JCDA
Journal of the Canadian Dental Association

Vol. 70, No. 11 December 2004

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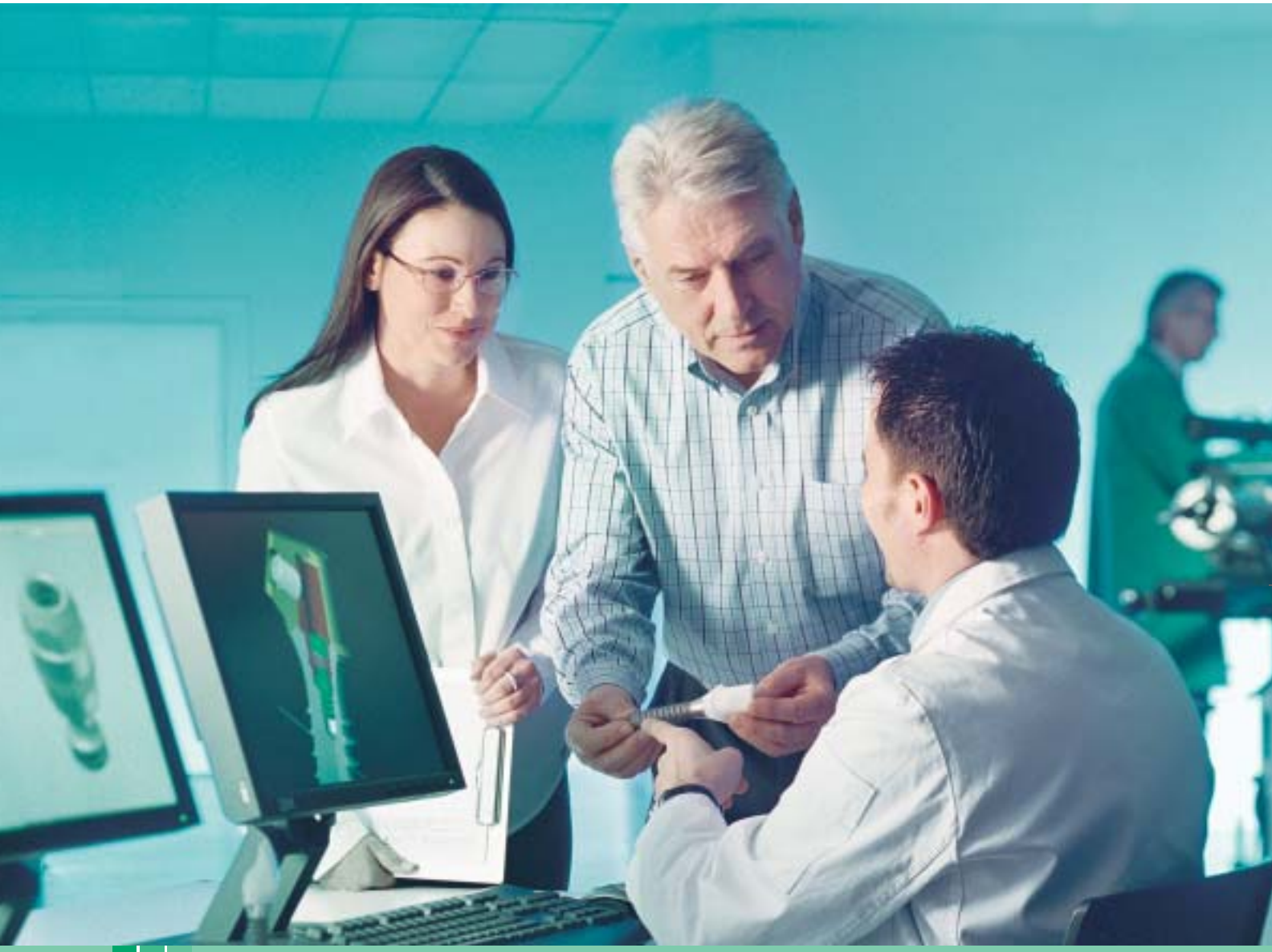

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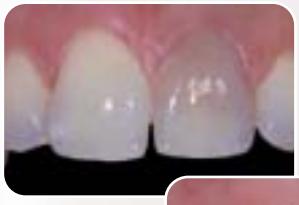

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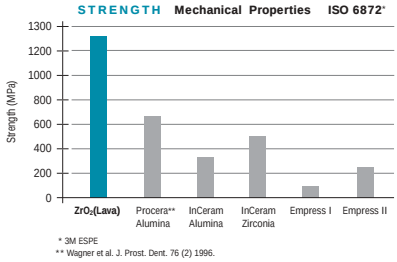

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Editorial

SHOULD A JOURNAL BE ENTERTAINING?

Dr. John P. O'Keefe

Recently, I gave a presentation to the American Association of Dental Editors about the role of peer-reviewed journals in guiding clinical decision making. Speaking to a former president of CDA well before the presentation, I told him the nature of the talk I was preparing. His comment was "that's going to be a very short presentation, John."

He had a point. The literature I consulted indicated that peer-reviewed literature has little impact on clinical decision making. The 2 main bodies of literature that brought me to this conclusion related to the uptake of clinical practice guidelines by physicians and the types of information that influence their prescribing habits.

A purely educational approach for the publication and dissemination of guidelines doesn't seem to be very effective. According to a 1999 publication called *Getting Evidence into Practice* (see http://www.cda-adc.ca/jcda/vol-70/issue-11/735.html), other strategies need to complement the dissemination of guidelines if clinicians' behaviour is to change. One well-documented example of physician behaviour change is the decision to prescribe a newly introduced medication. Here again, the peer-reviewed literature is among the least important sources of information influencing the decision to prescribe.

Many clinicians gain awareness about a new drug through pharmaceutical industry publications or through face-to-face contact with a company representative. Once awareness is raised about the new drug, a practitioner often experiments to see if the new medication suits patients' needs. The endorsement of the drug by a respected specialist colleague is another factor that prompts a physician to actually prescribe the newly introduced preparation. In my opinion, this process is similar to how we find out about and decide to use new dental materials.

Can a publication like ours hope to influence your clinical decision making and help you in your quest to make the best decisions in the interest of your patients? With regard to clinical matters, we will have to content ourselves with raising your awareness about relevant topics. We can only achieve this if we present timely, credible and pertinent material in an attractive and, dare I say, entertaining manner.

In the desire to present a serious and dignified professional air, *JCDA* and other journals have often ended up more dull than interesting; a chore to read rather than fun to pick up. I believe we have to make every effort to create a new *JCDA* that will meet certain goals, but will still grab readers' attention. And what are the primary goals we strive to reach?

First and foremost, I believe that our role is to produce a community-building publication for dentists. The paper version of *JCDA* should answer the questions being asked by Canadian dentists. With each edition, you should be able to learn something interesting and new, that is also relevant to your professional life. I see the paper version evolving into the "clinician's" edition, with the electronic version becoming the more "academic" edition. Our combined print and electronic publication should reflect well on CDA and the Canadian dental profession, and every Canadian dentist should have reason to be proud to support *JCDA*.

How can you support a newly invigorated *JCDA*? I believe you can do so through CDA membership or by subscribing to *JCDA*. You can help develop the publication by contributing as an author or reviewer, or as an engaged reader who suggests questions for us to answer, or one who expresses opinions through our letters section. I think of *JCDA* as a "campfire" for dentists to gather around and swap stories. While we all enjoy the heat and the fellowship that comes with the campfire, we need a critical mass of people to throw logs on the fire or it will die.

Taking time to reflect, I feel very humble recalling the wonderful contributions that so many people have made to develop *JCDA* further in 2004. I heartily thank our colleagues from Canada, and increasingly from around the world, who helped us so generously this year. I wish these authors, reviewers, advisors and all our readers a very happy and peaceful holiday season. I look forward to working with you in 2005 to create an even more enjoyable and interesting publication.

John O'Keefe
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1. Volpe AR, et al. J Clin Dent. 1996; 7 (suppl): S1-S14. 2. Data on file, Colgate-Palmolive Company. 3. Ayad f, et al. Clinical efficacy of a new tooth whitening dentifrice. J Clin Dent. 2002; 13:82-85. 4. Singh S, et al. The clinical efficacy of a new tooth whitening dentifrice formulation: A six-month study in adults. J Clin Dent. 2002; 13:86-90.
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President's Column

BRINGING YOUR CONCERNS TO PARLIAMENT HILL

Dr. Alfred Dean

The new federal government has begun the process of preparing for its next budget and has called for submissions to the Standing Committee on Finance to that end. Each year when these discussions take place, CDA makes a submission on your behalf, as part of our ongoing government relations efforts.

As a national organization, making representation to the federal government is one of the most valuable things we do. In a recent survey of Canadian dentists, you expressed the importance you place upon CDA's government lobbying efforts. Our work is coordinated under the auspices of the Government Relations and Public Advocacy Committee and its current chair, Dr. Phil Poon of Manitoba. The committee is supported by the government relations department at CDA.

Making Canadian dentists' wants and needs known to government takes on many forms, including regular communication with members of Parliament and their staff, bureaucrats, committees and the relevant government departments. We are active participants in the Retirement Income Coalition, the National Professional Association Coalition on Tuition and the Canadian Coalition for Action on Tobacco, to name only 3 initiatives. CDA also responds to direct inquiries from government and its agencies.

Following our submission to the Finance Committee, the next big event will be CDA's "Days on the Hill." Working on your behalf, we will spend 2 days "storming" Parliament Hill, meeting with as many parliamentarians as time permits. Joining CDA leadership and the Government Relations Committee at these meetings will be a representative of the faculty deans and aboriginal representatives.

We have confirmed meetings with the ministers of Health, Public Health and Human Resources and Skills Development. The Opposition and NDP health critics and the Opposition immigration critic will also hear our concerns. In addition, we will meet with the parliamentary secretaries on Health and Indian and Northern Affairs as well as the chair of the Health Committee.

The subjects we will address with these decision-makers are varied, but are all aimed at benefiting dentists, our patients and our profession. Public health issues like access to care and the primacy of the dentist in delivering oral health care will receive attention. We will be addressing the unprecedented funding crisis facing dental faculties, including the severe problems they encounter in attracting educators from the private sector. We will be stressing that government demonstrably reinvest in tobacco reduction strategies. We will be advocating for the immediate appointment of a Chief Dental Officer to spearhead oral health promotion activities, including the collection of national oral health indicators.

We will be re-emphasizing the fact that the oral health status of First Nations and Inuit Canadians requires greater attention, as the dental portion of the Non-Insured Health Benefits (NIHB) program continues to suffer from serious flaws. In April 2003, the Standing Committee on Health held a special meeting to examine the oral health of First Nations and Inuit. The resulting report made strong recommendations for improving the NIHB program; however, these recommendations have yet to be embraced by the department.

Finally, the issues that affect your pocketbook, such as RRSP contribution increases and the deductibility of dental plan premiums, will also be on the agenda.

I trust you can recognize that CDA is tirelessly working on your behalf to ensure that the issues which affect you are front and centre when we speak to governments. What can you do? If you are a CDA member, you can continue to support this great national organization. If you are not a member, then I hope I have made a strong case to earn your membership.

We need your help. Please help us.

Alfred Dean, DDS
president@cda-adc.ca

My July/August column ("Who represents you?") continues to draw comments from both sides of the spectrum. It is important that you know it was not my intention to create division, but rather to stir debate. Please understand that the President's Column *strictly contains my views and does not necessarily reflect the viewpoint of the Board of Directors or the Canadian Dental Association.*

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1. Harris M, Mackay H, *et al.*, Effectiveness of Johnson & Johnson REACH® Clean Burst™ vs. GLIDE® Mint Floss in Reducing Plaque, Journal of Dental Research, Vol. 82, Special Issue B, June 2003.
2. Harris M, Hardie-Muncy D, *et al.*, Effectiveness of Johnson & Johnson REACH® Clean Burst™ vs. Oral-B® SATIN FLOSS™ in Reducing Plaque, Data on file, Johnson & Johnson Inc., 2003.

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Letters

Editor's Comment

The *Journal* welcomes letters from readers about topics that are relevant to the dental profession. The views expressed are those of the author and do not necessarily reflect the opinions or official policies of the Canadian Dental Association. Letters should ideally be no longer than 300 words. If what you want to say can't fit into 300 words, please consider writing a piece for our Debate section.

Is Dentistry a Profession?

I must commend highly the author and yourself for the article "Is Dentistry a Profession?"[1] published in the September issue of *JCDA*. The author, for an excellent exposition on the question of the meaning of a "profession" and "professionalism," and you for undertaking its publication in 3 issues of the journal. Today, it is imperative that this subject be discussed widely, forcefully and repeatedly, because the true meaning of professionalism and its teaching to dental students has been de-emphasized or eliminated altogether. The appearance of young dentists in increasing numbers before their respective disciplinary boards, the rising number of post-graduate presentations on the "marketing" of dental services, the growing number of patient complaints of unprofessional behaviour or outright dishonesty, and the seeming lack of concern over these issues is alarming. It may indeed lead to the disqualification of dentistry as a profession.

The author's listing of the definition of "professional" and "professionalism" reveals that it is only the American dictionaries that define professionalism in terms of financial gain or monopoly, while the other explains the more restrictive original meaning of these terms: that a professional "professes" to accept a binding obligation, individually and collectively, to voluntarily provide for the patient's needs ahead of one's own and the responsibility of this unwritten, lifelong "social contract" as fundamental to the dental practice.

Every graduating dental student and dental practitioner should read and take to heart what is advocated in this series of articles. It was not too long ago that being summoned before a disciplinary board for an infraction of professional standards was considered shameful. Today, this occurrence and imposed reprimands or fines are regarded by some as part of the "cost of doing business." Should this attitude be allowed to prevail, then the practice of dentistry and the days of its recognition as a profession may very well be numbered. The public will abandon the "social contract" and dentistry will become another business enterprise to which the dictum of *caveat emptor* will apply, and the hard earned trust, won over these many past years, will be lost.

Dr. Morton R. Lang (retired)
Montreal, Quebec

Reference

1. Welie JVM. Is dentistry a profession? Part 1. Professionalism defined. *J Can Dent Assoc* 2004; 70(8):529–32.

Access to Care

In his October column,[1] Dr. Dean discussed accessibility issues and the push to add dental services to the national medicare program. I think that as a profession we would be making a huge mistake if we were to take that route. Of course we need to worry about increasing accessibility to dental services for all Canadians, and I believe that we would be wise to do so before the government feels a need to get involved and try to do it for us. Do we really want increasing government involvement in our profession? Just ask our physician friends how they like it, or observe the quality of dental care provided under the constraints of national dental health programs in other countries, and I think we would have an idea of what we would be inviting upon ourselves. As a self-directed and innovative profession, surely we can find ways to address the accessibility concerns without government "help."

Dr. Matt Irvine
Penticton, British Columbia

Reference

1. Dean A. The ability and the will. *J Can Dent Assoc* 2004; 70(9):589.

In his October column,[1] Dr. Dean asked for feedback from the profession on the possible inclusion of dentistry in medicare. If our profession were included in the national medicare system, it would be the biggest mistake our governing body ever made. I personally do not believe this would ever happen, simply because the national medicare system is currently stretched to its limits.

