows the Carver Model of Policy Governance, and consultant, Caroline Oliver, conducted the orientation session. The Board reviewed data from the Member-owner linkage project with consultant, Dr. Sandy Kolberg.

Provincial updates were given. Congratulations to New Brunswick on achieving self regulation! All provinces have been working diligently on quality assurance, continuing competency model, continuing professional development, legislation advocacy, and health promotion activities.

The Board completed an annual review of policies. Dr. Susan A. Ziebarth, Executive Director updated the Board on the national learning outcomes project, on CDHA's web portal projects as well as on information from the research and education advisory committees.

The Annual General Meeting (AGM) was held on 17 October. Jacki Blatz gave a heartfelt and empowering president's message. Business and financial reports of 2008–2009 were submitted and accepted. CDHA's Annual Report was distributed. CDHA is in sound financial condition, and continues to grow in membership and services. Board discussions are ongoing as to changing the format for future annual general meetings to allow for greater participation from the membership. Office bearers of the Canadian Foundation for Dental Hygiene Research and Education (CFDHRE) also met on 17 October. Laura Dempster, President of CFDHRE gave an overall review of the Foundation's activities. Financial reports were accepted.

Wanda Fedora was elected to represent CDHA at the International Federation of Dental Hygiene (IFDH) as the junior member for three years. Wanda will be attending the International Symposium on Dental Hygiene in Glasgow, Scotland, in July 2010 along with Alison MacDougall, senior member. Alison MacDougall and Patty Wickstrom, former senior member to IFDH, joined the Board via teleconference to discuss CDHA's relationship with IFDH. The Board thanks Patty Wickstrom for her dedication to CDHA, and for her role as past president and senior member of IFDH.

The Board continues its focused progress to lead and to support its community of dental hygienists.

CDHA lobbying efforts heard loud and clear… now we need your help

As a result of CDHA's lobbying efforts, the House of Commons Standing Committee on Finance submitted a report to the House of Commons with the following recommendation:

> ***"…the government should revise applicable programs and procedures within Health Canada's Non-Insured Health Benefits Program for First Nations and Inuit to allow dental hygienists to receive payment for the services provided to beneficiaries of these health benefits."***

Many First Nations and Inuit peoples live in rural and remote communities where poor oral health and limited access to service providers indicate a serious need for services. The focus on preventive care by dental hygienists puts the profession in a unique position to improve oral health and to lower downstream restorative costs.

The House of Commons Standing Committee on Finance believes "that the federal government should address these challenges in order to ensure that our Aboriginal peoples can contribute to our prosperous future."

But the fight is far from over; and we need your help. CDHA will be launching a lobbying campaign to ensure that the federal government takes the appropriate action to implement the Committee's recommendation.

There is no better time to contact your Member of Parliament and the Minister of Health, and ask them to support this issue. Don't forget—politicians represent you. Visit www.cdha.ca for resources to help you ask your Member of Parliament to improve the oral health of the First Nations and Inuit peoples in Canada. And also read CDHA's finance brief recommending payment for dental hygienists.

CDHA President wins New Business of the Year award

CDHA congratulates its President, Jacki Blatz, on winning the 2009 Fort Saskatchewan Chamber of Commerce New Business of the Year award for her private practice, *Dentique* The New Business of the Year award is given to a business started within the last two years, and which has shown positive performance in terms of current or expected profitability. Judging was based on the nature of the new venture, and its impact on job creation and market expansion. Six other businesses were nominated in this category.

University of Manitoba launches BScDH program

CDHA congratulates the University of Manitoba on launching a Bachelor of Science in Dental Hygiene program. This program represents the culmination of over thirty years of effort in attempting to offer a baccalaureate degree program in dental hygiene at the University of Manitoba. The efforts of three different Dental Hygiene Directors, and multiple proposals, have finally paid off!

Dental hygienists interested in pursuing a baccalaureate degree, now have more choice than ever before when deciding to continue their education. The new program will be offered in person on campus, on a full time or part time basis. Once the program description and requirements are developed over the next several months, they will appear on the School of Dental Hygiene web page. The first students enrolled in the BScDH program will start in January 2010.

The Cochrane Library needs your help!

THE COCHRANE COLLABORATION®

The Canadian Cochrane Network and Centre runs the risk of losing the national licence of The Cochrane Library, a valuable and credible resource which makes over 4,000 health systematic reviews available to all Canadians. To contribute to the effort to save the ability to access full articles through The Cochrane Library, take a three minute user survey: http://tiny.cc/cochranesurvey.

H1N1: The largest and quickest mass immunization campaign in Canadian history

Dr. David Butler-Jones, Chief Public Health Officer of Canada, provided further clarity regarding the H1N1 flu vaccine through full page advertisements that ran in the front section of all major daily and weekly papers. Key statements from the message follow:

- More than 8,500,000 doses of the H1N1 flu vaccine were delivered to provinces and territories to be administered in phases.
- Priority groups who need to be vaccinated first include people under 65 years of age with chronic health conditions, pregnant women, children 6 months to under 5 years of age, people living in remote and isolated settings or communities, health care workers responding to the H1N1 pandemic or delivering essential health care services, and caregivers or close household contacts of persons who cannot be vaccinated or who may not respond to the vaccine.
- Once the priority groups are vaccinated, immunization will begin for the rest of the population.
- Canada is one of the few countries in the world to make enough vaccine available for all its citizens.

National Health expenditure trends: 1975–2009

This health expenditure trends publication, released by the Canadian Institute for Health Information, provides detailed, updated information on health expenditure in Canada. Highlights include:

- Dental Care – private sector expenditure: Households (out of pocket) - $4,829.4 million; Insurance - $5,744.8 million; Total - $10,574.2 million.
- For dental services, the shares of private insurance and of household (out-of-pocket) spending were almost equal in 1988. The share of household (out-of-pocket) spending decreased to 45.7%, and that of private health insurance increased to 54.3% in 2007.
- Prescribed drugs and dental care are the greatest components of total private health spending. Dental care accounted for more than 71.6% of private-sector expenditure for privately practising dentists, dental hygienists, denturists, chiropractors, massage therapists, osteopaths, physiotherapists, podiatrists, psychologists, private duty nurses and naturopaths in 1975. This share is expected to decrease to 65.5% in 2009.

Practice Success

Interested in having your own dental hygiene practice?

Then you don't want to miss this one-day workshop jointly hosted by

Canadian Dental Hygienists Association
and
Saskatchewan Dental Hygienists' Association

Establishing a Dental Hygiene Practice in Saskatchewan

Saturday, 6 March 2010
SIAST, Wascana Campus
Regina, Saskatchewan

If you think you might be ready to go out on your own but don't know where to start, this workshop is for you.

- Learn from **knowledgeable experts** in the fields of both dental hygiene and regulated health practices.
- Participate in the panel discussion with dental hygienists **who own a dental hygiene business**.
- Find out about everything from **equipment and facility needs, timelines** and **financial projections** to **risk management and liability**.

CDHA ACHD SDHA

Visit www.cdha.ca

Health Council of Canada publishes International Comparisons of Health Care Quality and Safety

The vast majority of Canadians who are in poor health say the quality of the care they personally receive is good to excellent, but more than half feel that fundamental changes are needed to improve our health care system.

International Diabetes Federation

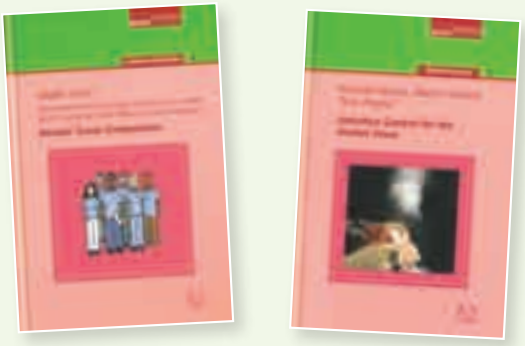
IDF 2009 MONTREAL

New oral health guidelines to improve the treatment of diabetes worldwide

The International Diabetes Federation (IDF) launched new diabetes guidelines on oral health at its 20th World Diabetes Congress in Montreal. This document joins a list of IDF Clinical Guidelines addressing core needs in diabetes.