I see at least one patient a week who makes a half-witted comment about dentists having the highest suicide rates. Although this may have been true in the past, I recently learned that we are now no. 6 on the list. Do you know which occupation has shot up to no. 2? Physicians and surgeons. I really feel sorry for our medical colleagues because they graduate — often after spending much more time in school than dentists do — with a very high debtload. They enter a workforce with a very demanding work schedule and earn a paycheque that dwindles year by year. The increasing workload and pressure, associated with diminishing earnings, is likely the direct cause of the suicide rate increasing among these professionals. Guess who regulates the medical profession?

We need to control our destiny and not leave it to some outside agency. We struggle enough against the large insurance companies; we don't need the interference of government in our affairs. I suspect that dentists who favour the inclusion of dentistry into the national medicare system are inept business people who feel a government agency would better manage their practices. Perhaps they should become associates and leave business decisions to those dentists with an understanding of what it takes to manage a practice. I view the government for what it should be — a legislative agency. The government has proven time and time again that it is not good at business. It should stay out of private business and leave it to those who know it best. Please downplay these suggestions of integrating dentistry with medicare — it would be a huge mistake to move in that direction.

Dr. Ryan Chernesky
Calgary, Alberta

Reference

1. Dean A. The ability and the will. *J Can Dent Assoc* 2004; 70(9):589.

Updating Infection Control Guidelines

It is interesting to note that CDA has acknowledged the concept of "standard" precautions.[1] Standard precautions were introduced by the U.S. Center for Disease Control and Prevention's (CDC) Hospital Infection Control Practices Advisory Committee in 1996. Since the intended use of these precautions was in hospital settings, modifications for dental practice were proposed in an extensive report on infection control submitted to the Royal College of Dental Surgeons of Ontario (RCDSO) in 2000. CDA received a copy of the report at that time. CDA was therefore aware of "standard" precautions at least 4 years ago, and quite possibly, as far back as 1996. Why CDA waited so long to recognize the validity of "standard" precautions remains another mystery in the saga of infection control in dental practice.

The new CDC guidelines state that "questions regarding infection control practices and their effectiveness remain unanswered."[2] Some of these unanswered questions include the usefulness of gloves, how bloodborne transmissions occur and the value of prevention measures, and the financial viability of infection-control interventions. It is hoped that the updated CDA guidelines will address these issues and the 18 other research considerations identified by the CDC.

The 2000 report to the RCDSO indicated that clinical guidelines on infection control should include expected outcomes and how they will be evaluated, the real and potential side-effects of the guidelines, the costs of implementation, the exploration of reasonable alternatives, and the strengths and weaknesses of the evidence used to substantiate the recommendations. If the revised CDA guidelines incorporate these criteria, they should also include the fact that the majority of infection-control procedures for dentistry are based on expert panels and consensus groups — the lowest level of acceptable evidence. This information should be communicated to practitioners, their staff and patients.

Dr. John Hardie
Lisburn, Northern Ireland

References

1. CDA to update infection control guidelines [News]. *J Can Dent Assoc* 2004; 70(8):515.
2. CDC. Guidelines for infection control in dental health-care settings, 2003. *MMWR* December 2003; 52(RR17):1–61.

Response

Thank you for the opportunity to respond to Dr. Hardie's letter regarding the updating of CDA's guidance on infection control. This guidance takes the form of CDA's position on the subject and resources to assist members in implementing appropriate procedures. As the national voice of dentistry, CDA has a responsibility to provide such information and resources to its members.

CDA is and has been aware of the concept of "standard" precautions as this concept has evolved over time. With the publication of the 2003 U.S. Centers for Disease Control and Prevention (CDC), CDA is now taking the appropriate and necessary action to review its infection control documents and resources to ensure that any deviations from the 2003 CDC guidelines are either changed or justified to our membership.

Regarding the scientific basis for guidance to dentists, CDA supports evidence-based clinical practice guidelines developed through the joint efforts of the Canadian Collaboration on Clinical Practice Guidelines in Dentistry (www.cccd.ca). Because infection control is not a topic amenable to a clinical practice guideline designed to assist dentists and their patients in reaching oral health care decisions, CDA produces "guidance" documents and resources in the area of infection control based on the best evidence that is available to the profession at the time. In the case of infection control in dentistry, this may very well be the advice of expert scientific panels from organizations such as CDC.

Dr. Benoit Soucy
Director
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News

Highlights of CDA Board Meeting

CDA's Board of Directors met on October 23–24 in Ottawa. Here are a few highlights from that meeting.

CDA Position Statements

CDA guidelines and position statements are being reviewed to ensure consistent messaging and continued applicability. Three documents have been rescinded (Adverse Drug Reactions, Denture Mechanics, and Certifying Board for Dentistry), 19 position statements will require minor editing and another 18 will need substantial changes.

Because CDA receives many public and media requests for its position statements, the Board agreed that all finalized statements will be posted on the public side of CDA's Web site. Additional information in the form of FAQs and detailed scientific research will be available on the members' only side of the Web site. The revised position statements will also remind patients to discuss the information with their dentists.

2004 World Dental Federation (FDI) Congress

The Board received a report from the Canadian Delegation to the 2004 FDI meeting held in New Delhi, India. CDA was able to get its point of view across in the development and approval of 4 FDI statements: Continuing Dental Education, Endorsement of ISO Standards, Quality of Dental Implants, and Code of Practice on Tobacco Control for Oral Health Organizations.

CDA past-president Dr. Burton Conrod was elected to FDI Council for a second term. He has decided to run for the position of president-elect at the 2005 meeting. If successful, Dr. Conrod would be the first Canadian president of FDI.

2005 World Dental Federation (FDI) Congress

Preparations for the 2005 Congress in Montreal are progressing well under the leadership of the Local Organizing Committee, chaired by Dr. Denis Forest.

Pan-Canadian Health Information Privacy and Confidentiality Framework

The Board received a status report on CDA's work with the federal government on the development of the Pan-Canadian Health Information Privacy and Confidentiality Framework. The purpose of the framework is to avoid the development and implementation of inconsistent health information privacy legislation throughout the country. CDA's response to the draft framework has been shared with Corporate Members with a view to establishing a common, coordinated approach to the consultation process.

Electronic Standards

Canada Health Infoway has renewed the funding of the Oral Health Special Interest Group under the National e-Claims Standard initiative. At a meeting held on August 31, CDA reiterated its support of the Electronic Health Record (EHR) and outlined its concerns regarding privacy if the EHR is not implemented properly.

Gilbert Medical Dental Supplies Company

CDA received numerous complaints about Gilbert's, leading to a series of *CDAlerts* advising members to carefully consider their own interests before conducting business with this company. Gilbert's is now bankrupt. The Board took note of the many messages of appreciation received from member dentists.

Corporate Member/Board of Directors Liaison Program

The Corporate Member/Board of Directors Liaison Program that calls for Board members to attend Corporate Member governance meetings as observers continues to provide important opportunities for communication with the Corporate Members. The Board of Directors agreed to continue the Liaison Program.

2006 CDA Convention

The national convention will be held in St. John's, Newfoundland, pending completion of a mutually acceptable contract.

Conference on Access to Care for Seniors

The Steering Committee for this conference, which includes representatives of CDA, the British Columbia Dental Association, the Nova Scotia Dental Association and the Ontario Dental Association, is proposing a one-day workshop on Saturday, February 12, 2005, to develop statements on senior-related issues. The workshop will focus on dentistry. Representatives of the Corporate Members and the dental regulatory agencies who have knowledge and expertise in this area will be invited to attend.

Continovation Services Inc. (CSI)/ITRANS™

ITRANS continues to grow significantly and went live in November. A letter was distributed to all Canadian dentists inviting them to register and obtain their digital certificates in order to benefit from the ITRANS services. ◆

George Weber Elected as CSAE Chair

CDA executive director George Weber was elected chair of the Canadian Society of Association Executives (CSAE) 2004/2005 Board of Directors, at CSAE's annual general meeting in Montreal.

Mr. Weber was chosen earlier this year by CSAE's Nominating Committee and officially elected to his new position at the AGM in October. Mr. Weber is currently serving the second year of his second 2-year term on the CSAE Board.

Considered by some as Canada's "association of associations," CSAE is the professional organization of the men and women who lead and manage many of this country's most progressive associations. CSAE promotes the value that associations can offer its members, and in turn Canadian society.

Some areas that CSAE focuses its efforts on include exploring new strategies on association governance models and developing best practices to manage organizational change in Canada's complex association environment.

Winners of the CDA Survey of Canadian Dentists Prizes

This summer, Summit Strategy Group of Toronto conducted the 2004 CDA Survey of Canadian Dentists, to assess current and anticipated needs, interests and priorities of dentists. Input provided by the respondents will help CDA develop its new 5-year strategic plan. Winners of the survey prizes, determined by random draw, were:

- Dr. Matthew Son-Kun Soo of Scarborough, Ont. (1st prize: $1,000 cash prize)
- Dr. Alice L. Chadwick of Vancouver, B.C. (2nd prize: $500 cash prize)
- Dr. G. Joseph Belsito of Windsor, Ont. (3rd prize: Fujifilm FinePix A340 digital camera)

CDA would like to thank all respondents who participated in the survey, which was conducted by mail and online. It was the first time a survey of this magnitude was conducted on CDA's Web site. The survey response rate in 2004 was 15%, compared with 9% in 2002.

CDA will publish the survey results in a future issue of *JCDA*.

Resolution on Dental Care to Go Before Canadian Municipalities

A resolution recommending the development of a National Dental Care Strategy will go before the Federation of Canadian Municipalities (FCM) at its annual general meeting in May 2005. The resolution is spearheaded by the City of Ottawa. On October 27, city council passed a motion recommending that Canadian municipalities work with the federal and provincial governments to develop a comprehensive national strategy "that would have as its goal providing universal access of both preventative and treatment services to all Canadians." Municipalities are called upon to administer and cost-share some of the provincially mandated dental health programs. Levels of service and eligibility of care vary significantly across the country. The resolution is meant to address the lack of consistency in applying these programs.

The full text of the motion is available on the City of Ottawa Web site at www.ottawa.ca, under Calendar of Events (choose October 2004, then click on October 27 City Council Meeting).

The Cochrane Library Available to All in Saskatchewan

In October, Saskatchewan became the first province in Canada to provide all residents with free access to the Cochrane Library, a collection of 6 databases of health information, including systematic reviews. The resource is available in all 13 health regions and all public libraries. One of the driving forces behind this initiative was the Canadian Cochrane Network and Centre. The Canadian group will be approaching the federal

COVER ARTIST

This month's cover artist is Dr. Gene Cervini of Bolton, Ontario. Dr. Cervini's interest in painting began after he graduated from the University of Toronto in 1975, but he didn't actively pursue his hobby until May 2002. He has been taking lessons from a local artist and has since completed approximately 25 paintings. His painting medium is oil and his subjects of choice are nature and still lifes. "Self-expression has always been one of my attributes, so when I met my art teacher it was an instant match — an expert teacher and a willing and receptive student," explains Dr. Cervini. "We have had 2 successful art shows together and look forward to many more."

Dr. Cervini was born in Italy and moved to Canada in 1955, when he was 9 years old. He maintains a private practice in Toronto, where he has been very active in organized dentistry. He is a former president of the North York Dental Society, the Ontario Academy of General Dentistry and the Toronto Academy of Dentistry.

government to propose that all Canadians be given access to the Cochrane Library.

The Cochrane Library is produced by the Cochrane Collaboration, an international organization that is dedicated to making up-to-date, accurate information about the effects of health care readily available worldwide. Its systematic reviews are summaries of the findings of all research studies done on a specific topic. To learn more about the Cochrane Collaboration and its Canadian counterpart, visit www.cochrane.org and www.cochrane.mcmaster.ca.

Resources on Early Childhood Tooth Decay Soon to Be Available Online

Dr. Bob Schroth, an assistant professor in the University of Manitoba's faculty of dentistry and a doctoral trainee with the Canadian Child Health Clinician Scientist Program, recently received grants totalling over $16,000 for an ongoing project to prevent childhood tooth decay. The University designated a $6,000 Major Outreach Award and the Foundation of the Pierre Fauchard Academy contributed $10,000 US to the Manitoba Collaborative Project for the Prevention of Early Childhood Tooth Decay. The funding will be used to distribute community-developed resources and to host workshops to familiarize health care workers on how to incorporate the resources into existing programs. These resources are based on the results of a pilot project launched by the Collaborative in 2000, when it conducted surveys in selected communities to determine the factors affecting tooth decay in children under 6 years of age.

The resources (a manual and toolkit) will soon be available online on various Manitoba health Web sites, including the University of Manitoba's faculty of dentistry (http://www.umanitoba.ca/faculties/dentistry/). "We don't want to own these resources," explains Dr. Schroth. "We want the community-developed resources to be available to all communities."

APPOINTMENT

RCDC Elects New President

Dr. Elie M. Wolfson

Dr. Elie M. Wolfson is the new president of the Royal College of Dentists of Canada (RCDC) Dr. Wolfson, a Toronto-based endodontist, begins his 2-year term as president after a long association with the RCDC, including terms as chief examiner in endodontics, councillor for endodontics and vice-president. Dr. Wolfson is currently in private practice as a senior partner in a multilocation practice in endodontics.

For direct access to the Web sites mentioned in the News section, go to the Decembre *JCDA* bookmarks at http://www.cda-adc.ca/jcda/vol-70/issue-11/index.html.

REMINDER

DAT Deadline

The registration deadline for the Dental Aptitude Test (DAT) is Saturday January 15, 2005, at 24:00 EST for the February 15, 2005, test date.

Please visit the CDA web site at www.cda-adc.ca for additional information.

Advertisers' Index

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ANNUAL REALIZATIONS FOR SELECT CDA MEMBERSHIP BENEFITS

Benefit	Potential Value	Assumption**	Annual Benefit Realized
CDAnet™	$ 1,200	70% realized	$ 840
ITRANS™	$ 1,360	5% realized***	$ 68
Increase in RRSP limits	$ 1,980	100% realized	$ 1,980
FDI World Dental Federation membership	$ 65	100% realized	$ 65
Increased traffic flow through public education	$ 990*	100% realized	$ 990
Tax deduction for unincorporated self-employed	up to $ 2,190*	50% realized	$ 1,095
Amalgam waste management	$ 2,500	50% realized	$ 1,250
Non-taxing of dental benefits	$ 4,410*	100% realized	$ 4,410
CDA insurance and investment plans	$ 1,210	50% realized	$ 605
Total Benefit	$ 15,905		$ 11,303

* Potential values calculated using a modest 30% profit margin.

** Each of the benefits outlined above is different in nature and may not be realized fully by all dentists. Those not fully applicable to all have been reduced accordingly to calculate an overall average.

*** Small level of realization based on a program still in its start-up phase.

This table prepared for the Canadian Dental Association by an independent consultant.

For more details about the benefits of CDA membership, visit our Web site at **www.cda-adc.ca**. Or call us toll free at **1-800-267-6354.**

CANADIAN DENTAL ASSOCIATION ™

The Canadian Dental Association (CDA)
invites nominations for a position on its

BOARD OF DIRECTORS

In 2003, the Canadian Dental Association (CDA) adopted a new "knowledge-based" governance model that includes a Board of Directors to identify and manage strategic issues, approve general policy, develop and maintain an accountability system, and oversee CDA's finances, among other duties.

The Board of Directors consists of thirteen (13) voting directors, including the President, President Elect and Vice President, with at least one (1) director from each Province of Canada in which there is a corporate member. The CDA Executive Director shall be a non-voting director ex officio. *(CDA Bylaws, section 9.01)*

The Committee invites nominations for the following positions:

Vice-President This is a one-year term, followed by a one-year term as President-Elect and another one-year term as President.

Director There are seven positions available, each for a two-year term.

All candidates must be:

- *Members of CDA and their provincial dental association (sections 9.02 and 5.03 of the CDA Bylaws)*
- *Experienced in governance of organized dentistry (i.e. progressive experience in policy/decision making at the provincial or national level)*

Desired attributes and qualifications of directors include:

- *Commitment to act in the best interests of the Association, which acts on behalf of all dentists of Canada*
- *Demonstrated interest in advancing the profession of dentistry*
- *Strategic thinking — achieve progress toward desired outcomes*
- *Thorough knowledge of operating a dental practice*
- *Solid understanding of business and finances*
- *Strong communication skills — able to motivate others and work toward solutions*
- *Experience in volunteer/staff relations*
- *Willingness to use and manage technology (i.e. e-mail, fax)*

A member of the Board of Directors of the Association may not simultaneously be a member of the board or council of any Corporate members, as of the end of the Annual General Meeting on April 15, 2005.

Members will be elected at the Annual General Meeting on April 15, 2005 for a term of two years and are eligible to serve up to 5 two-year terms, or a combination of two-year and one-year terms for a maximum cumulative total of 10 years, including any one-year terms served as President, President-Elect and Vice-President.

Directors are expected to attend all board meetings, at least four times per year, and attend other meetings, teleconferences and other functions, as required. CDA's Expense Policy provides for per diem and reimbursement of travel and accommodation expenses incurred on behalf of CDA.

Please send nominations, including a résumé and signed *Conflict of Interest* and *Consent and Undertaking* forms *(available on CDA's Web site at* www.cda-adc.ca *or by calling 1-800-267-6354)* before **January 17, 2005** to:

Dr. Wayne Halstrom, Chair, Nominating Committee
Canadian Dental Association, 1815 Alta Vista Drive, Ottawa, ON K1G 3Y6
reception@cda-adc.ca or fax (613) 523-7736

THE DENTAL ADVISOR™

"Improved Patient Care Through Research"

This month's feature of THE DENTAL ADVISOR is taken from the September 2003 issue, Vol. 20, No. 7.

For subscription information, please call 734-665-2020.

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Layered Resin Composites

Since the introduction of resin composites, there have been many advances in the esthetics of direct restorations. The desirable properties of highly polishable microfills and high strength hybrids have been combined to form new composites known as microhybrids and nanofills. These composites can typically be used for both anterior and posterior restorations. More recently, clinical techniques that use layering of composites to mimic the natural layering of dentin and enamel have become popular.

Natural teeth are intricate with variations of shades, opacities and textures. Layering of composites to simulate natural teeth involves the use of opaque dentin shades, which are overlayed by more translucent enamel shades.

Applications

- In cases where a high level of esthetics is desired.
- When an esthetic, direct restoration is selected over a ceramic or laboratory composite.
- For through-the-tooth anterior restorations and incisal edges.
- For direct composite veneers.
- To block or opaque dark underlying tooth structure.

Advantages of Layering

- Excellent esthetics.
- Create opacity and translucency where needed.
- Systems are complete – can usually be used for all types of restorations.
- Layering using 2-mm increments (as limited by the light source) does not take any more time for placement than a single shade.

Disadvantages of Layering

- Requires time and practice.
- Shade matching may not follow Vita Classic guide.
- May be difficult to identify composite when replacing restorations in the future.
- Layering systems are generally more expensive.
- Requires more shades and use of more than one compule for each restoration.

Microhybrids – Esthetic properties of microfills while having good strength – commonly used as a universal or layering composite (***4 Seasons***, ***Venus***).

Reinforced Microfills – Greater strength than conventional microfills due to higher filler load. Use sparingly for higher stress restorations such as large Class II restorations (***Micronew***).

Nanofills – Newest class of composites, consisting of nanofillers (<0.1 µm) and other particles similar to a microhybrid. Nanofiller particles help to improve handling and polishability while increasing the filler load. Their strength is in the range of hybrid composites, and they have relatively low shrinkage (***Filtek Supreme***).

continued on page 749

Rating Layered Resin Composites

Product	Company	Type	Bonding Agent in Kit	Filler, Volume %	Dentin/Opaque Shades	Enamel/Translucent Shades	Bleach Shades	Shade Guide	Designed for 3 or More Layers	Shade Guide/Layered Tabs	Flexural Strength	Flexural Modulus	Shelf Life, Months	Cost, $/ml*†	Rating
ESTHET.X	DENTSPLY/ CAULK	Microhybrid	PRIME & BOND NT	60	23	5	3	Vita Classic	Yes	Yes/No	MH	H	36	49.46	90%
FILTEK SUPREME	3M ESPE	Nanofill	ADPER PROMPT L-POP SELF-ETCH ADHESIVE	58-60	18	9	2	Vita Classic	Yes	No/No	MH	H	36	56.00	92%
4 SEASONS	IVOCLAR VIVADENT	Microhybrid	None	55-58	12	24	4	Vita Classic	Yes	Yes/No	MH	MH	48	30.02	91%
GLACIER	SDI	Microhybrid	STAE	62	8	14	1	Vita Classic	No	Yes/No	MH	H	60	22.49	91%
GRADIA DIRECT	GC AMERICA	Microhybrid	None	64-65	17	8	1	Vita Classic	Yes	Yes/Yes	M	M	24	17.68	ce
MICRONEW	BISCO	Reinforced Microfill	None	51-53	3	21	3	Vita Classic	Yes	No/No	M	MH	36	15.26	86%
MIRIS	COLTENE/ WHALEDENT	Microhybrid	None	59	10	6	1	Proprietary	No	Yes/Yes	MH	H	24	55.71	90%
POINT 4	SDS/KERR	Microhybrid	OPTIBOND SOLO PLUS	57	8	19	3	Vita Classic	Yes	No/No	MH	MH	24	26.58	na
SIMILE	PENTRON CLINICAL TECHNOLOGIES	Nano-hybrid	None	68	17	2	2	Vita Classic	No	No/No	M	H	48	15.60	88%
3D DIRECT	VIDENT	Microhybrid	None	65	13	4	3	Vita 3D-Master	Yes	No/No	M	MH	36	26.32	86%
VENUS	HERAEUS KULZER	Microhybrid	GLUMA COMFORT BOND + DESENSITIZER	61	7	18	2	Vita Classic	Yes	Yes/No	M	H	48	50.86	92%
VIT-L-ESCENCE	ULTRADENT	Microhybrid	PQ1	58	18	13	2	Proprietary	Yes	Yes/Yes	H	H	48	24.22	na

M=medium, MH=medium high, H=high, ce=currently being evaluated, na=not available
*Cost based on introductory kit with compules (if available) that may include bonding agent and accessories.
†Costs are listed for comparison only and are not used to calculate the ratings. All costs are listed in U.S. dollars.

THE DENTAL ADVISOR Recommends:
Filtek Supreme, Venus, 4 Seasons, Glacier, Esthet.X, Miris

Filtek Supreme
(3M ESPE)

4 Seasons
(Ivoclar Vivadent)

Glacier
(SDI)

Esthet.X
(DENTSPLY/Caulk)

Layered Resin Composites *continued*

Composite Selection

- Kits with more dentin/body shades and fewer translucent shades are better suited for posterior restorations (***Simile***). Kits that have more enamel/translucent/incisal and bleach shades are better for anterior restorations (***Filtek Supreme***, ***Miris***, ***Venus***).

Miris (Coltene/Whaledent)

- Most kits allow single-shaded restorations using either body or enamel shades alone. The esthetics using a single shade varies.
- Usually two shades for posterior teeth are sufficient. For anterior teeth, use of two or more shades, including opaque or translucent shades, can greatly increase esthetics.

Clinical Tips

Shade Selection

- For more accurate shade matching, bleach teeth a minimum of one week before placing composite restorations.
- Do not overdry before shade matching.
- Select shades before placement of rubber dam material.
- Avoid distracting colors such as lipstick, bright bibs, or bright clothing.
- When the adjacent teeth are significantly different in shade, try to match the lighter shade.
- Limit shade matching to five seconds at a time. Usually your first perception is the best match.
- If a shade cannot be selected to match, choose the closest two shades and start with the lighter shade. Lighter shades are easier to darken.
- When using for the first time, select posterior teeth without great esthetic demands to become accustomed to the layering characteristics of the system.
- For visual confirmation of shades selected, place small amounts of composite on a surrounding tooth surface and light cure before bonding.
- Place layers on an unprepared tooth to verify shade selection.
- A dark shade over a light shade has greater impact than the reverse.

Layering

- Rubber dam use is recommended.
- The appearance of the finished restoration is due to the layered thicknesses of each of the underlying composite shades. Underlying dentin should be thickest at the cervical portion of the tooth, imparting a higher chroma.
- Enamel translucency and transparency should be most evident at the incisal portion of the tooth, imparting a lower value.
- Select the dentin shade to be 1-2 shades darker than the cervical shade of the tooth.
- Select the enamel shade from the incisal 1/3 of the tooth to be restored or from adjacent teeth.
- Use opaque shades to block light transmission, mask dark areas of the tooth, and lighten the tooth (increase value).
- Tints increase translucency, help increase coloration, and darken the tooth (decrease value).
- Translucent shades can mimic the edge of teeth in between mamelons where enamel is naturally thickest.
- If a dentin shade appears too dark during placement, it may be modified in the next incremental layer by using a lighter dentin body shade or a lighter enamel shade.
- Follow anatomy such as cusps, grooves and pits in the layering process when adding incremental layers, similar to rebuilding dentin and enamel.
- Some clinicians advocate the use of similarly shaded dentin and enamel composites for layering. This technique may eliminate the variability associated with different thicknesses of the dentin and enamel shades.
- Color modifying kits for special characterization are available from several manufacturers (***Biscolor****/Bisco*; ***Kolor + Plus****/SDS/Kerr*; ***Tetric Color****/Ivoclar Vivadent*; ***Creative Color****/Cosmedent*). ■

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Placing Oral Health on the Health Care Agenda: Lessons Learned from the United States

• Dushanka V. Kleinman, DDS, MScD •

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A symposium on *Access and Care: Towards a National Oral Health Strategy* was held May 13–15, 2004, in Toronto. The symposium's objectives were to develop key recommendations for a national oral health policy, and to identify knowledge, service and funding gaps in oral health. Dr. Dushanka Kleinman was the keynote speaker. A summary report of the symposium and selected presentations are available at http://individual.utoronto.ca/accessandcare.

The symposium on *Access and Care: Towards a National Oral Health Strategy* provides a unique opportunity to assess the current status of oral health care for Canadians and to develop options for a national oral health strategy. Taking steps to place oral health on the health care agenda is one component of such a strategy and one that the United States has experienced in a variety of ways.

Whether we are in the United States, Canada or another country, it is our responsibility to inform others of the effects of oral diseases on society and on general health and the benefits of good oral health. We know that to improve oral health a more extensive approach is required as

- oral health is integral to overall health and well-being
- dental care is a critical component of primary health care
- responsibility for oral health involves the broad-based health, social service and education communities
- both public and private health care systems must include oral health components
- all care must be science based.

Placing oral health on the health care agenda requires the commitment of people, investments in partnerships and sustainability of effective programs. The United States experience has been one of perseverance and persistence over time and there is still much more to be done. Using the emerging science base and having the right people in the right places have been major contributors. In addition, the following lessons have emerged and may serve as references for similar efforts in Canada.

Lesson 1

Getting oral health needs recognized by diverse communities of interest and, especially, putting a "personal face" on the issues stimulates interest and action.

The message is more powerful and is more likely to stimulate action when the lay public, policymakers, program directors and health care professions work together to emphasize the importance of oral health to overall health and well-being. Each group has a different imperative and audience. Together their impact is greater.

Voluntary groups attach a "personal face" to the effects of the neglect of oral disease. In the United States, such voluntary groups as Family Voices, the National Foundation for Ectodermal Dysplasias, Support for People with Oral and Head and Neck Cancer and the Sjögren's Syndrome Foundation, have played instrumental roles. They have done so by informing educators, dental and medical practitioners and legislative decision-makers about the importance of appropriate oral health care to their unique conditions and to oral health overall.

Lesson 2

The communication of the science base and the value of oral health to society at national and local levels by trusted leaders (preferably non-dental) enhances trust in and visibility of the "message."

The United States has benefited from the "bully pulpit" statements and science-based reports of the surgeon general. The oral health effects of tobacco use were included in the

Two of the speakers at the symposium: Dr. David Mock, dean of the University of Toronto's faculty of dentistry, and Dr. Patricia Main, associate professor in community dentistry at the faculty.

Minister of State (Public Health) Dr. Carolyn Bennett was one of the government representatives attending the symposium.

Dr. Kleinman acknowledged that the health promotion efforts of the United States have benefited from the role model established by Canada.

Dr. Mock discussed innovative research and programming from the perspectives of faculties and hospitals.

first surgeon general's report on smoking and health in 1964.[1] Since then, surgeon general reports on tobacco have included an assessment of oral health. In addition, oral health is included in the surgeons general reports on health promotion and disease prevention and on nutrition and in statements on water fluoridation and dental sealants. Several surgeons general have provided a critical focus on oral health within their unique areas of emphasis. For example, Surgeon General C. Everett Koop stressed that "You are not healthy without good oral health," a comment that resonated with his activities aimed at curbing the HIV/AIDS epidemic. Surgeon General Antonia C. Novello invested in oral health as a key component of her initiative aimed at having children healthy and ready to learn on entry to school.

The visibility of oral health in the United States has benefited greatly from the release of the first oral health report in 2000, *Oral Health in America: A Report of the Surgeon General*.[2] This report was commissioned by the secretary of the Department of Health and Human Services, Donna Shalala, and released by Surgeon General David Satcher. The report raised awareness of oral health, nationally and internationally. It highlighted the fact that "oral health is essential to the general health and well-being of all Americans and can be achieved. However, not all Americans are able to take that message to heart." The report described "a 'silent epidemic' of oral diseases… affecting our most vulnerable citizens — poor children, the elderly, and many members of racial and ethnic minority groups."

These messages have been used to stimulate action. Together with many other efforts related to oral health, these messages have contributed to national, state and local actions, including development of state oral health plans, oral health campaigns, Medicaid summits focused on oral health and legislation extending oral health reimbursement.

Lesson 3

Acquisition, analysis and reporting of data to plan, monitor and evaluate health status and programs are critical. These data provide the rationale for action and permit comparisons among different health needs of the public.

The United States still has a way to go to improve national data systems and surveillance infrastructures. However, the importance of and the need for these systems were emphasized with the establishment of national objectives with measurable outcomes. These objectives were set after the release of the 1979 surgeon general's report on health promotion and disease prevention[3] and renewed every 10 years; since 1980, progress toward them has been measured every 5 years.

Setting the objectives required baseline data and the capacity to monitor changes over time. The current *Healthy People 2010* objectives specify outcomes to be assessed for multiple subpopulations. The 2010 oral health objectives focus on reducing oral diseases, delivering critical services (such as dental sealants, community water fluoridation and dental examinations) and increasing the public health dental care infrastructure.[4] In addition, numerous oral health-related objectives are included in chapters on access to quality health services, education and community-based programs, health communication, medical product safety and general public health safety. The data used to monitor progress can also be used to compare the health status of populations and health conditions. Data have been organized by state and made available on the Internet (www.cdc.gov/OralHealth/state_reports/index.htm).