CDHA Library

The CDHA library recently received the following publications from Quintessence Publishing International: *Infection Control for the Dental Team* and *Dental Team Companion*. These two books are part of the Quintessence Dental Practice Series that stress a client centred, and team approach environment.



We are also pleased to add the following thesis by Sylvia Ieraci to our collection: *Improving the Oral Health Status of Functionally Independent and dependent Seniors Residing in Long Term Care through Dental Hygiene Education.* CDHA welcomes all dental hygiene related theses and dissertations as important additions to our library.

National Non Smoking Week 2010:
Quitting is contagious, pass it on!

The Canadian Council for Tobacco Control has selected the theme for National Non Smoking Week (NNSW), 17–23 January 2010: *Quitting is contagious, pass it on!*

Is quitting smoking contagious? Recent research, published in the *New England Journal of Medicine*, suggests it could be. Researchers found that it was easier for people to quit smoking when others in their social circle also kicked the habit. People followed the quitting habits of their spouses, friends, brothers and sisters, and in small firms, behaviour of co-workers was also influential.

The greatest influence was seen in close relationships. When a husband or wife quit, the chance that their spouse would smoke, fell by 67%. When a brother or sister quit, the chance a sibling smoked decreased by 25%. Smoking cessation by a friend decreased the chances by 36% and among people working in small firms, smoking cessation by a co-worker decreased the chances by 34%.

This research highlights the powerful role that social networks play in smoking behaviours and decisions. It suggests that cessation programs may work better if aimed at groups rather than individuals and indicates that one person quitting may lead to others quitting too.

For more information about NNSW, visit www.nnsw.ca.

10th edition of *Health Care in Canada* report released

This report, published by the Canadian Institute for Health Information, observes that 7.5% of 84 billion dollars was spent on dental services over the past year, and also notes marked growth in dental hygiene and other health professions, such as chiropractor, social work, nursing and occupational therapy. The report also discusses health care funding, and concludes that while there is an abundance of information about health expenditures, there is no method in place to know what value is created.

Health research roadmap: creating innovative research for better health and health care

This new strategic plan outlines the following strategic directions that CIHR will pursue over the next five years:

1. Invest in world class research excellence
2. Address health and health system research priorities:
   a) Enhance patient oriented care and improve clinical results through scientific and technological innovations;
   b) Support a high quality, accessible and sustainable healthcare system;
   c) Reduce health inequities of Aboriginal peoples and other vulnerable populations;
   d) Prepare for and respond to existing and emerging threats to health;
   e) Promote health and reduce the burden of chronic disease and mental illness.
3. Accelerate the capture of health and economic benefits of health research
4. Achieve organizational excellence, foster ethics and demonstrate impact.

CIHR IRSC
Canadian Institutes of Health Research | Instituts de recherche en santé du Canada

8th Canadian Cochrane Symposium 2010
Call For Abstracts - Form

Type of Abstract Submission:

Oral Presentation: Concurrent oral presenters will have 20 minutes to present and 5 minutes for questions. Total of 75 minutes per session.

Posters: Posters will be displayed during the Symposium and a prize for the best student poster will be awarded. Poster size is 0.9m wide x 1.2m high.

Workshops: Workshops are 75 minutes in length and should have clear learning objectives and indicate how there will be interactive learning with/among participants.

Panels: Panels consist of a maximum of three people. Total 75 minutes per panel.

Please save, complete, and attach your form in an email to ccnc.symposium@uottawa.ca

Title of Abstract
Presenting Author Surname
First Name
Position/Job Title
Organization
Street address
Province/State
Postal Code
City
Country
Telephone
Email

Please complete the abstract submission according to your preferred format: oral, poster or workshop

Target Audience
Related Symposium Theme
Presentation Format

- Continued on Next Page -

8th Annual Canadian Cochrane Symposium call for abstracts

Join the Canadian Cochrane Network and Centre during the Canadian Tulip Festival this spring for the 8th Annual Canadian Cochrane Symposium on 19–20 May 2010. This year's symposium theme, *Evidence in Uncertain Times: Meeting the Challenge*, reflects the urgent need to network, share and communicate lessons learned about the best ways to produce, synthesize and use research evidence to improve the health of Canadians. Participate in this exciting event by submitting an abstract by 12 February 2010. Further details are available at www.ccncsymposium.com.

Partnership ties

CDHA is proud to announce SUNSTAR as a Gold Member of **CDHA's Partners' Circle**. As a Gold member, SUNSTAR believes in recognizing and supporting the achievements of dental hygiene professionals and students, by funding awards offered through CDHA's Dental Hygiene Recognition Program. Additionally, SUNSTAR keeps CDHA members up to date on new oral health innovation through Product Showcase listings, and advertisements in the *Canadian Journal of Dental Hygiene*. For complete details of the awards and programs that SUNSTAR supports, visit www.cdha.ca.

SUNSTAR G·U·M HEALTHY GUMS. HEALTHY LIFE.®

CDHA is pleased to announce TD Insurance Meloche Monnex as the Presenting Sponsor for the CDHA and Réso-HD-Québec tour. This tour provides participants the opportunity to explore different tools to better understand the current job market indicators, and to further knowledge of prosthodontics and dentifrices. CDHA wishes to thank TD Insurance Meloche Monnex for their generous and continuous support of the profession and of CDHA.

TD Insurance
Meloche Monnex

CDHA New Recognition awards in 2010

THE CANADIAN DENTAL HYGIENISTS ASSOCIATION
L'ASSOCIATION CANADIENNE DES HYGIÉNISTES DENTAIRES

P&G Oral Health

Attend the Canadian Cochrane Network and Centre Symposium as a CDHA representative

CDHA is delighted to present the ***Symposium Bursary 2010***, in participation with P&G, giving members an opportunity to attend the Canadian Cochrane Network and Centre Symposium in **Ottawa, Ontario,** on **19–20 May 2010**. The successful applicant will receive a maximum of $2,000 to cover expenses. Applicants must be enrolled in, or be graduates of, a master, doctoral or post doctoral program. Application deadline is **1 March 2010**.

1

For entry details, visit www.cdha.ca. For details about the symposium, visit www.ccncsymposium.com.

Assistez au Symposium du Réseau-centre canadien Cochrane en tant que représentante ou représentant de l'ACHD

L'ACHD a le plaisir de présenter la ***Bourse 2010 du Symposium***, décerné avec la participation de P&G, qui donne à ses membres l'occasion d'assister au Symposium du Réseau-centre canadien Cochrane à **Ottawa (Ontario), les 19 et 20 mai 2010**. La lauréate ou le lauréat recevra jusqu'à concurrence de 2 000 $ pour couvrir ses frais. Les candidates et candidats doivent être inscrits à un programme de maîtrise, de doctorat ou de postdoctorat ou diplômés d'un tel programme. La date limite pour soumettre sa candidature est le **1er mars 2010**.

Pour obtenir des renseignements à propos de l'inscription, consulter www.cdha.ca. Pour de plus amples renseignements au sujet du Symposium, voir au www.ccncsymposium.com.

Recognizing the important research work done by dental hygienists

CDHA is pleased to announce the ***Outstanding Research Award 2010***, in participation with P&G, to acknowledge the important role of dental hygiene research in building the knowledge base and guiding the practice of the dental hygiene profession, and in improving the oral health of Canadians. Applicants can submit a research project, a program evaluation, or a systematic literature review for consideration. The author(s) of the winning entry will receive a $2,000 prize. In addition, the winning entry will be published in volume 44 of the *Canadian Journal of Dental Hygiene* in 2010. Application deadline is **1 March 2010**.

2

For entry details and application form, visit www.cdha.ca.

Reconnaissance de l'importance des recherches effectuées par les hygiénistes dentaires

L'ACHD est heureuse d'annoncer le ***Prix 2010 pour la recherche exceptionnelle***, décerné avec la participation de P&G. Ce prix souligne l'importance du rôle de la recherche en hygiène dentaire dans la construction du corpus de connaissances ainsi que dans l'orientation de la pratique de la profession d'hygiéniste dentaire et l'amélioration de la santé buccodentaire des Canadiens. Les candidates et candidats peuvent soumettre à l'examen soit un projet de recherche, une évaluation de programme, une étude ou bien une analyse systématique de travaux antérieurs. Un prix de 2 000 $ sera décerné à l'auteur ou aux auteurs de l'inscription gagnante. De plus, le texte primé sera publié en 2010 dans le volume 44 du *Journal canadien de l'hygiène dentaire*. La date limite pour soumettre sa candidature est le **1er mars 2010**.