Lesson 4

The development and availability of planning documents facilitate collaborations and partnerships among individuals and communities. These documents highlight common goals and contribute to extended partnerships.

The United States has benefited from multiple documents, such as *Healthy People 2010*, that provide a focus for a range of communities of interest. One recent example is *A National Call to Action to Promote Oral Health*, released in 2003 under the leadership of the Office of the Surgeon General.[5] This document brings together a framework for action from the surgeon general's oral health report and the *Healthy People 2010* oral health objectives — to promote oral health, improve quality of life and eliminate oral health disparities. Five actions are highlighted: change perceptions of oral health; overcome barriers by replicating effective programs and proven efforts; build the science base and accelerate science transfer; increase oral health workforce diversity, capacity and flexibility; and increase collaboration.

Other documents include *A Plan to Eliminate Craniofacial, Oral and Dental Health Disparities*,[6] a research agenda supported by the National Institute of Dental and Craniofacial Research; state oral health program plans, supported by the Centers for Disease Control and Prevention[7]; and the *Future of Dentistry* report,[8] supported by the American Dental Association. These and other documents provide a context for addressing oral health within such categories as biomedical and behavioral research, public health programs and health services. Each of these areas provides another venue for placing oral health on the health care agenda. At the same time, the national call to action benefits from these individual efforts and serves to support them.

Aligning with existing movements that have common elements can enlarge the circle of supporters. For example, strengthening the infrastructure for public health surveillance can increase the availability of oral health data. In addition, enhancing the capacity of individuals to "obtain, process and understand basic health information and services needed to make appropriate health decisions" will contribute to overall health literacy as well as to oral health literacy.[9]

These lessons have contributed to an expanded base of committed individuals and organizations at multiple levels working together in partnerships to address oral health needs in the United States. These partnerships are supported when data are in hand to plan strategies, assess effectiveness of programs and monitor progress. Although there are many other lessons from the United States experience, the basic steps of developing a plan of action, working to remove barriers and investing in evaluation must be part of any effort to place oral health on the health care agenda.

I know that the Canadian dental community will succeed in establishing a national oral health strategy. I must acknowledge that the health promotion efforts in the United States have benefited from the role model established by Canada with the Lalonde report,[10] the Canadian clinical preventive services task force[11,12] and so much more. I also know that those of us in the United States will learn from the course you set as a result of this symposium. ➧

Dr. Kleinman is chief dental officer and assistant surgeon general, United States Public Health Service, and deputy director, National Institutes of Dental and Craniofacial Research.

The views expressed are those of the author and do not necessarily reflect the opinions or official policies of the Canadian Dental Association.

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2005 Call for Award Nominations

The Canadian Dental Association (CDA) is seeking nominations for its 2005 award recognition program, including CDA Honorary Membership, Distinguished Service, and the Award of Merit. Nominations received by **January 25, 2005**, will be reviewed by the CDA Nominating Committee, which will then make recommendations on suitable award winners to the Association's Board of Directors. The 2005 award recipients will be recognized during an awards ceremony and luncheon on April 15, 2005 at the Fairmont Chateau Laurier Hotel in Ottawa.

Persons responding to this Call for Nominations should submit the name of only one individual for the Honorary Membership or Distinguished Service Awards. All submissions must include a detailed curriculum vitae for each person nominated. Although submissions should indicate the award an individual is being nominated for, the Nominating Committee reserves the right to recommend which award, if any, will be granted to the nominee.

Honorary Membership

Honorary Membership is the highest award of the Association. Its purpose is to recognize the individual deemed to have made outstanding contributions to the art and science of dentistry, or to the dental profession, over a sustained period of time. Although this award may be for service that is provincial, national or international in nature, an outstanding contribution at the national level shall be a principal consideration. Most often, recipients of the Honorary Membership would be dentist members of CDA.

Honorary members receive a personalized framed certificate and a gold lapel pin. Those who are licensed dentists are exempt from CDA membership dues, and all recipients may attend Association-sponsored scientific and social functions, as well as annual meetings and conventions at no registration cost.

Distinguished Service Award

This award may be given to a dentist or other person to recognize either an outstanding contribution in a given year, or outstanding service over a number of years. It may also recognize outstanding contributions to the dental profession at the academic level, corporate level, specialty society, council, commission or committee level. Recipients receive an engraved wall plaque.

Award of Merit

The award will be conferred upon an individual who has served in an outstanding capacity in the governing of the Canadian Dental Association or who has made similar outstanding contributions to Canadian dentistry, including:

- at least 2 full terms on the former Executive Council and/or Board of Directors;
- a number of years of service to any dental organization, institution or specialty section;
- at least 4 years as chair of a CDA Council/Commission/Committee/Task Force

Recipients receive an engraved wall plaque.

Nominations

Nominations for Honorary Membership, Distinguished Service or the Award of Merit should be submitted no later then **January 25, 2005** to:

Nominating Committee
Canadian Dental Association
1815 Alta Vista Drive, Ottawa, ON K1G 3Y6

Nominations should be kept in confidence until a final decision regarding the awards has been made.

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Gain-sharing: Effective Marketing Strategy or Ethical Dilemma?

• Barry Schwartz, DDS, Cert ADR •

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It is 7:30 am and the entire team — assistants, hygienists, receptionist and office manager — is assembled for the final weekly meeting of the month. There is a giddy sense of anticipation as the dentist walks in, carrying the latest billing summaries. "Good news, everyone!" he announces as he takes his seat. "We've reached our monthly target already. Now, let's see how well we can do this week." The day's cases are then discussed, with an emphasis on previous recommendations for major dentistry that have yet to be approved by the patients. The staff members already know to first engage the patient in warm small talk and then remind him or her about that important bridge or other procedure, stressing that they themselves would accept the dentist's recommendation despite the cost. "Build trust, and then work in the reminder" is the mantra from the latest dental consultant hired by the dentist. As Cathy, one of the dental assistants, heads to her first appointment, she muses aloud, "I wonder how I'll reward myself this month with the extra money. Maybe I'll get that new purse in the window down the street. Gain-sharing is such a good idea. What a great place to work!"

As dentistry becomes more competitive and expenses for staff, rent, materials and infection control lead to higher costs for patients, new marketing techniques are blossoming. One such technique, gain-sharing, is a system in which financial measurement and feedback are used to monitor company performance and gains are distributed in the form of bonuses; the system also incorporates focused involvement to eliminate barriers to improving company performance by being active participants in a program that increases office revenues.[1] In the scenario presented above, the staff shares a percentage of the profit above a typical month's billings, but that extra profit depends on the employees encouraging patients to follow the dentist's recommendations. Gain-sharing differs from profit-sharing in that the employees have a direct impact on any extra incentive, and they know what they need to do to make it a reality — ensure that patients choose higher profit procedures. On the surface this approach may appear not only effective but also beneficial to the patient, albeit in a paternalistic way, in that it leads patients to accept recommended treatment that they have previously considered and declined. Certainly replacement of missing teeth can have important long-term implications from a dental perspective alone; however, the costs need to be budgeted and prioritized appropriately by the patient. If the patient's choice is between a new bridge and smoking, and the patient gives up smoking so that money previously spent on cigarettes can be put toward the dental work, then the decision to proceed leads to a win–win situation. If, on the other hand, the dental work would be undertaken at the expense of the children's college fund or paying down credit card debt, then the choice becomes less obvious.

Two ethical issues are at play here: conflict of interest and informed consent. The primary obligations of dentists and their staff are to provide service to the patient for the benefit of his or her well-being, as well as to uphold the honour and dignity of the profession. The very nature of fee-for-service dentistry can present an unmanageable conflict of interest if recommendations to the patient for dental services are influenced by the dentist's need for income. If the dentist is to act in the patient's best interest, he or she must be willing to exercise good judgement and occasional selflessness.[2]

With regard to informed consent, it is accepted that providing important information to a patient repetitively, over a sustained period, can result in better understanding and retention than giving the patient the same information, but just once, at a stressful moment.[3] For proper informed

consent to occur, dentists must involve patients in the decision-making process and must also strive to understand the patient's values, concerns and rationales. In this way, informed consent becomes an integral part of the dentist–patient relationship. In the scenario presented here, I see no problem with staff reinforcing the recommendations of the dentist, provided they would do the same with a close family member in the same circumstances *and* provided they inform the patient of the gain-sharing policy (i.e., the staff member stands to gain personally from certain decisions made by the patient). This, to me, is the essence of informed consent. Not only should the patient's decision to proceed take into account all the pros and cons of the procedure for that particular patient, but it should also take into account the potential conflict of interest that lurks beneath the sincere and trusting relationship between staff and patient.

Over the years, the patients in my own practice have come to know and trust my staff members, and I have overheard patients discussing potential procedures with my employees, asking what they would do regarding a particular recommendation that I have made. What patients may not realize is that purchasing a procedure from a dentist is a bit like buying a new car. We all know that the salesperson who tells us that we look great in that expensive new car is on commission, and we take such comments in stride. The same principle applies in the dental office, where the appearance is of strictly professional interactions but where a commercial model is sometimes present below the surface. As more patients become aware of marketing strategies such as gain-sharing, the principle of *caveat emptor* (buyer beware) may affect the entire trust-based relationship. In fact, dentistry's position of respect has been eroded, and these marketing approaches may be at the root of the decline. In the latest Gallup poll, dentistry has slipped to fifth place (from third and, before that, first place) in the list of most respected professions or occupations.[4] Patients are beginning to question the honesty and integrity of their dentists more often.[5] The Third Ethics Summit, held in Orlando in January 2004, dealt with truth claims in dentistry. Leaders in dental education and ethics, as well as representatives of regulatory bodies, the insurance field, dental manufacturers and dental consultant services, examined the possible causes of the decrease in truth telling in dentistry. One of the conclusions arising from the summit was that the "truth climate" in oral health care can best be improved through greater transparency, ethics education, new regulations and promotion of general awareness of the problems.[6] All of these issues appear to be at play in this case.

I am all for team-building and for staff being supportive of recommendations made by their dentist/boss; however, these activities must be tempered by the values of our patients and the ethics of our profession through which patient trust is earned and maintained. Losing sight of those objectives may have initial short-term personal rewards, but at what cost to our integrity, professional values and long-term patient relationships? It is incumbent on all dentists to be aware of these profit-raising strategies and to advocate on behalf of all patients by taking a more active role in promoting ethics and professionalism first and putting profit second. Maybe then we can earn our way back up on the next Gallup poll. ➧

Dr. Barry Schwartz is an adjunct professor in practice administration at the University of Western Ontario, School of Dentistry. He is currently completing his Master of Health Sciences in Bioethics at the Joint Centre for Bioethics, University of Toronto, and has a certificate in Alternate Dispute Resolution.

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The views expressed are those of the author and do not necessarily reflect the opinions or official policies of the Canadian Dental Association.

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Estimated Quantity of Mercury in Amalgam Waste Water Residue Released by Dentists into the Sewerage System in Ontario, Canada

• Albert O. Adegbembo, BDS, DDPH, MSc, FRCD(C) •
• Philip A. Watson, DDS, MScD•

Abridged Version

The complete article can be viewed on the **eJCDA** *Web site at: http://www.cda-adc.ca/jcda/vol-70/issue-11/759.html*

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This article has been peer reviewed.

There are no valid estimates of the quantity of mercury in the amalgam waste residue released from dental offices into waste water. Various government reports on the subject have involved assumptions for key variables. Because it is difficult to determine best management practices when a problem is poorly defined and the subject of considerable speculation, the Royal College of Dental Surgeons of Ontario (RCDSO) commissioned this study to acquire reliable data on the release of mercury from dental offices in Ontario.

The aim of this study was to determine the quantity of amalgam particles and the associated quantity of bound mercury released from dental offices into the public sewerage system in Ontario.

A postal survey was conducted among 2,000 dentists randomly selected from the list of all licensed dentists. On the basis of data obtained from the self-administered questionnaire, algorithms were developed to calculate the quantity of amalgam produced by each dentist that bypassed solids separators at the chairside and ISO-certified separators (for dentists who reported having installed such a device).

The response rate was 44.0%. Respondents were representative of licensed dentists. As well, dentists who responded early (mailing sent in March 2002) and those who responded later (mailing sent in June 2002) were generally similar. Most dentists (82%) reported placing or removing amalgam restorations; however, 78% of the specialists neither placed nor removed amalgam.

The annual estimate of the quantity of amalgam removed by all Ontario dentists during 2002 was 1,880.32 kg (940.16 kg of mercury). However, given the upper and lower 95% confidence limits of the weights of amalgams and the number of amalgam restorations removed, the quantity of amalgam was estimated to range from 1,498.96 kg (low estimates of both numbers and weights of amalgam) to 2,298.21 kg (high estimates of both numbers and weights of amalgam) during 2002 (749.48 to 1,149.11 kg of mercury, respectively). Consequently, if no dentist in Ontario used an ISO-compliant separator, the quantity of mercury bound in amalgam that eventually bypasses conventional solids traps would range from a low of 449.69 kg (60% of 749.48 kg) to a high of 689.47 kg (60% of 1,149.11 kg). Given the current level of use of ISO-compliant separators (22%), the estimated quantity of amalgam released during 2002 was 861.78 kg (430.89 kg of mercury or 170.72 mg mercury per dentist daily). If all dentists were to use an ISO-compliant separator, there is a 95% chance that the quantity of mercury in amalgam waste water released from dental offices in Ontario during 2002 would have ranged from 5.79 kg (or 2.29 mg per dentist daily) to 6.63 kg (or 2.63 mg per dentist daily), an average of 6.21 kg or 2.46 mg per dentist daily. The proceedings of the 1995 Canadian Mercury Network meeting indicated that the total release of mercury from all sources in Ontario was 1,587 kg; therefore, dentistry may have contributed 27% (430.89 kg/1,587 kg) of this loading. The use of separators by all dentists could dramatically reduce dentistry's share of mercury in Ontario's municipal sewage treatment plants, to barely 0.54%. ◆

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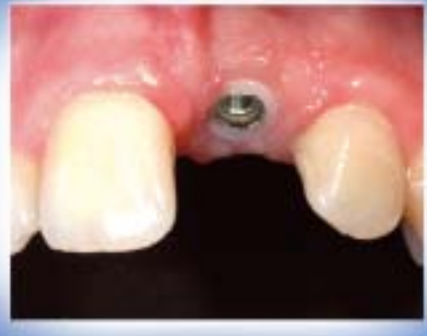

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Mandibular Third Molar Autotransplantation — Literature Review with Clinical Cases

· Rui Amaral Mendes, DMD ·
· Germano Rocha, DMD, PhD ·

Abstract

Autotransplantation of mandibular third molars in a precocious phase of development is indicated when a substitute for adjacent compromised or missing molars is needed, and when mesial movements of the posterior teeth, the resultant loss of space, and overeruption of opposing teeth and consequent changes in the occlusion must be avoided. Provided that the apices of the mandibular third molar are immature, the immediate replacement of a lost or compromised tooth usually ensures a good outcome. Transplantation of third molars helps to maintain alveolar bone and enables endosseous implantation without requiring bone regeneration. We present examples of transplantation of mandibular third molars and review the factors that affect the success or failure of this procedure, such as atraumatic extraction and adequate immobilization of the transplanted tooth and root development after transplantation. Sex or age seem to have no effect on the final outcome.