Pour obtenir des renseignements à propos de l'inscription, consulter www.cdha.ca.

Showcasing your contribution to Canadian dental hygiene research abroad

The CDHA ***Ambassador Travel Bursary 2010***, in participation with P&G, is awarded to support a Canadian researcher who is submitting an abstract for an oral presentation, poster presentation, or a workshop at the *International Symposium on Dental Hygiene* (ISDH), taking place in **Glasgow, Scotland,** from **1 to 3 July 2010**. The successful applicant will receive $3,000 to cover expenses for participating in the ISDH. Applicants must be enrolled in, or be graduates of, a baccalaureate, master, doctoral or post doctoral program. Application deadline is **19 March 2010**.

3

For entry details and application form, visit www.cdha.ca.

Mise en évidence, à l'étranger, de votre contribution à la recherche canadienne en hygiène dentaire

La ***Bourse de voyage à l'étranger pour l'ambassadrice ou l'ambassadeur de l'ACHD 2010*** est attribuée, avec la participation de P&G, à une chercheuse ou à un chercheur du Canada qui présente un résumé en vue d'un exposé oral, d'une présentation d'affiche ou d'un atelier au *Symposium international d'hygiène dentaire* qui aura lieu à **Glasgow, en Écosse,** du **1er au 3 juillet 2010**. La lauréate ou le lauréat recevra 3 000 $ pour couvrir ses frais de participation au Symposium. Les candidates et candidats doivent être inscrits à un programme de baccalauréat, de maîtrise, de doctorat ou de postdoctorat, ou diplômés de 1er, de 2e ou de 3e cycle. Date limite pour soumettre sa candidature : **le 19 mars 2010**.

Renseignements et formulaire d'inscription sur le site de l'ACHD.

Canadian Public Health Association Conference

On the occasion of the 100th anniversary of the founding of the Canadian Public Health Association (CPHA), public health practitioners from across the country and around the world will meet in Toronto to celebrate a century of achievements and to shape the future of public health. For more information about this conference taking place on 13–16 June, in Toronto, please visit www.cpha.ca

Have your say in this survey

The journal's *Readership Survey*: Why participate? The journal is one reflection of your professional voice as dental hygienists. Make this voice big. Make it heard. Make it matter.

The editorial office of the *Canadian Journal of Dental Hygiene* calls for your participation in its online *Readership Survey*. Your responses are much appreciated, and will collectively help in further improvements to the journal. Go to www.surveymonkey.com/s/9B96HYB to complete the survey.

Réso-HD-Québec et l'Association canadienne des hygiénistes dentaires vous proposent une journée de formation complète

Nous travaillons pour notre profession, nous travaillons pour vous

- Venez **profiter de l'expertise** de vos collègues sur des sujets pertinents tel que :
  - *Améliorer vos conditions de travail!*
  - *L'impact de vos associations Réso-HD-Québec et de l'ACHD au Québec*, et
  - *Chacun son dentifrice!*
- Venez **accumuler 5 heures de formation continue reconnue par l'OHDQ**
- Venez **créer des liens** et **établir un réseautage** pendant les pauses santé et le dîner causerie
- Venez **rencontrer** les hygiénistes dentaires de votre région
  - 30 janvier à Sherbrooke
  - 6 février en Outaouais
  - 27 février à Québec
  - 13 mars à Montréal – *en anglais*
- Venez **consulter le site Internet** www.cdha.ca ou www.resohdquebec.com pour plus de détails.

Réso-HD-Québec and the Canadian Dental Hygienists Association invite you to a full-day workshop

Working for Our Profession, Working for You

- Come to **benefit from your colleagues' expertise** on these topics:
  - *Improving Your Working Conditions!*
  - *The Impact of Your Réso-HD-Québec Association and the CDHA in Quebec*, and
  - *To Each His Own Toothpaste!*
- Come to **accumulate 5 professional development hours recognized by the OHDQ**
- Come to **meet dental hygienists from your region and share about the profession**
  - 30 January in Sherbrooke – *in French*
  - 6 February in Outaouais – *in French*
  - 27 February in Québec – *in French*
  - 13 March in Montréal – *in English*
- Come to **create links** and **network** during the nutritional breaks and lunch
- Come and visit the **Web site** www.cdha.ca or www.resohdquebec.com for more information.

WEBINAR WATCH

Learn by accessing CDHA's live interactive online sessions

Webinars
virtual sessions...
real professional development

NEW CDHA WEBINAR series

Professional development coming to you this year!

20 January 2010
GETTING ON BOARD with evidence-based practice!
Module 2: Finding reliable research: Matching your question with what's in *The Cochrane Library*
8 p.m. – 9 p.m. ET

17 February 2010
GETTING ON BOARD with evidence-based practice!
Module 3: Navigating a systematic review
8 p.m. – 9 p.m. ET

19 May 2010
Oral Cancer Awareness
8 p.m. – 9 p.m. ET

WEBINAR WATCH

All you need is a computer and Internet connection

Visit www.cdha.ca for weekly programming updates & registration

THE CANADIAN DENTAL HYGIENISTS ASSOCIATION
L'ASSOCIATION CANADIENNE DES HYGIÉNISTES DENTAIRES

Canadian Journal of Dental Hygiene

Thank you to our reviewers of 2009!

Reviewers of peer reviewed journals serve as unsung and unseen mentors who strive to enhance the value of content in the manuscripts they volunteer to review. The editorial office of the *Canadian Journal of Dental Hygiene* gratefully acknowledges the service of its reviewers in 2009.

Arlynn Brodie
Dagmar Slot
Denise Laronde
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Fran Richardson
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Dr. Shafik Dharamsi
Terry Mitchell

CDHA also thanks the members of the editorial board for their enthusiasm and interest in raising the profile of the *Canadian Journal of Dental Hygiene*.

Barbara Long
Indu Dhir
Dr. Laura Dempster
Leeann Donnelly
Peggy Maillet
Sandra Cobban
Dr. Susanne Sunell – Scientific Editor

Managing clients with non carious tooth surface lesions: A case report

Soo-Lyun An, RDH; Catherine Ranson, RDH, BHAd; Susan Rudin, RDH BSc, MSPH

ABSTRACT

Optimum oral health should be the focal point of dental hygiene practice. This case report presents discussion of a client case from the George Brown College dental hygiene clinical program. This client presented with moderate to severe non carious tooth surface lesions. The non carious tooth surface lesions were related to various factors that were a result of past and current etiologies including attrition, abrasion, erosion, and abfraction. The conclusion of this case discussion is that the etiology of non carious tooth surface lesions is multifactorial. In order to manage tooth wear and reduce further risk, it is imperative that the dental hygienist perform comprehensive assessments and dental hygiene diagnoses encompassing the goal of optimum oral health.

RESUME

La pratique de l'hygiène dentaire devrait viser la santé optimale de la bouche. Le présent compte-rendu fait état du cas d'un client du programme d'hygiène dentaire clinique du collège George Brown. Ce client s'était présenté avec des lésions dentaires non carieuses modérées à graves sur la surface des dents. Ces lésions non carieuses sur la surface dentaire étaient reliées à divers facteurs résultant d'étiologies anciennes et courantes, notamment l'attrition, l'abrasion, l'érosion et l'abfraction. L'examen de ce cas porte à conclure que l'étiologie des lésions non carieuses sur la surface dentaire est multifactorielle. Pour gérer l'usure des dents et réduire les risques éventuels, l'hygiéniste dentaire doit absolument effectuer des évaluations complètes et poser des diagnostics d'hygiène dentaire comprenant l'objectif d'une santé buccale optimale.

Key words: abfraction, abrasion, attrition, bruxism, dentinal hypersensitivity, erosion, non carious cervical lesions, tooth wear

INTRODUCTION AND BACKGROUND

Non carious tooth surface lesions of abrasion, erosion, attrition, and abfraction are increasing in prevalence.[1] An aging population, and improvements in health care and oral health care services have resulted in the longevity of the human dentition. Along with the retention of the dentition, clients are subject to increased exposure to environmental, health, and dietary factors that are associated with progressive tooth wear.

Because health is considered more than the absence of disease,[2,3] the dental hygienist should consider how the consequences of tooth wear can affect a client's optimum oral health and overall health. Non carious loss of tooth structure impacts optimum oral health in several ways: loss of structural integrity of the dentition, nutrition and lifestyle constraints related to dentinal hypersensitivity, loss of esthetics and increased root caries risk, posterior bite collapse and traumatic occlusion.[4–19] These consequences can affect physical health, and emotional and overall well being.

METHODS

The case study was taken from the George Brown College's dental hygiene clinical program. To provide optimal oral health care for the dental hygiene program's client population, clinical faculty consists of self initiated dental hygienists and dentists. All phases of dental hygiene care were performed by the dental hygiene student, and then evaluated by clinical faculty.

The focus of the oral health team in managing non carious loss of tooth structure was to determine client specific modifiable and non modifiable risk factors for non carious loss of tooth structure. By assessing the possible pre-existing and existing contributory factors, the dental hygienist plays an important collaborative role in facilitating a dental differential diagnosis. Dental hygiene interventions focused on prevention and palliation of non carious tooth surface lesions.

Case Report

This client was a new client to the dental hygiene clinic at George Brown College. This client was assigned to a first year dental hygiene student and treated in the client care phase of student learning.

For the purposes of this paper, non carious tooth wear at the cervical region will be referred to as non carious cervical lesions (NCCL).

Assessment

Client profile: The client is a 56 year old female. She was a new client to the George Brown College dental hygiene clinic. Her last debridement was about 9 months prior to her first appointment at George Brown.

Chief concern: Tooth wear was evident on the buccal surfaces of the posterior teeth in quadrant one. The client was experiencing dentinal hypersensitivity to cold.

Health history: This client presented with rheumatoid arthritis and carpal tunnel syndrome. These conditions developed later in life. She was taking acetylsalicylic acid (ASA) 600 mg and acetaminophen 500 mg daily. There was no history of taking corticosteroid medications and the client was under the care of a rheumatologist. The client reported no history of trauma to the face or dentition.

Oral health history: The client's parafunctional habits included self reported past nocturnal bruxism, and slight anterior tongue thrust habit. The client's current oral self care routine included brushing twice daily for 1–2 minutes with a past history of scrubbing with a hard bristle toothbrush with 'Pearl drops' toothpaste for over 10 years that

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Figure 1: Dental hygiene care plan.

Client name:	Student name:	Continuing care interval: 4 months

Summary of gingival findings: Mild chronic edematous generalized gingivitis.

Appropriate AAP classificatons of periodontal diseases and conditions: Class I Type I A, plaque induced gingival disease, Type B.6.b) non plaque induced, physical injury related to toothbrush abrasion, Class II mild to moderate chronic generalized periodontitis, Class VIII, Type IV, Secondary occlusal trauma related to bruxism and occlusal interferences and evidenced by angular bone loss, fremitus and gingival recession in areas of NCCLs.

Dental hygiene diagnostic statements

1. Risk for increased pocket depth.
2. Gingival recession on buccal surfaces of posterior teeth.
3. Generalized mild to moderate non carious tooth surface lesions. Severe non carious tooth surface lesions on the buccal surfaces of teeth 14, 15 and 16, and NCCLs on other teeth and generalized microfractures.
4. Cervical dentinal hypersensitivity on all buccal surfaces of the posterior teeth and 11.

Etiology – related to all pertinent and probable contributory factors

Lack of knowledge of the oral disease process and effective oral self care habits.

Oral plaque and biofilm.

- Ineffective and excessive force of brushing technique
- Occlusal trauma
- Soft tissue abrasion
- Dietary acid erosion
- Attrition related to bruxism habit
- Abfraction (stress induced) from occlusal interferences and bruxism
- Toothpaste abuse
- Occlusal interferences
- Bruxism
- Tooth paste abrasion
- Dental erosion
- Microfractures
- Exposed dentin

Onset of care where previous goals met i.e., mutual goals based on client needs and desires:

❑ Yes ❑ No ❑ Partially ☑ No previous care at George Brown College

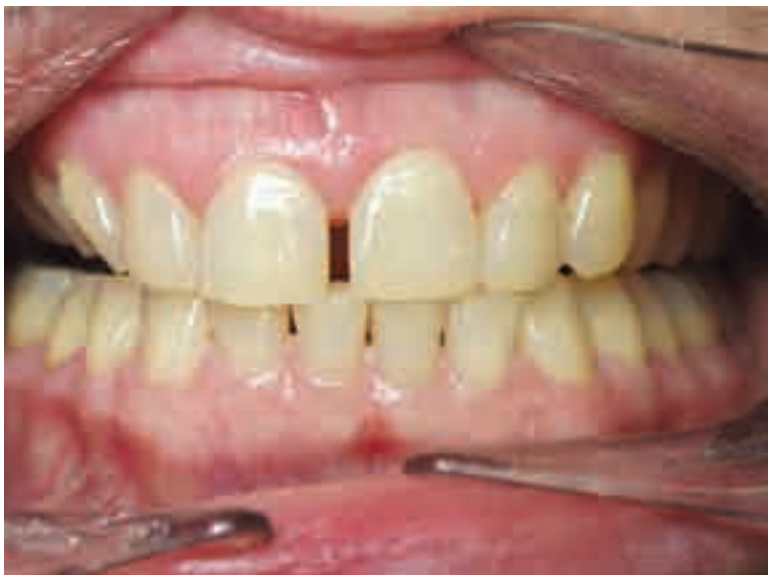
New goals

- Client will use rolling stroke technique and continue to brush 2 times a day for 2 minutes by continuing care appointment.
- Reduce bleeding sites to zero by next continuing care appointment.
- Reduce plaque control record from 87% to 50% by continuing care appointment.
- Client will follow up with referrals by continuing care appointment.
- Client will return for continuing care appointment.

Dental hygiene interventions/Care pan

- Oral self care education: review flossing technique, introduce rolling stroke technique, advise to brush half hour after acid exposure, and drink through a straw, or rinse out. Avoid abrasive toothpaste.
- Nutritional counselling: advise to meet Canada's Food Guide to Healthy Eating (CFGHE) standards of nutritional requirements. Counsel and educate on the risks of dental erosion associated with acidic beverages.
- Debridement: Ultrasonic, manual and photodynamic therapy – 2 appointments.
- Selective polish with fine grit prophy paste.
- Desensitization of all affected teeth with 5% sodium fluoride varnish.
- Referral for comprehensive occlusion evaluation and night guard consultation to University of Toronto Dental Clinic.
- Topical fluoride NaFl 2% on separate day.

Figure 2: This photo shows generalized microfractures and moderate occlusal and incisal non carious tooth surface lesions. There are severe non carious tooth surface lesions on teeth 13, 14, 15 and 16. This client is also in protrusion in this photograph, although not completely. There were posterior occlusal interferences in complete protrusion.



the client no longer used. The client reported daily flossing, and had no oral appliances.

Intra oral assessment: The client presented with a midline palatine torus. There were minimal soft deposits and minimal supragingival calculus in the mandibular anteriors, and minimal subgingival calculus scattered interproximally. There were no clinical signs of abnormal pathology. There was mild localized extrinsic stain. The plaque control record score was 87 per cent which was of a light consistency and concentrated on the cervical third and interproximal surfaces.

Dietary analysis: There was no evidence of any endogenous sources of acid. Dietary analysis revealed 3–4 dietary acid exposures daily in the form of juice, coffee, and wine. Sweet score was high and was considered a moderate caries risk. The client reported that she had never "swished" her beverages or mulled her fruit.

Hard tissue assessment: The hard tissue assessment revealed a diastema between teeth 11 and 12. The client had an Angles occlusion of Class I, overbite of 3 mm, overjet of 2 mm and a midline shift to the right of 3 mm. There was evidence of localized posterior occlusal interferences when assessing mandibular lateral excursions, working side and non working side, and on protrusion.