MeSH Key Words: *molar, third; tooth/transplantation; tooth loss/surgery*

This article has been peer reviewed.

Autotransplantation involves the transfer of a tooth from its alveolus to another site in the same person.[1,2] This site may be either an extraction site or a newly surgically prepared alveolus.[2,3] Transplantation has a key role in the replacement of young patients' missing teeth.[3] Osseointegrated implants are generally contraindicated for young patients with developing alveolar bone because infraocclusion results when the implant fails to form alveolar bone.

Successful tooth transplantation offers improved esthetics, arch form and dentofacial development, mastication, speech and arch integrity. A transplanted third molar also maintains natural space, with little or no root resorption[4]; alveolar bone volume[3,5]; and the morphology of the alveolar ridge through proprioceptive stimulation.[3,6]

The outcome of this procedure depends on careful case selection and an understanding of the biological principles.[5] Box 1 summarizes the indications for transplantation. Teeth traditionally selected for transplantation are impacted maxillary canines, which play a key role in dentofacial esthetics. A developing mandibular third molar can be transplanted to the socket of a first mandibular molar.[2,4] Transplantation can also maintain space, for example, in Class I malocclusions for which the space opening is the preferred treatment option, and where a tooth is lost and good buccal interdigitation exists.[3] Transplantation is also indicated for rehabilitation or reconstruction for patients with cleft palate whenever the same teeth are congenitally missing or have an abnormal shape or route of eruption.[3]

A transplanted tooth diminishes the extent of resorption of newly formed alveolar bone and provides functional stimulation.[3,9] When Hamamoto and others[10] transplanted teeth into bone-grafted alveolar clefts, they showed that the grafted bone undergoes resorption in the absence of occlusal load. They suggested that this procedure be done soon after the formation of a bone bridge is confirmed so

Box 1 Indications for autotransplantation of teeth[5,7–9]

Impacted or ectopic teeth
Premature tooth loss
Traumatic tooth loss
Tumours
Iatrogenic grounds
Congenitally missing tooth in one arch with clinical signs of tooth crowding in the opposing arch
Replacement of developmentally absent teeth
Teeth with bad prognosis
Developmental anomalies of teeth and related syndromes

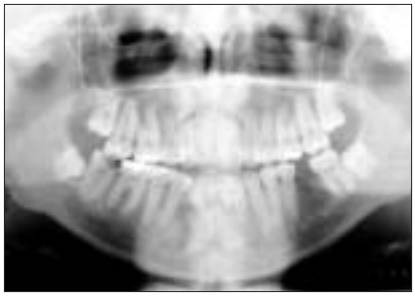

Figure 1a: *Initial radiograph for case 1.*

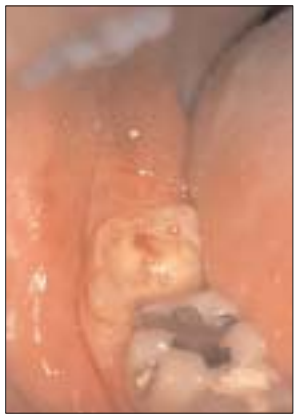

Figure 1b: *Carious lesion of tooth 47.*

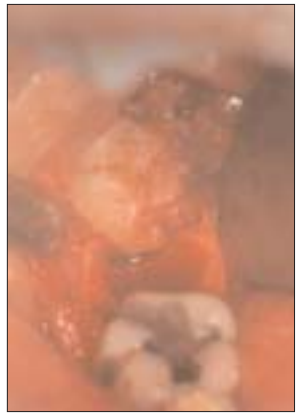

Figure 1c: *View of tooth 48 still in the alveolus.*

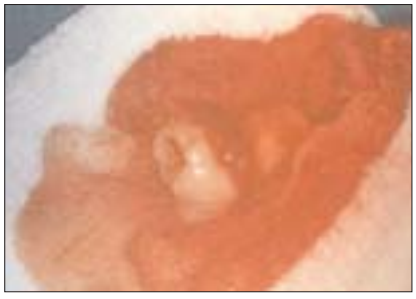

Figure 1d: *Tooth 48 after extraction. Note the remaining collar of follicular sac.*

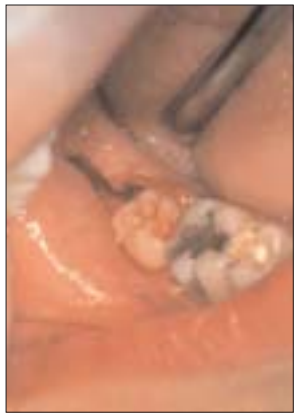

Figure 1e: *Implant of tooth 48 in the prepared receptor alveolus.*

Figure 1f: *Suture and fixation of the transplanted tooth. Note the remaining follicular sac in the lingual aspect.*

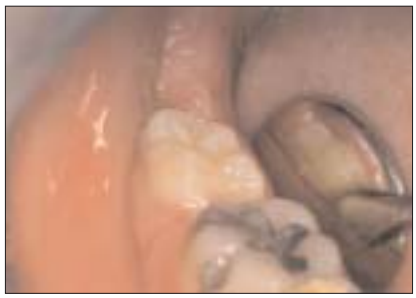

Figure 1g: *Postoperative situation 2 weeks after the surgery (lateral view).*

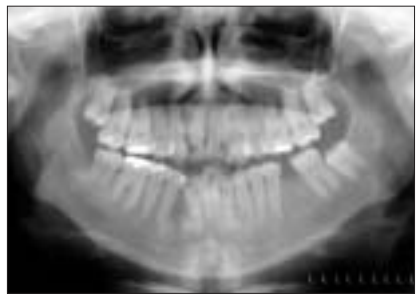

Figure 1h: *Final radiograph, 6 months after the surgery.*

that bone remodelling is stimulated as it progresses.

Developmental anomalies of the teeth and related syndromes, such as regional odontodysplasia, tooth aplasia, cleidocranial dysplasia[3,6] and tooth agenesis,[11] are other indications for transplantation.

Patients who have undergone chemotherapy and irradiation have had transplantation, despite doubts about the revascularization of the pulp of an autotransplanted tooth in irradiated bone since vascularization is assumed to be disturbed.[8]

Clinical Case 1

A 16-year-old healthy female presented with extensive caries in tooth 47, pulpal necrosis and healthy oral soft tissues. Clinical and radiological examinations confirmed the suitability of both the donor and recipient sites (Figs. 1a and 1b).

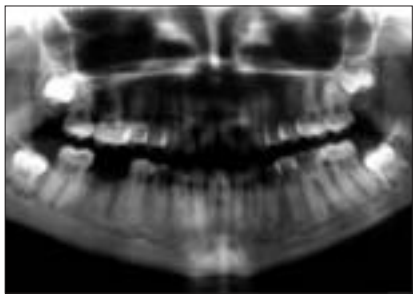

Figure 2a: *Initial panoramic radiograph for case 2.*

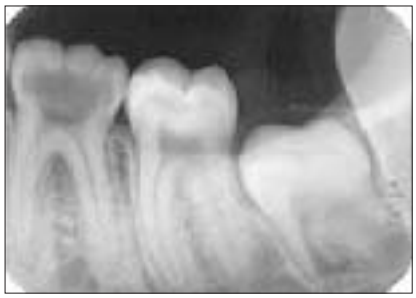

Figure 2b: *Initial periapical radiograph.*

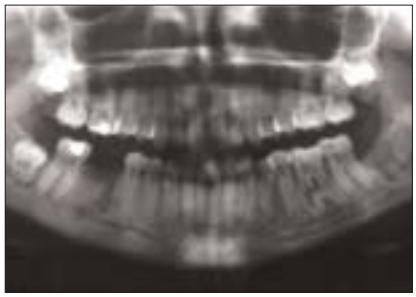

Figure 2c: *Final periapical radiograph (1 week after surgery).*

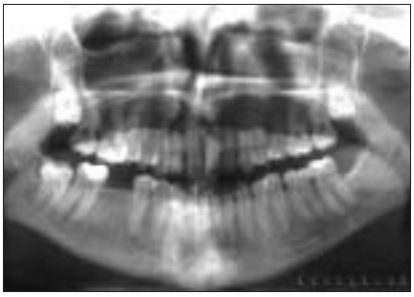

Figure 2d: *Final panoramic radiograph.*

Although tooth 47 had a pulpal necrosis, no special presurgical preparation was undertaken. The surgical procedure, which is similar to that used for third molar surgery, requires care to avoid injury to the tooth crown and its developing root. Tooth 48 remained in the alveolus until tooth 47 was removed and the socket fully prepared (Fig. 1c). Care was taken to preserve the buccal and lingual alveolar bone during the extraction of 47. The intra-alveolar septum was trimmed with a rongeur, and the socket irrigated. The third molar was stored in gauze soaked in sterile saline, according to the procedure of Raghoebar (Fig. 1d).[12] Tooth 48 was transplanted with the tooth in infraocclusion to provide space for the expected continued root growth and development (Fig. 1e). The surgical wound was sutured, joining the remaining part of the follicular sac to the gingival mucosa.[13] The interproximal papilla was sutured tightly with a 3/0 silk that passed over the crown of tooth 48 to immobilize it[13,14] (Fig. 1f). Radiographs were taken 1 week and 6 months later (Figs. 1g and 1h).

Clinical Case 2

A healthy 17-year-old female was referred with extensive caries in tooth 36 and a lingual infraosseous fracture. Clinical examination revealed good oral hygiene. Tooth 38 was in a favourable position and stage of development for autotransplantation. Radiographs (panoramic and periapical) showed favourable development of the third molars (Figs. 2a and 2b).

The surgical procedure was similar to that described for case 1. To spare the circular gingival fibres of tooth 36, no releasing incisions were made. Radiographs were taken at 1 week and 1 year later (Figs. 2c and 2d). The latter revealed complete formation of the root.

Factors That May Interfere with the Success of the Transplant

Autotransplantation of developing third molars has a reported 5-year success rate of about 50%.[4] Higher success rates have been documented.[11,14] No large studies reporting success rates for this procedure exist, but case reports indicate that the survival rate for autotransplantation is 10 to 20 years.[4,7]

The prognosis for an autologous transplant of an unerupted normal tooth is generally good, not only because of the greater probability of total integration in the alveolus, but also due to the lack of any histoincompatibility problem. Some of the factors that may influence the outcome[4,15] are atraumatic extraction of the transplanted tooth that preserves the root structure; adequate immobilization of the transplanted tooth, which usually requires only a tight suture; and root development after transplantation that allows reestablishment of both innervation and vascularity to the pulp.

Sex or age seem to have no effect on the final outcome.[16] However, because immature teeth are usually covered by a thick follicle or periodontal ligament, which enables extraction of the transplanted tooth with minimal force,[7] there are fewer chances of damaging the ligament during the procedure. Patients 15 years to 19 years of age are more appropriate candidates for third molar transplants.[7]

Contraindications include cardiac anomalies, poor oral hygiene and poor self-motivation.[3] Frenken and others[1] and Thomas and others[3] also consider the width of the alveolar process. If the recipient site has insufficient buccopalatal or buccolingual width to accommodate the donor tooth, resorption of the alveolar ridge may occur.[3] If transplantation is deferred, it should be scheduled as soon as possible within 2 months so that the resorption of bone that occurs in the interim does not compromise the wound bed for the donor tooth.[5]

Atraumatic Procedure

An atraumatic surgical technique preserves bone and periodontal support.[3,7,12,16–18] Minimal handling of the transplant is required to protect the Hertwig's root sheath and pulpal tissue[3–5]; otherwise root growth may be compromised,[3] leading to ankylosis or root resorption and attachment loss.[12,16] The tooth to be transplanted should be out of its socket a minimal amount of time to avoid desiccation.[12,16] The longer the tooth is left outside the socket, the poorer the prognosis.[7,12,16] Vriens and Freihofer[8] noted that despite damage to the follicle of the upper third molar during surgical transplantation, the clinical outcome is good, even at 5 years' follow-up. According to Tsukiboshi,[5] the periodontal ligament on the root surface may be repaired by a new attachment mechanism. Its success depends on the space existing between the socket wall of the recipient site and the donor tooth.

The Development of the Root

Transplanted teeth with incomplete root formation have a 96% rate of pulpal healing, compared with 15% for transplanted teeth with complete root formation.[19] Most authors believe that the roots should be developed beyond their bifurcation for successful transplantation of the tooth.[4] Some authors prefer radiographic evidence that the root has developed at least 2 to 3 mm, whereas others advocate root development of at least 3 to 5 mm.[4] Still others[3,4,7,20,21] stipulate root development between one-third to three-quarters of its final length. Although higher success rates are achieved with teeth that have immature roots, these teeth have less root growth after transplantation than other autografted teeth that have more mature, although not completely formed, apices.[3] The diameter of the apical foramen is a reliable predictor of pulpal healing. Teeth with an apical diameter greater than 1 mm have a diminished risk of necrosis[3,5,7,17] because postoperative revascularization is more likely.[3] Overall, transplantation of teeth with immature roots offers high success rates because root development of the donor tooth and adjacent alveolar bone growth are unimpeded.[3,7,11,17]

Autotransplantation is feasible for teeth with complete root development, but endodontic treatment is usually indicated.[5,7,11] The success rate of autotransplantation of teeth with complete root formation is arguably higher, according to recent data.[17]

The American Association of Endodontists recommends that the pulp of teeth with closed apices be extirpated 7 to 14 days after transplantation; otherwise the necrotic pulp and subsequent infection may result in inflammatory resorption and decrease the survival time of the autografts.[5,7] Moreover, all postoperative treatment should be done within 8 weeks.[17] Endodontic treatment or apicoectomy during the surgical procedure is not advisable because it increases the risk of root resorption.[3,7]

Adequate Fixation

Excessive time or rigid splinting of the transplanted tooth will adversely affect its healing outcome.[3,7] Splints can also compromise oral hygiene procedures, thus leading to periodontal inflammation around the transplanted tooth.[7] The splint should not force the tooth against the bony walls of the alveolus because it may damage the periodontium.[18] In animal studies,[3,4,7] splinting did not improve periodontal or pulpal healing after transplantation, but resulted in either increased inflammatory root resorption (ankylosis) of the transplanted teeth or increased pulp necrosis. Most reports advise flexible splinting for 7 to 10 days,[3,7,18] with sutures placed through the mucosa and over the occlusal surface of the crown[3,8] because this permits some functional movement of the transplant and stimulates periodontal ligament cellular activity and bone repair.[3,18]

The transplanted tooth must be placed at the same occlusal level as the donor site so that it will develop a longer root than those placed in a superficial, more occlusal, position.[3] However, if the graft has a mature root and is fully erupted, the graft should be placed just slightly below the occlusal level to prevent postoperative trauma.[3] The patient should also be advised to eat a soft diet for the first few days after the transplant.