There were severe non carious tooth surface lesions on the buccal-occlusal surfaces of teeth 16, 15, 14 and 13. The client had mild to moderate generalized incisal and occlusal tooth wear (see figures 2–7). Generalized microfractures were also present. Wear facets, with cupping, were present on teeth 23, 24, 25, 34, 44, 45, and 46. NCCLs were noted on the buccal surfaces of teeth 24, 25, 26 and 44, 45 and 46.

Alginate impressions were taken and used to pour study models. This is one of the clinical competencies for the assessment phase of care in the dental hygiene program.

Periodontal assessment: The client presented with localized interproximal bleeding on periodontal probing. Periodontal pocket depths of 4 mm were localized to five sites in the posteriors. There was mild fremitus on the maxillary anterior teeth. The client had localized 1–2 mm or gingival recession on the facial surfaces of teeth 24, 25, 26, 45, and 46. The summary of gingival findings and American Academy of Periodontology (AAP) classifications are stated in Figure 1. There was no mobility or furcation.

Radiographic interpretation: The client presented with generalized early horizontal bone loss and scattered areas of angular bone loss.

Dental diagnosis

Severe non carious tooth surface lesions on teeth and surfaces of 13 BIMD, 14 OB, 15 OB, 16 OB to be restored. Attrition, erosion, and abrasion were evident.

Dental hygiene diagnosis and planning

This client's non carious tooth lesions were determined as:

- attrition—related to with bruxism and secondary wear factors,
- abrasion—related to tooth paste abuse and secondary wear factors,
- erosion—from dietary sources, and
- abfraction—related to eccentric occlusal loading induced from occlusal interferences and bruxism.

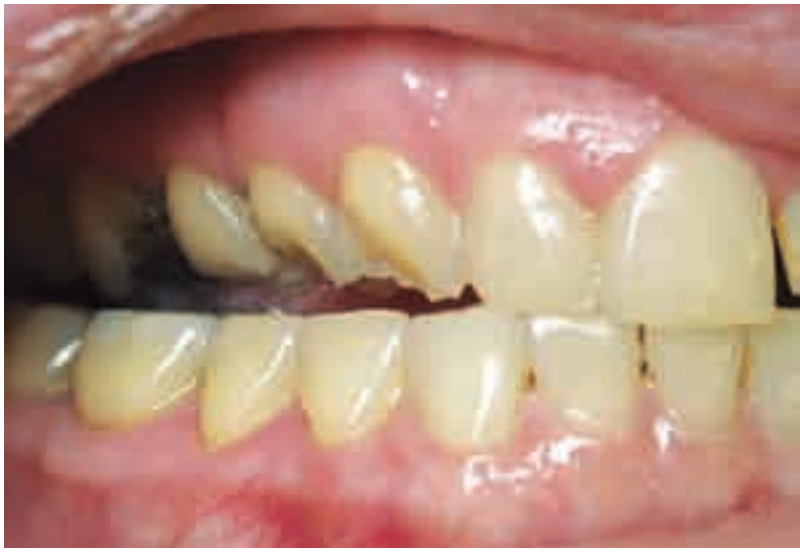


Figure 3: This view represents a manibular working side excursion to the right.

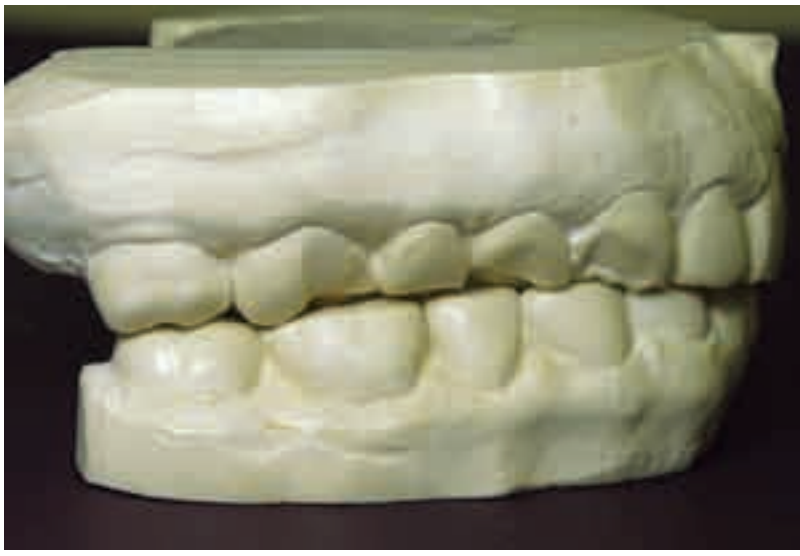


Figure 4: This is an unarticulated stone study model of the client. Notice the corresponding wear in the photograph in figure 3.

IMPLEMENTATION, REFERRALS AND EVALUATION

Informed and written consent was taken prior to implementation. Nutritional counselling and oral self care education were implemented synchronously to facilitate client understanding of the link between nutrition, oral health and overall health. Smoking cessation education was not required as the client had no history of tobacco use.

The client's referrals for an occlusion evaluation and oral appliance consultation were sent to the University of Toronto Dental clinic. The restorative referral consultation included teeth 13 BIMD, 14OB, 15 OB, 16 OB was sent to the George Brown College dental hygiene restorative program.

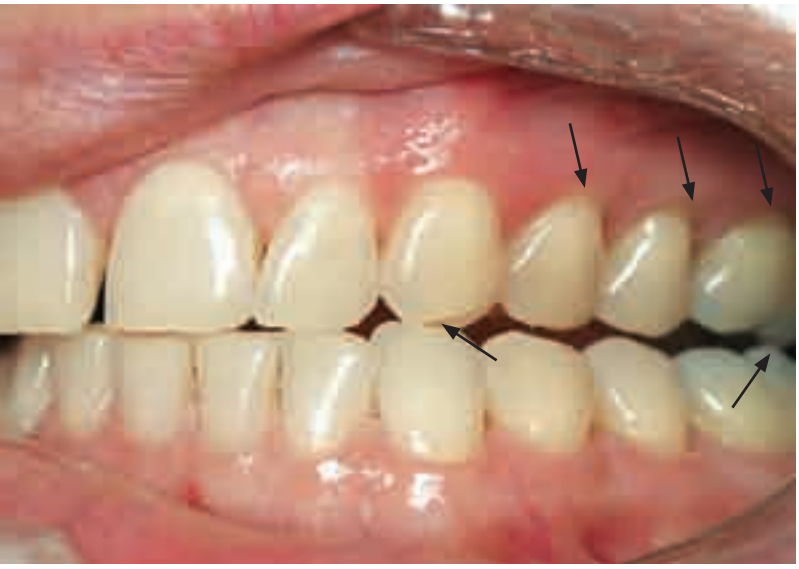


Figure 5: This photo represents a mandibular lateral working side excursion to the left. Notice the NCCLs on teeth 24, 25 and 26 as well as the occlusal interference between teeth 26 and 36 distal buccal cusps and the incisal notch on tooth 23.

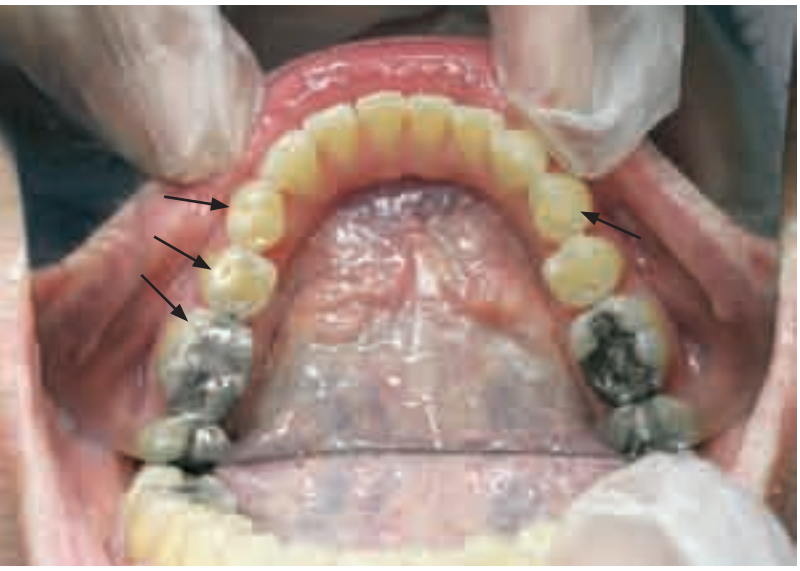


Figure 6: This is an occlusal view of the client's mandible. Notice the cupped wear facets. Cupping of the enamel or dentin indicates the presence of secondary wear factors such as acid erosion or toothpaste abrasion.[23]

An additional request for restorative consultation for the non carious cervical lesions was also sent although they were early lesions.

A referral to the periodontist was not recommended at this time. The client's periodontal condition was expected to be maintained with non surgical periodontal therapy and the gingival recession and fremitus was considered mild. A referral to the periodontist would be considered at the next continuing care appointment.

Ongoing evaluation was implemented at every clinical appointment including evaluation of all short and long term goals, tissue response, client satisfaction, and the status of referrals. The continuing care appointment interval was determined and agreed upon at four months.

RESULTS AND DISCUSSION

Previously, the morphology of the non carious tooth surface lesion determined the condition and the cause: abrasion, erosion, abfraction, and attrition.

Although the dominant shape of the lesion may be a pathognomic sign of the etiology and the tooth wear condition, most lesions are multi factorial in nature.[1,6–7,9–10,13–16,19,21–23] Contributing factors may occur independently, synergistically, or alternately. Furthermore, a factor that may have contributed to the initiation of a lesion may differ from a factor that contributes to the progression of a lesion.

This client's non carious tooth surface lesions were multifactorial. The non carious tooth surface conditions were determined as:

- attrition—related to bruxism and secondary wear factors,
- abrasion—related to chronic tooth paste abuse and secondary wear factors,
- erosion—related to extrinsic sources, and
- abfraction—related to eccentric occlusal loading induced from occlusal interferences and bruxism.

It was also considered that the client could have asymptomatic gastroesophageal reflux disease (GERD), and that she had a habit of sleeping on her right side.[24] This could possibly explain the severity of tooth wear on quadrant 1 facial that may have been exacerbated by chronic toothpaste abuse. There is also a possibility that the client may have had a tendency to brux to the right. A decision was made to wait until we received the results from her pending referrals to determine if a referral to an MD to asses for GERD was required.

The etiologies related to this client's non carious tooth surface lesions included toothpaste abrasion, dietary acid erosion, possible intrinsic acid erosion related to GERD, attrition and abfraction related to bruxism and occlusal interferences. Also, after discussion of client health and oral health history, it was determined that all factors were involved synchronously in the past. Thus, the client could reduce the risk of further non carious loss of tooth structure by changing the existing modifiable contributory factors.

This client's non modifiable risk factors related to increase in risk for the progression of non carious tooth surface loss were considered to be: bruxism and possibly her occlusion. This client's modifiable risk factors were considered to be diet, oral self care habits, and choice of oral health products.

The client is scheduled to return for her 4-month continuing care appointment with the same dental hygiene student in second year client care clinic. Follow up of referrals and client goals will be evaluated at the continuing care appointment. The completed referrals are expected to provide a dental diagnosis of the client's occlusion evaluation, a dental diagnosis of the non carious tooth surface conditions and completed restorations. Considering dental hygiene interventions are focused on prevention and palliation, it is imperative that the dental hygienist practise collaborative care with other oral health professionals for

the interventions that are not within the dental hygiene scope of practice.

CONCLUSION

The etiology of non carious tooth surface lesions is multifactorial; every client will present with different contributing factors that vary in severity and sequence. The signs, symptoms, and oral manifestations of non carious loss of tooth structure can also vary for each client. The key in prevention of non carious tooth surface lesions is to determine the pre existing and existing modifiable and non modifiable risk factors that are client specific. The role of the dental hygienist is to complete a comprehensive oral assessment and dental hygiene diagnosis to facilitate the differential diagnosis of non carious tooth surface lesions. Dental hygiene interventions include prevention, palliation, and providing an appropriate restorative consultation.

ACKNOWLEDGEMENT

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How do we define business success? A comparison with the chiropractic model

Business Development Manager, Ann E. Wright

Data available on the business success of dental hygiene private practices is scant. In marketing terminology, dental hygiene private practices are labelled as being in the "early initiator" stage. This stage of business development is characterized by few people entering the market, lack of awareness by the public about the service or product, fewer clients, more administrative obstacles including the ability to get loans, supplies and equipment, and in the case of dental hygiene, barriers to receiving payment for the services provided.

Recently I reviewed an article on the financial success of new private practice chiropractors in the USA. The purpose of the article was to provide graduating chiropractors with guidance if they chose to set up a private practice. The article explained the optimal decisions one might make which would enable financial success.

While the differences in practice are obvious, the business model is close in comparison. When looking at the financial information, the measures of practice success and overall costs are very similar to those in dental hygiene. On average, the chiropractors required approximately $140,000 in start-up costs to build their practice, and needed to earn approximately $4,200/month to cover their expenses. The author[1] used this information to justify an important conclusion—that new chiropractic business owners need to ensure that they have enough money to carry through the start up years. A further important result of the study showed that 50 per cent of chiropractic start ups required a loan to carry their business through the first year.

Advertising was reported as a key component to business success. In the analysis of marketing strategies used to recruit new clients, the most effective media reported were client referrals followed by word of mouth. Advertising through health education seminars, spinal screenings, and networking came next on the list. At the bottom of the list were the least effective advertising vehicles that, incidentally, were the most expensive—radio, television, and billboard advertising.

One of the more interesting results in this survey was an analysis of the productive office hours. Monday, Tuesday and Wednesday were reported to be most effective times to schedule visits. Thursday, Friday, and Saturday were less effective, but productivity was greater if the appointments were scheduled in the morning. Success with evening hours peaked towards the end of the week, with the exception of Saturday.

With respect to insured services, the chiropractors generally accepted and relied on third party payment for their services. Interestingly, the average fee/visit was reported at $33.

Choosing an optimum location for the practice was highly advised. The most successful chiropractor respondents spent time researching and understanding their market, including determining the number of potential clients, their specific needs and wants as well as knowing and understanding the competition.

The most important conclusion when looking at the financial success of chiropractors is the amount of time it took to establish a self sustaining practice. Fifty per cent of the chiropractors reported that they were self sustaining within two years, 30% within 3–4 years, and 20% between 5–6 years. None of the respondents in the study required longer than six years to become self sustaining.

This report on chiropractic practice underlines the importance of having a good grasp of the important factors and statistics that define practice success. Practice success for dental hygienists is not much different than it is for chiropractors. Dental hygienists with overly optimistic financial predictions are cautioned to review their practice expectations. Practice success can and does mean that the practice may well operate at a loss or break even position at the end of the first year or two of operation.

On a positive note, CDHA feedback from dental hygienists in private practice have shown us that these dental hygiene entrepreneurs are far sighted and can deal with adversity as a matter of course. They are quick to change direction when they see that their plans are off course, and make necessary adjustments to get their business back on track. While sometimes frustrated, they are resoundingly unanimous in their passion for this style of practice. CDHA is committed to the success of private dental hygiene practice, and continues to provide information, support, and advocacy on behalf of all dental hygienists considering this exciting practice option.

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CDHA welcomes your feedback: awright@cdha.ca

Staying connected

CDHA staff

Dental hygiene educators look for ways to stimulate research, and to promote evidence based care provided by dental hygiene practitioners. Some ways include determining what research based information resources are available to alumni, as well as promoting alumni memberships, and utilization of college and university resources among graduates. It is vitally important that research is part of decision making, and that dental hygienists have an understanding of research, and apply findings in their practice decisions. These skills and their application take time, practice, and continuous learning requiring access to resources, and support in the clinical setting.

Based on an informal survey conducted among alumni associations and libraries of those Canadian universities and colleges offering dental hygiene programs, there appears to be some variation in alumni resources among schools, with information access not always being a featured benefit.

The table below summarizes the responses received.

Licensing agreements and budgetary restraints were most often cited as reasons for limited access to electronic resources. The costs of including all alumni were described as prohibitive, especially as many libraries have faced several years of staff and funding cuts.