The Transplant Tooth and Periodontal Healing

Preservation of the periodontium of the grafted tooth is key to a successful clinical outcome.[12,16] When the periodontal fibres are vital, natural reorganization of the periodontal fibres occurs.[16] When the periodontal ligament is damaged, the healing process is characterized by periodontal fibres that run parallel to the root surface.[16] Periodontal healing is usually completed after 8 weeks and appears radiographically as a continuous space around the root[3,7,17] with absence of root resorption and presence of a lamina dura.[3,4,10] Conversely, replacement root resorption occurs in teeth with cementum injury, suggesting that cementum is important for the regeneration of the periodontal ligament.[17]

Infection at the host site and postoperative control of supragingival plaque adversely influence the success of tooth transplantation.[7,16] Inflammatory resorption arises through bacterial contamination of either the pulp tissue or the dentinal tubules.[18] Patients should routinely rinse with chlorhexidine gluconate (0.12% in aqueous solution) for several days perioperatively to reduce plaque and promote healing.[22] Although some studies[2,3,7] show no relation between graft survival and administration of antimicrobials, we and other authors[1,19] believe that antimicrobials improve the patient's chance of having a good clinical outcome.

The final position of the donor tooth within the recipient socket influences periodontal healing. The donor tooth should be placed so that 1 to 2 mm of the width of the periodontal ligament stays above the bone crest to achieve an ideal biologic width.[5] Otherwise, apical migration of epithelium may occur and result in vertical bone resorption (too deep placement) or long connective tissue attachment (too shallow placement).[5]

Evaluation of Success

Root resorption, marginal periodontal attachment level, mobility and pain affect the success of a transplant.[16] Success is defined as normal periapical healing, without any inflammatory pulpal changes or progressive root resorption, and continued development of root growth.[3] Some other factors affect the success of the transplant[4,5]: the transplanted tooth resides in its new socket without residual inflammation; masticatory function is satisfactory and is without discomfort; the tooth is not mobile; a pathologic condition is not apparent on the radiographs; the lamina dura appears normal on radiographs[3,4,10]; there is radiographic evidence of further growth of the root; and pocket depths, gingival contour and gingival color are within normal limits.

Complete periapical healing and periodontal health are more reliable parameters of prognosis and success because slight external root resorption (either surface, inflammatory or replacement resorption) is often not radiographically detectable.[12] In fact, replacement resorption (ankylosis) may be evident only 3 to 4 months[4] to 1 year[3] after the procedure, whereas inflammatory resorption may take about 3 to 4 weeks to become evident.[3,7] Perceiving a metallic percussive sound is, however, an accurate indication that the tooth is ankylosed.[1,3]

Some authors[7,11,19] believe that transplanted teeth can be submitted to orthodontic treatment only 3 to 6 months after transplantation. According to Hamamoto and others,[10] orthodontic treatment can be initiated just after regeneration of the periodontal space and subsequent confirmation of the lamina dura on the dental radiographs. The clinician should remember that orthodontic movement of autografted teeth with complete root formation, although possible, results in a slight increase in the frequency of surface and inflammatory root resorption.

Because nervous tissue may take months to grow, unlike vascular tissue that can begin growing within days,[7] sufficient time, usually up to 1 year, must be allowed to permit reinnervation of the teeth. Teeth with a closed apex can also become revitalized (though rarely).[7]

Avoidance of any kind of trauma is also important for the success of the transplant. Otherwise, trauma will become an extra cause of impaired healing.[16]

Conclusion

In growing persons, bridgework and implants are not feasible because they may impede the normal growth of facial bones, in particular, of the alveolar process, and are therefore contraindicated.[7,11] Therefore, when space closure seems an unlikely or undesirable option, the transplant of a tooth with incomplete root formation may be an alternative solution because both alveolar growth and root development will be unimpeded.[7,11] Although the patient's age is not a factor for successful autoplastic transplantation, available epidemiologic data[3,4,7,11,17,19] indicate that better results can be achieved when it is done at a younger age, when the donor tooth is still developing so that its eruptive potential can be used to best advantage.

Box 2 Advantages and disadvantages of transplantation

Advantages

Better alternative than fixed or removable prosthodontics
Avoidance of adjacent teeth preparation
Comparative cost-effectiveness

Disadvantages

Surgical involvement superior to that of a simple extraction
Poor prediction of the final outcome
Eventual loss of the tooth because of possible complications such as root resorption and loss of attachment

In case 1, the existence of a necrotic lesion of the pulp was not a contraindication for the procedure because there was no terminal periodontal disease nor an acute inflammatory process.[4,7] Whenever unrestorable teeth need to be extracted, clinicians should make patients aware of other treatment alternatives, such as tooth transplantation, rather than replacing teeth with a fixed or removable prosthesis, and the advantages and disadvantages of transplantation, as depicted in Box 2, should be taken into consideration.[5]

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Unusual Post-Extraction Hemorrhage in a Cardiac Patient: A Case Report

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• **Keerthilatha M. Pai,** MDS •
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Abstract

In patients with cyanotic congenital heart disease (CCHD), the need for antibiotic prophylaxis for infective endocarditis is well known among dentists, but not many dentists are aware of the associated hemorrhagic tendencies in such patients. We report a case of post-extraction hemorrhage in a patient with Eisenmenger's syndrome and discuss the importance of more elaborate hematologic evaluation in patients with CCHD before oral surgery.

MeSH Key Words: *Eisenmenger complex/complications; oral hemorrhage/adverse effects; tooth extraction/adverse effects*

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An untreated ventricular septal defect may result in Eisenmenger's syndrome, which is defined as "elevation of pulmonary arterial pressure to the systemic level caused by increased pulmonary vascular resistance with reversal or bi-directional shunting through a large intracardiac or extracardiac congenital heart defect."[1] In Eisenmenger's syndrome, deoxygenated venous blood returning to the heart is pumped out into the systemic circulation without passing through the lungs for oxygenation, which results in central cyanosis.[2] Chronic hypoxia, caused by cyanosis, results in increased erythropoietin secretion by the kidneys and, subsequently, polycythemia.[3] The type and magnitude of hematologic abnormalities in patients with cyanotic congenital heart disease (CCHD) are directly proportional to the degree of polycythemia.[3]

Cardiac patients usually undergo dental treatment only after a physician's consent, and treatment follows established protocols for infective endocarditis antibiotic prophylaxis and withdrawal of anticoagulants, which are set, reviewed and updated periodically by scientific authorities. However, these measures alone cannot ensure safe extraction in a patient with CCHD. Review of the literature reveals that excessive bleeding can occur in such patients for reasons other than the use of acetylsalicylic acid and anticoagulant therapy. Hematologic abnormalities can be thrombocytopenia, accelerated fibrinolysis or decreased production of coagulation factors leading to increased prothrombin time and thromboplastin time.[4] This case report highlights a hemorrhagic tendency encountered in a patient with a ventricular septal defect with Eisenmenger's syndrome. With an increasing number of patients with Eisenmenger's syndrome surviving to adulthood,[5,6] it is more likely that dentists will encounter such patients in their practice, underlining the importance of their awareness of this condition.

Case Report

A 30-year-old man presented with bleeding from the lower left molar region over 2 days. The patient was known to have congenital heart disease. Two days earlier, a local dentist had extracted his lower left first molar after routine antibiotic prophylaxis for infective endocarditis. However, the dentist did not order any hematologic investigations. Bleeding occurred that evening and the patient noticed blood-tinted saliva and droplets of blood oozing from the extraction socket. The next day, the patient returned to the dentist, who debrided and sutured the socket area. The patient appeared normal after this treatment, but had a recurrent episode of bleeding after a few hours. He then reported to our department for evaluation.

The patient was of moderate build, fairly well nourished and with vital signs within normal limits. There was clubbing of fingers. Liver, spleen and lymph nodes were not palpable and no signs of pedal edema or ascites were observed.

Table 1 **Summary of hematologic investigations**

Investigation	Normal range[a]	Patient's value	Evaluation
Hemoglobin	8.1–11.2 mmol/L	15.45 mmol/L	Increased
PCV	0.40–0.54 L/L	0.80 L/L	Increased
TLC	4.0–11.0 × 10^9/L	3.6 × 10^9/L	Normal
RBCs	4.5–6.5 × 10^{12}/L	9.9 × 10^{12}/L	Increased
Platelet count	150–400 × 10^9/L	96 × 10^9/L	Decreased
Bleeding time	1–6 min (Ivy method)	5 min	Normal
PT	< 3.0 (INR)	3.13 (INR)	Increased
aPTT	25–35 s	43.0 s (control 32 s)	Increased
Biochemical investigations			
AST	5–40 U/L	61 U/L	Increased
ALT	5–40 U/L	27 U/L	Normal
ALP	40–140 U/L	689 U/L	Increased

[a]*For males.*

ALP = alkaline phosphatase; ALT = alanine transaminase; aPTT = activated partial thromboplastin time; AST = aspartate transaminase; PCV = packed cell volume; PT = prothrombin time; RBCs = red blood cells; TLC = total leucocyte count.

An intraoral periapical radiograph of the region ruled out the presence of root fragments. The extraction area was again debrided under local anesthesia without adrenaline, irregular bony margins were smoothened and the area was closed with interrupted sutures. Pressure packs and local hemostatic hemocoagulase were used to control bleeding and the patient was discharged. The patient reported again the next day with bleeding from the same area. Examination revealed petechiae over the skin of his arms and thorax. Ethamsylate was administered and the bleeding was controlled temporarily. The patient was referred for cardiac consultation and hematologic tests were ordered. The next day, the patient had another episode of bleeding and was admitted to hospital.

Cardiologist's Report

The patient had grade III carpopedal clubbing and central cyanosis. He had a grade III left parasternal heave with a right ventricular fourth heart sound and an accentuated pulmonary component in the second heart sound along with pansystolic murmur with tricuspid regurgitation. An electrocardiogram suggested right ventricular hypertrophy, right axis deviation and secondary ST-T changes. It revealed a large (2.2 cm) ventricular septal defect; right-to-left shunting; a right ventricular thickness of 1.3 cm; and grade II tricuspid regurgitation. Cardiac catheterization revealed a pulmonary-to-systemic flow ratio of 0.8 and a pulmonary vascular resistance of 520 dynes × s × cm^{-5}.

Hematologic Investigation

Tests revealed a high hemoglobin concentration (15.45 mmol/L), a high red blood cell count (9.9 × 10^{12}/L), a packed cell volume of 0.80 L/L, a prothrombin time of 3.13 (INR), an activated partial thromboplastin time of 43 s (with a control of 32 s) and a reduced level of platelets (96 × 10^9/L) (**Table 1**). Biochemical investigations revealed an increased level of aspartate transaminase (61 U/L) and alkaline phosphatase (689 U/L). White blood cell counts were normal.

Subsequently, 2 units of fresh frozen plasma were infused, after which the bleeding stopped completely.

Discussion

Hemostatic abnormalities in patients with CCHD are well documented. Bleeding tendency is usually mild to moderate and is characterized by easy bruising, petechial hemorrhage and gingival bleeding.[7] In patients with congenital cardiac defects, infective endocarditis prophylaxis and determination of bleeding tendency are the most important factors that dental practitioners must consider.[8]

In Eisenmenger's syndrome, pulmonary hypertension causes the heart to circulate deoxygenated blood resulting in chronic hypoxia. Hypoxia triggers the secretion of erythropoietin from the kidneys, which causes erythrocytosis and subsequent polycythemia and an increase in the hematocrit[3] (**Fig. 1**). Because bleeding in patients with CCHD has a systemic cause, the use of a topical hemostatic agent results in only temporary cessation of bleeding, as observed in our case; hence the role of local hemostatics is limited.

In CCHD, abnormal hemostasis has a multifactorial etiology. It may be caused by a decrease in the coagulation factors synthesized in the liver, i.e., vitamin-K-dependent factors II, V, VII, IX and X, which can be explained by deficient synthesis resulting from hypoxic damage to the liver and sluggishness of microcirculation caused by high blood viscosity[9] (**Fig. 1**). This explains the elevated levels of liver enzymes and the increase in prothrombin time and activated partial thromboplastin time observed in our patient. It also emphasizes the need for specific assays (**Box 1**), which had not been performed in our patient. Our patient's abnormal hemostasis was a result of deficient clotting factors, which was corrected by transfusion of fresh frozen plasma.

In patients with CCHD, platelets have both qualitative and quantitative abnormalities. Platelet count and hematocrit are inversely related; thus an increased hematocrit is associated with thrombocytopenia.[3,9] Low platelet counts are attributed to either shortened half life of the platelets[3] or decreased production of platelets as megakaryocytes escape fragmentation in lungs owing to a right-to-left shunt.[10] An elevated PCV and reduction in platelet count was found in our patient (**Table 1**).

In patients with CCHD, polycythemia occurs with overproduction of platelet microparticles, probably due to high shear stress caused by increased blood viscosity, which might play an important role in the coagulation abnormalities identified in such patients.[11] In their study of 33 patients, Bhargava and others[12] concluded that there was reduction in platelet adhesiveness to glass and impaired availability of platelet factor 3 in nearly 50% of patients and poor clot retraction in 84% of patients. There is also a deficit in the platelet adhesion receptor glycoprotein Ib, which can also contribute to hemostatic complications.[13] Qualitative platelet defects associated with CCHD include abnormal aggregation of platelets in response to adenosine diphosphates, epinephrine and collagen, which is directly related to the degree of polycythemia.[3] Tests to confirm these findings were not performed in our patient, as temporary cessation of bleeding indicated that the hemostatic defect was not due primarily to platelet abnormalities but to a coagulation defect. However, tests to rule out qualitative platelet defects are recommended in CCHD patients (**Box 1**).