OTHER RESOURCES

Community libraries, such as the Vancouver Island Regional Library System, and Ottawa Public Library host many excellent databases and online catalogues that are linked to larger regional systems; they therefore provide first rate alternatives for finding up to date information. For example, membership in Sm@rtLibrary allows the user to search several national capital library catalogues at once. These libraries include Algonquin College, University of Ottawa, Carleton University, CISTI, Ottawa Public Library, Library and Archives Canada among others. An integrated online catalogue of all Ontario community colleges, and inter library loans can be accessed through the Bibcat bibliocentre at any community college in the province.

The Cochrane Collaboration at http://www.cochrane.org/ is a unique worldwide organization that aims to help professionals make well informed decisions about health care by preparing, maintaining, and promoting the accessibility of systematic reviews of the effects of health care interventions. Issue 4, 2009 of the Cochrane Library, contains several databases of evidence that total over half a million records. At present all Canadians have full access to the Cochrane Library that contains over 3,000 reviews and 9,000 abstracts.

AccessMyLibrary at http://www.accessmylibrary.com provides free access to over 30 million articles. In addition to the Medicine and Health sections, there are collections related to education, culture and society, and gender issues to name a few.

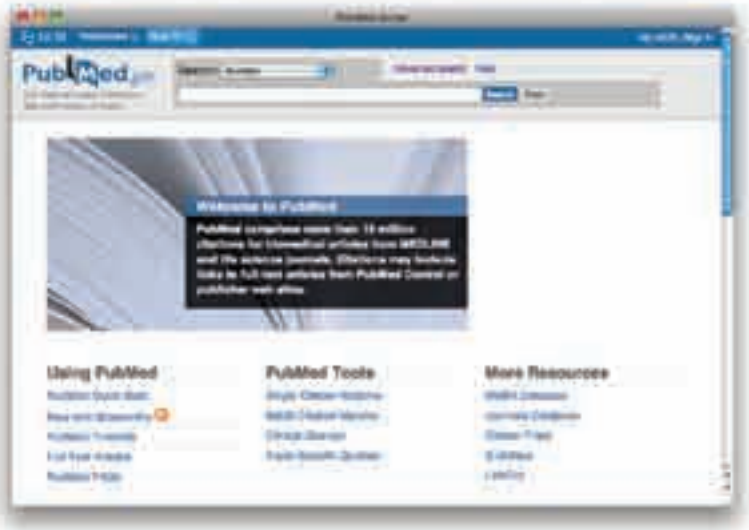
Information needs are important because they relate directly to the primary purpose of oral health care–client therapy. Dental hygiene graduates should be encouraged to become active in their alumni associations, and to advocate for improved access to critical reviews.

The CDHA library contains a number of dental hygiene related journals and will supply articles (up to 20 pages) from our collection free as a benefit to our members. We can also obtain materials through interlibrary loans. As these loans usually cost between $9 and $25, we will ask you to pay whatever fees the other library charges. Requests can be e-mailed to the Information Coordinator, Brenda Leggett at bleggett@cdha.ca.

School	Library privileges	Electronic database access
University of British Columbia, BC	An alumni "ACard" allows borrowing of resources	On site access to databases
Vancouver Island University, BC	Borrowing privileges and in-house services	No access
Vancouver Community College, BC	Borrowing privileges	On site access to databases (may be abstracts only)
Camosun College, BC	Borrowing privileges	One day login access
College of New Caledonia, BC	Borrowing privileges and in-house services	On site access to databases
Saskatchewan Institute of Applied Science and Technology, SK	$20 annual fee; Borrowing privileges	Limited access
University of Manitoba, MB	$25 annual fee; Borrowing privileges	No access
University of Alberta, AB	Borrowing privileges	Access with "OneCard" and on site day pass
Dalhousie University, NS	Borrowing privileges	Limited access
George Brown College, ON	Borrowing privileges	Limited access—currently under discussion to increase
Niagara College, ON	Borrowing privileges	On site access to databases
Fanshawe College, ON	Borrowing privileges	No access (access is available at UWO)
Durham College, ON	Borrowing privileges	Limited on site access
Georgian College, ON	Borrowing privileges	On site access
Algonquin College, ON	Borrowing privileges	Limited on site access

Working with PubMed: redesigned interface

CDHA staff



PubMed is a free search engine offering a medical database with over 19 million citations going back to the year 1865.

Information about the journals indexed in PubMed http://www.ncbi.nlm.nih.gov/pubmed/ is found in its Journals Database, searchable by subject or journal title, title abbreviation, the NLM ID (NLM's unique journal identifier), the ISO abbreviation, and both the print and electronic International Standard Serial Numbers (pISSN and eISSN).

What's in it for the dental hygienist or the dental hygiene student?

PubMed is an invaluable online resource for practising dental hygienists, and for students at diploma, baccalaureate, master, and doctoral levels. Get the latest published information to cite in your class papers or research papers. Enquire at your college or university library for access to full length articles. Expand your knowledge of oral health care and practice, and integrate that knowledge into practice.

At the end of October 2009, PubMed transitioned to a redesigned interface. What are some of the new features?

Quick Tours comprise instructional videos as a learner tool to use and search PubMed.

- Search PubMed for an author (3 minutes)
- Search PubMed by author and subject (1 minute)
- PubMed simple subject search (1 minute)
- Search for a journal (3 minutes)

PubMed's MeSH database Quick Tour

- Search with the MeSH database (3 minutes)
- Combine MeSH terms using the MeSH database (4 minutes)
- Apply subheadings and other features of the MeSH database (5 minutes)

Managing Results Quick Tour

- Download results for use in Reference Management software (2 minutes)

On the homepage, ***New and Noteworthy*** introduces you to new features of the website. *My NCBI: My Bibliography* is one feature among the many listed. It allows users to add citations from books, meetings, presentations, patents, and articles not found in PubMed.

You can now create a true bibliography, because in addition to journal articles, you can also add citations from books, meetings, presentations, and patents.

Create Bibliographies

- On the *My NCBI page*, click on the link "Bibliographies" under *My Saved Data*. On the *My Saved Data* screen, click on *My Bibliography*. Click on ⊞ to add items to *My Bibliography* (see Figure 1).

Figure 1: Create your My Bibliography.

http://www.ncbi.nlm.nih.gov/mesh

MeSH (medical subject headings) database is the US National Library of Medicine's controlled vocabulary used for indexing articles. MeSH terminology provides a consistent way to retrieve information that may use different terminology for the same concepts.

MeSH tutorials include Quick Tour

i. Search with the MeSH database
ii. Combine MeSH terms
iii. Apply subheadings and other features of the MeSH database

When writing a paper, you may require the referenced journal's short title. Check the correct title at http://www.ncbi.nlm.nih.gov/journals. Search by topic, journal title or abbreviation, ISSN, or browse by subject terms.

http://www.nlm.nih.gov/bsd/special_queries.html. Topic specific queries is a directory targeted for clinicians and health services researchers.

The homepage links directly to the clinical trials website of http://clinicaltrials.gov/ — a registry of federally and privately supported clinical trials conducted in the US and around the world.

CDHA welcomes your feedback: journal@cdha.ca

Guidelines for authors

The *Canadian Journal of Dental Hygiene (CJDH)* provides a forum for the dissemination of dental hygiene research to enrich the body of knowledge within the profession. *CJDH* is a peer reviewed journal. Manuscripts should deal with current issues, make a significant contribution to the body of knowledge of dental hygiene, and advance the scientific basis of practice. Manuscripts may be submitted in English or French. All accepted submissions will be edited for consistency, style, grammar, redundancies, verbosity, and to facilitate overall organization of the manuscript.

Criteria for submission: A manuscript submitted to *CJDH* for consideration should be an original work of author(s), and should not have been submitted or published elsewhere in any written or electronic form. It should not be currently under review by another body.

Pre submission enquires to: Ms. Linda Roth, Acquisitions Editor, *CJDH* 96 Centrepointe Drive, Ottawa, ON K2G 6B1; t: 613-224-5515 x 136; f: 613-224-7283; e: acquisitions@cdha.ca or lroth@cdha.ca; toll free: 1-800-267-5235 x136

CJDH welcomes your original submissions on:

1. **Professionalism:** manuscripts dealing with issues such as ethics, social responsibility, legal issues, entrepreneurship, business aspects, continuing competence, quality assurance, and other topics within the general parameters of professional practice.
2. **Health promotion:** manuscripts dealing with public policy and a variety of elements integral to building the capacity of individuals, groups and society at large. Based on the key elements described in the Ottawa Charter, this may include health public policy, creating supportive learning environments, developing abilities, strengthening community action, and reorienting oral health services.
3. **Education:** manuscripts related to teaching and learning at individual, group, and community levels. It includes education related to clients, other professionals, as well as entry to practice programs.
4. **Clinical practice:** manuscripts dealing with interceptive, therapeutic, preventive, and ongoing care procedures to support oral health.
5. **Community practice:** manuscripts dealing with oral health programs including topics related to program assessment, planning, implementation, and evaluation.
6. **Oral health sciences:** manuscripts dealing with knowledge related to the sciences that underpin dental hygiene practice.
7. **Theory:** manuscripts dealing with dental hygiene concepts or processes.

Word count in manuscripts:

1. Studies/Research paper – no longer than 6000 words, and a maximum of 150 references. Abstract within 300 words.
2. Literature review – no longer than 4000 words and as many references as required. Abstract within 250 words.
3. Position paper – no longer than 4000 words and a maximum of 100 references. Abstract within 250 words.
4. Case report – between 1000 and 1200 words, and a maximum of 25 references, and 3 authors. Abstract of 100 words.
5. Editorial – by invitation only, and may be between 1000 and 1500 words, using as many references as required. No Abstract.
6. Letter to editor is limited to 500 words, a maximum of 5 references, and 3 authors. No Abstract.

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Revision: When a manuscript is returned to the corresponding author for revision, the revised version should be submitted within 6 weeks of receipt of the referee reports. The author(s) should address the revisions asked in the cover letter, either accepting the revisions or providing a rebuttal. Additional time for revision can be granted upon request, at the Managing Editor's discretion.

Appeal for re-review may be addressed to the Scientific Editor by e-mail (journal@cdha.ca) who will take it forward to the Editorial Board. The committee members may decide to seek a further review or reject the submission. There are no opportunities for a second appeal.

	Check	Elements
1		Used standardized fonts such as Arial, New Times Roman, Verdana in 10–12 points.
2		Double spaced text in body of manuscript.
3		Manuscript has standard margins of 1 inch (2.5 cm) at the top, bottom, left and right.
4		Pages are numbered consecutively, starting with title page.
5		Cover letter accompanies manuscript with your declaration of originality, any conflict of interests, your contact information.
6		Placed figures, tables, graphs, photos at the end of the manuscript.
7		Provided signed permissions for any text or pictures of client/patient.
8		Are all previously published illustrations appropriately credited? Have you checked their publisher's website for restricted use or permissions?
9		Included corresponding author's contact information in the title page.
10		Included all the authors' academic titles, and their current affiliation(s).
11		Cover letter contains names and contact information of two possible and willing reviewers for your submission.
12		Key words are terms found in MeSH database in Search "MeSH": http://www.ncbi.nlm.nih.gov/mesh
13		Used only the Vancouver style of referencing in the manuscript: http://www.nlm.nih.gov/bsd/uniform_requirements.html
14		Used abbreviated titles of journals from PubMed database, in Search "Journals": http://www.ncbi.nlm.nih.gov/journals

Submission checklist

Manuscript components:

1. **Title page:** The title must provide a clear description of the content of the submission in 12 words. It should be followed by each author's name (first name, middle initial and last name) with respective degrees and any institutional affiliation(s), corresponding author's name, address and e-mail address. All authors should have participated sufficiently in the work to be accountable for its contents.
2. **Abstract** should not contain references or section headings. Typical formats are outlined below.
   a. **Study and Research paper:** Background (including study question, problem being addressed and why); Methods (how the study was performed); Results (the primary statistical data); Discussion, and Conclusion (what the authors have derived from these results).
   b. **Literature Review:** Objective (including subject or procedure reviewed); Method (strategy for review including databases selected); Results and Discussion (findings from and analysis of the literature), and Conclusion (what the authors have derived from the analysis).
   c. **Position paper:** Same format as in Literature Review.

d. **Case Report:** Introduction (to general condition or program); Description of case (case data); Discussion (of case grounded in literature), and Conclusion.

3. **Key words:** Provide a maximum of 10 key words or short phrases from the text for indexing purposes. Terms from the Medical Subject Headings (MeSH) list of *Index Medicus* are preferred. Use the drop down menu in Search to choose MeSH http://www.ncbi.nlm.nih.gov/mesh
4. Main body of **Text:** Logically organize information. All facts purported to be facts, must indeed be true at the time of writing.
5. **Acknowledgement:** Acknowledge any assistance or support given by individuals, organizations, institutions, or companies. Those identified here must have provided informed consent for you to cite their names as this may imply endorsement of the data and/or the conclusions.
6. **Artwork** includes any illustrations, figures, photos, graphs, and any other graphics that clearly support and enhance the text in their original file formats (source files).
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     iii. 1000 dpi minimum for bitmap (b/w) artwork.
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10. **Referencing Style and Citations:** The reference style is based on Vancouver style/Index Medicus at http://www.nlm.nih.gov/bsd/uniform_requirements.html References should be numbered consecutively in the order in which they are first mentioned in the text. Use the previously assigned number for subsequent references to a previously named citation (i.e. no "op cit" or "ibid"). Use superscript arabic numerals to identify the reference within the text (e.g.[1,2] or [3–6]). The Reference section lists these in numerical order as they appear in the text.

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CANADIAN JOURNAL OF DENTAL HYGIENE · JOURNAL CANADIEN DE L'HYGIÈNE DENTAIRE

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13,331 (including subscriptions as of 30 September 2009). CDHA member breakdown by province (approximate): NL=144; NS=599; PE=50; NB=188; QC=166; ON=6495; MB=488; SK=438; AB=2180; BC=2491; NT/NU/YT=19; USA=56; Other countries=17

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   96 Centrepointe Drive, Ottawa, Ontario K2G 6B1

CDHA Community Calendar

Plan ahead. Participate in the events posted on this page. Or mark your calendar.

UPCOMING EVENTS/ ÉVÉNEMENTS À VENIR

Le 30 janvier 2010	Sherbrooke, QC	Nous travaillons pour notre profession, nous travaillons pour VOUS
Le 6 février 2010	Outaouais, QC	Nous travaillons pour notre profession, nous travaillons pour VOUS
Le 27 février 2010	Québec, QC	Nous travaillons pour notre profession, nous travaillons pour VOUS
6 March 2010	Regina, SK	Saskatchewan Dental Hygienists Association (SDHA)/CDHA: Private Practice Workshop
13 March 2010	Montréal, QC	Working for Our Profession, Working for YOU
15–17 April 2010	Vancouver, BC	Catch us at the Pacific Dental Conference
17 April 2010	Vancouver, BC	British Columbia Dental Hygienists Association: Private Practice Workshop
25–26 June 2010	Montreal, QC	Vision to Venture: CDHA Leadership Event
9–11 June 2011	Halifax, NS	CDHA National Conference

ANNUAL EVENTS

CDHA ACHD National Dental Hygienists Week™ La semaine nationale des hygiénistes dentaires

11–17 April 2010 is National Dental Hygienists Week™

An annual event dedicated to heightened awareness about preventative oral health care, and to help Canadians understand the role and importance of the dental hygiene profession.

Every April is Oral Health Month.

Help spread the message.

Advertisers' index

ABOUT THE COVER

The outer front covers in the six issues of Volume 44 in 2010 feature **dental hygiene educators in Canada**, honouring their service to the dental hygiene profession. This picture was one among the entries selected for the front cover competition first advertised mid-November 2009 in the journal. ©CDHA. Printed with permission.

Linda Roth has been sharing her knowledge and skills since 1995 as a clinical educator at Algonquin College of Applied Arts, Ottawa, Ontario. Critical thinking and optimal client care are integral to this education. Linda's current 2nd year class comprises 26 dental hygiene students. Linda's driving commitment comes from watching students develop into earnest health professionals.