A variant of von Willebrand disease, characterized by a deficiency of the high molecular weight forms of the von Willebrand factor in plasma, has also been reported.[3,11,12] Cyanosis, turbulent blood flow and pulmonary vascular disease appear to be independently associated with a reduction in or the absence of large von Willebrand factor multimeric forms.[14,15] It remains to be determined whether the von

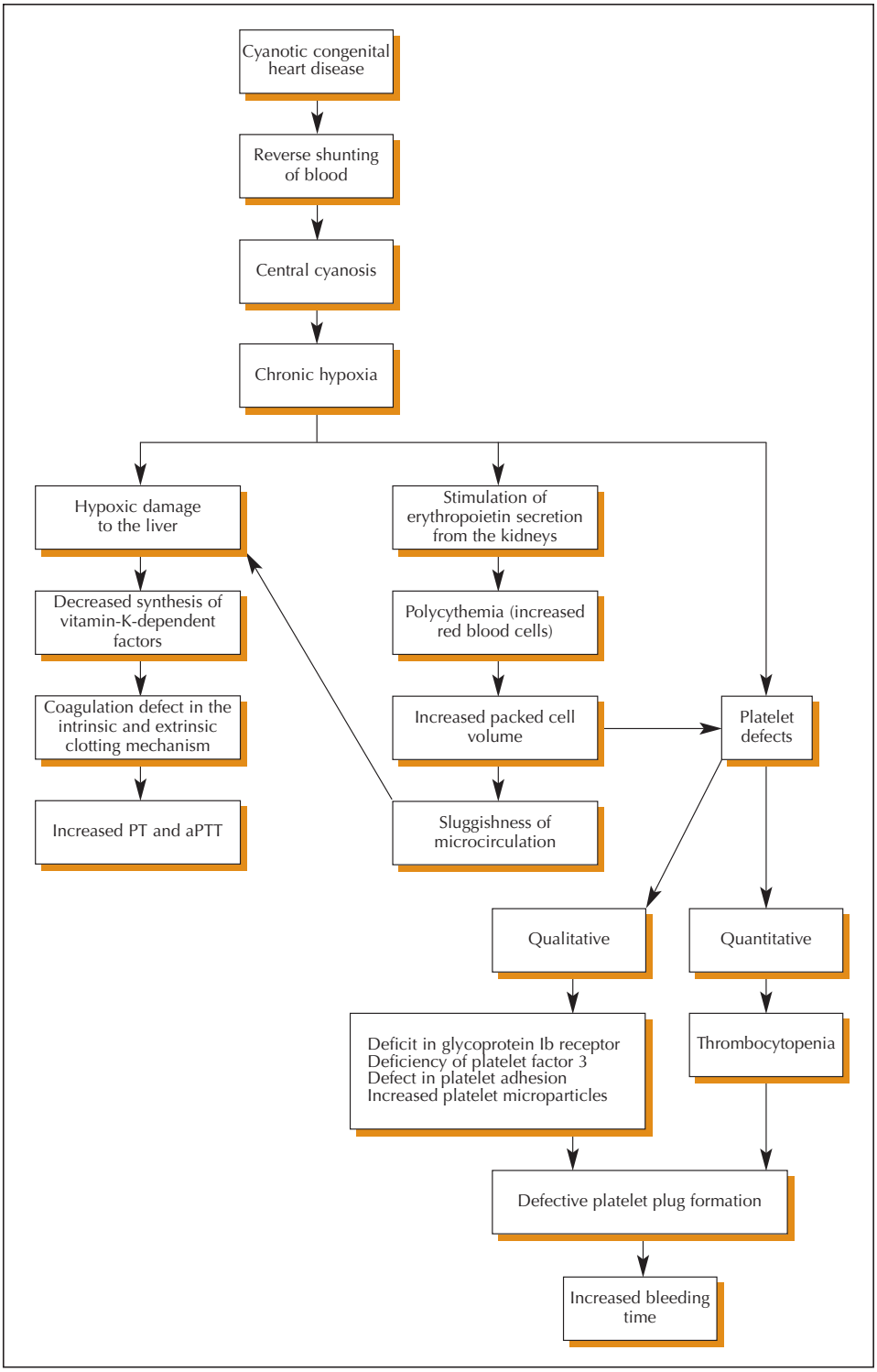

Figure 1: *Clinicopathologic processes responsible for abnormal hemostasis in patients with cyanotic congenital heart disease. (Disseminated intravascular coagulation and abnormality in von Willebrand factor also contribute to hemostatic abnormalities.) aPTT = activated partial thromboplastin time; PT = prothrombin time*

Box 1 Recommended investigations for patients with cyanotic congenital heart disease

Screening tests

Hematologic investigations

Complete blood count (CBC)
Platelet count
Peripheral smear
Bleeding time
Prothrombin time (PT)
Activated partial thromboplastin time (aPTT)
Clot retraction

Biochemical investigations

Aspartate transaminase (AST)
Alanine transaminase (ALT)
Alkaline phosphatase (ALP)

Specific tests[a]

Specific factor assay
D-dimer level
Antithrombin III level
Ristocetin aggregation test
von Willebrand assay

[a]A dentist routinely prescribes screening tests. A negative screening test does not preclude the need for specific tests before major surgical procedures or in cases of continuous postoperative bleeding.

Willebrand abnormality has a central role in the clinical hemostatic disturbance experienced by patients with CCHD.[7] Although rare, specific tests to rule out von Willebrand disease are recommended in CCHD patients after consultation with a physician.

Abnormal hemostasis resulting from a state of consumptive coagulopathy or disseminated intravascular coagulation has also been observed in some patients with elevated D-dimer levels. D-dimers are specific degradation products of cross-linked fibrin[16] and indicate prior thrombin generation and subsequent lysis. Chan and others[17] observed an increase in thrombin generation and consumptive coagulopathy as indicated by high levels of thrombin–antithrombin complexes in cyanotic and acyanotic heart disease patients. Therefore, assessment of D-dimer and antithrombin levels can be performed to rule out disseminated intravascular coagulation and increased fibrinolytic activity.

In most patients, preoperative abnormalities in screening tests predict a subclinical hemorrhagic tendency,[9] but normal test results do not exclude the possibility of a major postoperative bleeding diathesis.[18] This emphasizes the need for specific tests (**Box 1**), which should be performed with a physician's consent in patients with continuous postoperative bleeding tendency after minor orosurgical procedures despite normal screening tests or before any major orosurgical procedure.

In the management of such patients, nonsteroidal anti-inflammatory drugs, such as acetylsalicylic acid, should be avoided, as they block the cyclooxygenase pathway and inhibit platelet aggregation, thus enhancing intrinsic hemostatic defects caused by existing platelet abnormalities in patients with CCHD.[8] Corticosteroids and anticoagulants also increase the risk of bleeding, and these drugs should be avoided.

Before a major orosurgical procedure, if the hematocrit is high, prophylactic phlebotomy is recommended, with a physician's consent, to reduce the hematocrit level to below 65%. This improves hemostasis and decreases the risk of post-surgical hemorrhage.[19] Units of phlebotomized blood should be stored for potential autologous transfusion in the future. In addition to bringing the hematocrit under control, prophylactic platelet transfusion can be performed; if it does not stop bleeding, fresh frozen plasma can be infused. Aprotinin, epsilon aminocaproic acid, tranexamic acid and desmopressin can also be used to control bleeding in CCHD patients.

In patients with Eisenmenger's syndrome, dental extractions and other minor orosurgical procedures should be performed under conscious sedation.[20]

Conclusion

This article emphasizes the need for and the importance of preoperative hematologic screening in patients with CCHD to prevent postoperative bleeding by predicting subclinical hemorrhagic tendencies. A detailed case history, symptoms of CCHD and abnormalities in such screening tests as complete blood count, hematocrit, prothrombin time and activated partial thromboplastin time should alert the dentist to such tendencies. In view of the nature of the problem, a team approach involving the dentist and the physician in the management of such patients is necessary to provide them with better and safer care. ◆

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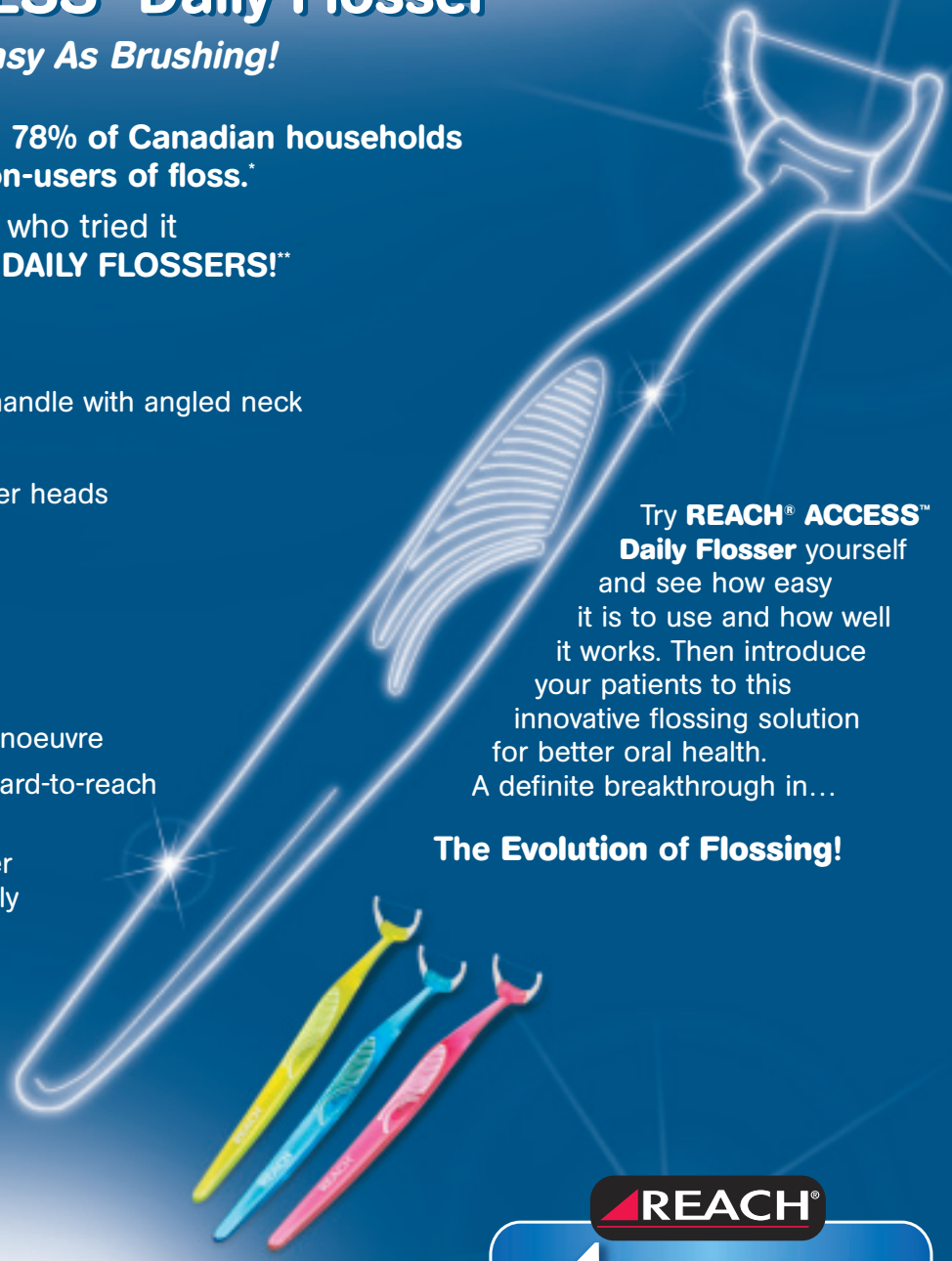

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Orthodontic Extrusion: Periodontal Considerations and Applications

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Abstract

Human teeth erupt naturally to compensate for tooth wear and tear. When a subgingival lesion such as crown fracture occurs, the general practitioner must consider orthodontic extrusion of the tooth to allow for prosthetic rehabilitation. However, because this therapeutic approach is not appropriate in all cases, each tooth must be carefully analyzed before treatment. The amount of force applied depends on the desired effect. Orthodontic extrusion can also be used to augment bone and tissue in the course of preparing an implant site. In most cases, endodontic treatment must be completed first, with close attention being paid to the contour of the final restoration. The benefits of extrusion are clear, but patients must nonetheless be informed of the disadvantages.

MeSH Key Words: *crown lengthening; tooth fractures/therapy; tooth movement/methods*

This article has been peer reviewed.

In everyday practice, the general practitioner sometimes sees cases of subgingival trauma or carious lesions. Possible therapeutic options include extraction and prosthetic restoration (by a bridge) or surgical lengthening of the crown, as well as orthodontic extrusion. The last of these options provides undeniable benefits for the patient.

Orthodontic Extrusion

Movement of a tooth by extrusion involves applying traction forces in all regions of the periodontal ligament to stimulate marginal apposition of crestal bone. Because the gingival tissue is attached to the root by connective tissue, the gingiva follows the vertical movement of the root during the extrusion process. Similarly, the alveolus is attached to the root by the periodontal ligament and is in turn pulled along by the movement of the root.

Rapid Extrusion

In the normal course of events, bone and gingival movements are produced under low-intensity extrusive forces. When stronger traction forces are exerted, as in rapid extrusion, coronal migration of the tissues supporting the tooth is less pronounced because the rapid movement exceeds their capacity for physiologic adaptation.[1] As well, rapid extrusion must be followed by an extended retention period[2] to allow remodelling and adaptation of the periodontium with the new tooth position. Rapid extrusion is associated with a risk that the periodontal ligament will be torn and that tooth ankylosis may occur.[3] Intense force can also lead to root resorption.[4] However, this latter phenomenon remains very limited if the forces, even if intense, are appropriately controlled.[5]

Indications for Orthodontic Extrusion

Orthodontic extrusion is indicated in the following situations (**Fig. 1**):

- for treatment of a subgingival or infraosseous lesion of the tooth between the cementoenamel junction and the coronal third of the root (e.g., caries, oblique or horizontal fractures, perforations caused by a pin or post, internal or external root resorption), especially when there are esthetic considerations
- for treatment of a restoration impinging on the biological width
- for reduction of angular bone defects and isolated periodontal pockets[6]

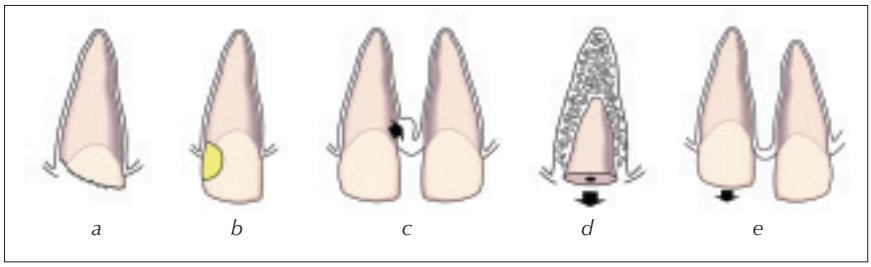

Figure 1: *Examples of indications for orthodontic extrusion: a) subgingival or infraosseous dental lesion, such as a fracture; b) restoration impinging on the biological width; c) reduction of localized angular bone defects; d) preimplant extraction; e) trauma or impacted teeth.*

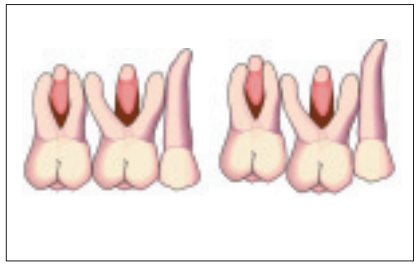

Figure 2: *Root proximity, a major contraindication for orthodontic extrusion of a molar.*

- for preimplant extraction to maintain or re-establish the integrity of an alveolar ridge (see "Extrusion for Implant Purposes")
- for orthodontic extraction where surgical extraction is contraindicated (e.g., in patients receiving chemotherapy or radiotherapy)[7]
- for treatment of trauma[8,9] or impacted teeth[10] (canines).

Contraindications to Orthodontic Extrusion

Extrusion is contraindicated in patients with the following conditions:

- ankylosis or hypercementosis[11] (the extra load would cause intrusion of the anchor teeth)
- vertical root fracture
- root proximity and premature closure of embrasures (**Fig. 2**).

Additional contraindications come into play when extrusion is used for prosthetic purposes:

- short roots, which do not allow for adequate support of the restoration[12] (that is, when the crown–root ratio is less than 1:1)
- insufficient prosthetic space
- exposure of the furcation.

These criteria are not absolute and do not apply if the purpose of orthodontic extrusion is to increase the quantity of bone in a ridge before placing a dental implant.

Advantages

Orthodontic extrusion is a conservative procedure that allows retention of a tooth without the disadvantages of a fixed bridge (e.g., the mutilation of adjacent dental tissue that typically occurs during bridge fabrication). As well, extrusion does not involve loss of bone or periodontal support, as commonly occurs during extraction. Simple surgical crown lengthening involves additional resection of bone of the teeth adjacent to the tooth that is to be lengthened, and such osteotomy can sometimes be avoided by use of orthodontic extrusion. Finally, this simple technique requires a relatively easy movement of the tooth.

Disadvantages

Wearing an orthodontic device, as is required for orthodontic extrusion, may cause esthetic problems and may adversely affect oral hygiene. As well, the duration of treatment (4 to 6 weeks of extrusion and 4 weeks to 6 months of retention for implant cases in which tissue and bone remodelling are the objectives[6]) may discourage some patients. Indeed, some authors recommend 4 weeks of retention for every millimetre of extrusion.[4] At the end of the procedure, conservative periodontal surgery may be necessary to correct any discrepancy that has developed between adjacent periodontal levels.[13]

Forces Exerted

Forces of 15 g for the fine root of a lower incisor and 60 g for a molar are sufficient for slow extrusion. Some authors recommend that the maximum force for a slow movement should not exceed 30 g,[4,14] whereas rapid extrusions are accomplished with forces higher than 50 g.[15]

After a latency period of a few days to a few weeks, including a period of hyalinization, slow extrusion occurs at a rate of approximately 1 mm or less per week.[4] The force used will vary depending on the physiologic response of the patient and other factors such as root surface morphology. The extent of the force exerted can only be approximated, since it is difficult to quantify the force applied. The forces must be adjusted on the basis of the clinically verified speed of extrusion.

It is imperative that constant force be maintained between the extrusion and hyalinization phases; otherwise, the desired orthodontic movement will not take place. Periodontal ligament tension is needed for bone remodelling and movement of the periodontal attachment.[8] Finally, the force must be applied along the tooth axis to prevent any undesirable tilting.

Periodontal Effects

Orthodontic extrusion forces coronal migration of the root and increases the bone ridge as well as the quantity of attached gingiva, in particular when weak to moderate forces are applied.[16,17] The amount of attached gingiva is

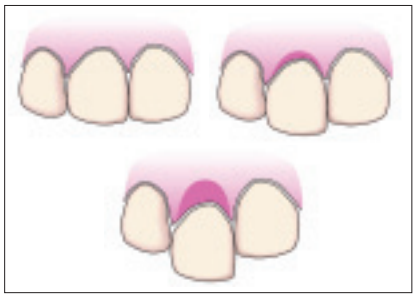

Figure 3: *Development of a band of immature nonkeratinized tissue ("red patch").*

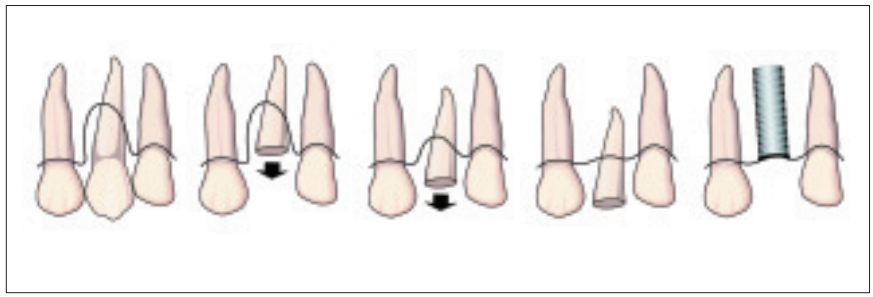

Figure 4: *Steps in orthodontic extrusion for the purpose of preimplant extraction.*

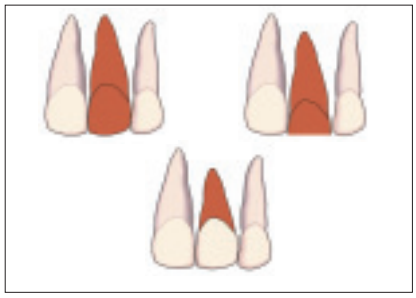

Figure 5: *Restoration phase. Care is needed to prevent overcontouring of the crowns.*

increased through eversion of the sulcular epithelium, appearing first as immature nonkeratinized tissue (known as "red patch") (**Fig. 3**) and then as keratinized tissue; the process of keratinization requires 28 to 42 days.[4] After coronal movement of the periodontal attachment has occurred, minor surgical correction may be necessary. To avoid or minimize this correction, some authors recommend weekly fibrotomy (incision of the supracrestal gingival fibres).[18,19] Others recommend a single fibrotomy procedure when the movement is completed,[5,17] before bone and gingiva remodelling occurs. However, according to several clinicians, fibrotomy has proved unpredictable, and gingiva and/or bone remodelling may still be required after the stabilization period.[1,20] In a study carried out on dogs, repeated fibrotomy failed to prevent coronal migration of the gingival attachment.[21] In-depth studies on human subjects to demonstrate the usefulness of this procedure and to define the appropriate frequency have yet to be carried out.[5]

Extrusion for Implant Purposes

Orthodontic extrusion, which preserves or regenerates the volume of bone in the ridge, makes the placement of dental implants more favourable. Conservation of the ridge allows placement of the dental implant within the thickness of the bone in a suitable axis. It also optimizes the potential for a guided bone regeneration technique.[7] Finally, the newly keratinized tissue improves the esthetic appearance at the site.[22] More specifically, extrusion is appropriate for teeth with average bone loss and when esthetics is a determining factor (**Fig. 4**), because it facilitates esthetic corrections and ensures stabilization of the implant within adequate bone mass.[23] The eruptive phase, lasting between 4 and 6 weeks, is followed by 6 to 8 weeks of stabilization, during which tissues are remodelled before extraction of the "condemned" tooth and placement of the dental implant.[7] However, some authors recommend up to 6 months of retention in preimplant cases to maximize remodelling of the ridge.[6] Indeed, prolonged stabilization allows more time for tissue remodelling, which, in turn, promotes more voluminous bone remodelling and decreases the risk of relapse before placement of the dental implant.[6]

Extrusion and Endodontics

In some cases, the tooth to be extruded must be treated endodontically to prevent sensitivity and exposure of the pulp during the occlusal reduction required during the extrusion.[4] A canal that cannot be adequately treated (because of subgingival fracture and lack of an adequate operative field) can be filled with calcium hydroxide before extrusion and subsequent treatment.[14] However, when the tooth must be extracted and the purpose of extrusion is to obtain an optimal ridge (e.g., in cases of preimplant extraction), pulpectomy may be sufficient.[15] Moreover, if the tooth is to be saved and its pulp kept intact, slow orthodontic extrusion, over a period of 3 to 6 months, is the preferred method of reducing the risk of pulpal necrosis; rapid extrusion could be traumatic to the pulpal tissue.[24] A histologic study demonstrated odontoblastic degeneration after 1 week of activation and pulpal fibrosis after 4 weeks in a tooth subject to an extrusion force of 50 g.[25] The authors assumed that the pulpal reaction would differ depending on the diameter of the apical foramen. Pulp prolapse would be due to ischemia secondary to rapid movement.[25] During rapid extrusion, a pseudo-apical lesion (an apical radiolucency) appears, which must be differentiated from a true lesion of endodontic origin. However, a tooth that has undergone incomplete root canal treatment, although asymptomatic, could eventually develop a true apical lesion because of inflammatory mediators involved in the root apex during orthodontic movement.[26]

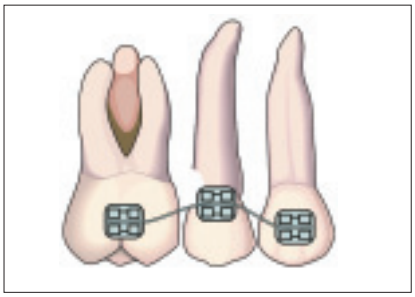

Figure 6a: *System of orthodontic brackets attached by a nickel–titanium wire*

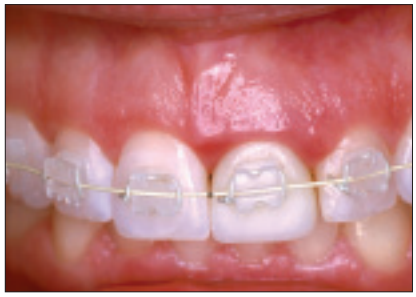

Figure 6b: *Extrusion is accomplished by the orthodontic brackets over a 1-month period.*

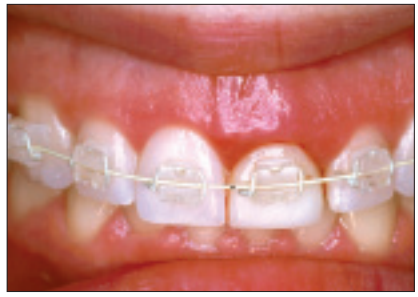

Figure 6c: *Coronal migration of the gingiva in the buccal aspect of extruded tooth 21. (Treatment by Dr. René Voyer.)*

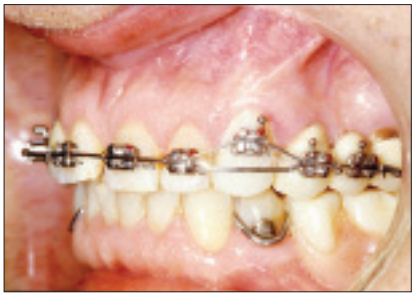

Figure 7a: *Extrusion accomplished by treatment with a traditional orthodontic bracket.*

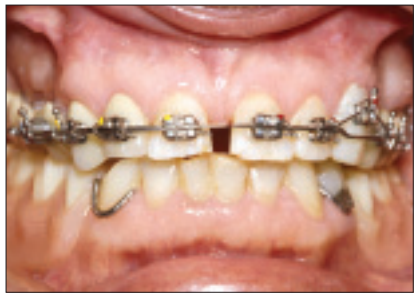

Figure 7b: *The stabilization wire is attached to the brackets adjacent to the tooth that is to be extruded.*

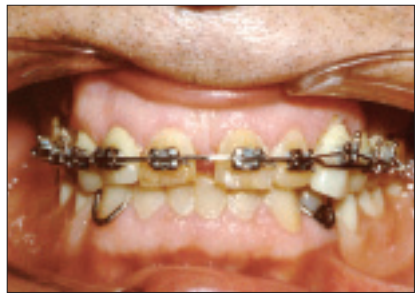

Figure 7c: *Active extrusion is carried out over a 1-month period. (Treatment by Dr. Martin Vallois.)*

Extrusion and Prosthodontics

The mesiodistal diameter of the root, which is naturally "strangled" at the cementoenamel junction of single-rooted teeth, is reduced with progression of the extrusion (especially in the case of conical roots), which involves expansion of interproximal gingival embrasures. The contour shape of the crowns must not be exaggerated to compensate for this reduction in diameter (**Fig. 5**). Similarly, embrasures should not be filled to prevent an overcontour, which could adversely affect the marginal periodontium.[27]

Techniques

Several extrusion methods are available, depending on the clinical conditions encountered. A variety of mechanical strategies can be used to control the forces applied.

One technique involves placing orthodontic brackets on the buccal aspect of the teeth adjacent to the tooth that is to undergo extrusion in a passive position that will not cause any orthodontic movement of the anchor teeth. The bracket on the target tooth is positioned more apically than the brackets on the adjacent teeth; the difference in distance represents the desired extrusion. A 0.016-in. nickel–titanium arch wire is attached to the brackets (**Figs. 6a, 6b** and **6c**). If greater movement is desired, a second, more rigid wire (0.016 in. x 0.022 in.), attached only to the brackets of the adjacent teeth, is used to stabilize everything (**Figs. 7a, 7b** and **7c**). Following extrusion, a more rigid 0.018-in. stainless steel arch wire is inserted and set by means of a metal ligature for a minimum retention period of 12 weeks.[11] If the dental tissues are inadequate for cementing a bracket, a composite reconstruction of the crown can be done or another consolidation strategy can be used.

It is possible to avoid positioning the bracket apically by shaping a stainless steel wire (0.018 in. diameter) into a horizontal loop (**Fig. 8**). This activated extrusion system will produce movement of 1 mm per month. A wire in the form of a spiral (a spring) can also be used to provide the necessary traction force (**Fig. 9**).

Another strategy consists of inserting a rigid wire into the restorations of the anchor teeth. A metal wire, 0.7 mm in diameter, hooked at one end, is cemented into the canal of the tooth that is to undergo extrusion. An elastic connects the hook to the rigid anchor wire to activate the mechanism (**Fig. 10**). The elastic is changed every 2 weeks. This method can be difficult to use on posterior teeth because occlusion can interfere with the mechanism.

If the anchor teeth have not been restored, a rectangular stainless steel arch wire (0.018 or 0.019 in. x 0.025 in.) can be folded and affixed with composite to the buccal aspect of each tooth (**Figs. 11a** and **11b**). Forces must be applied according to the position of the long axis of the tooth that is to undergo extrusion to prevent buccal or lingual tipping. A temporary crown cemented on a final post can be used as a traction attachment point; this approach maintains the esthetic appearance.[3] If necessary, the proximal contours of the tooth undergoing extrusion can be carefully reduced to prevent the

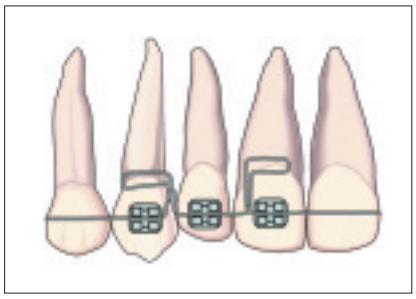

Figure 8: *A system of orthodontic brackets attached by a horizontal loop wire.*

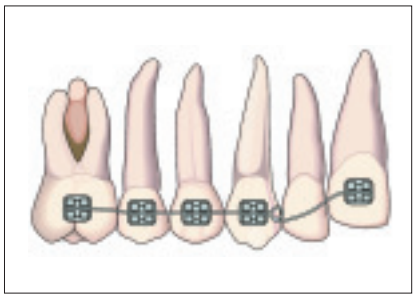

Figure 9: *Extrusion of a central incisor affected by traumatic impaction is accomplished with an orthodontic bracket system activated by a spring.*

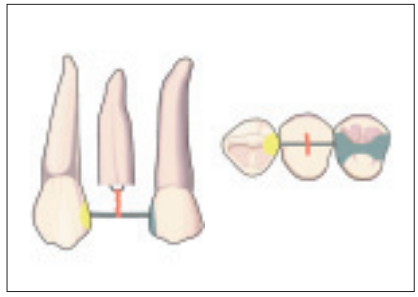

Figure 10: *Orthodontic wire embedded in the restorations adjacent to the tooth that is to be extruded. Movement is effected by an elastic that is changed regularly.*

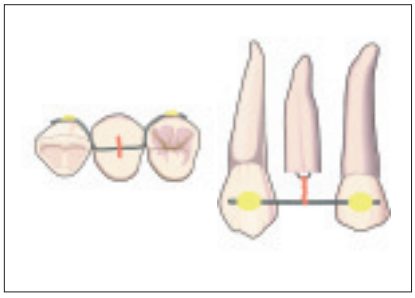

Figure 11a: *Orthodontic wire cemented by composite to the buccal aspect of the anchor teeth. An elastic activates the extrusion in the vertical axis only.*

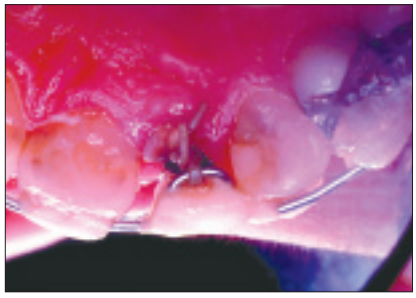

Figure 11b: *The extrusion is accomplished by means of an orthodontic wire activated by an elastic. The temporary restoration in acrylic resin is cemented to the wire to improve the esthetic appearance. (Treatment by Dr. René Voyer.)*

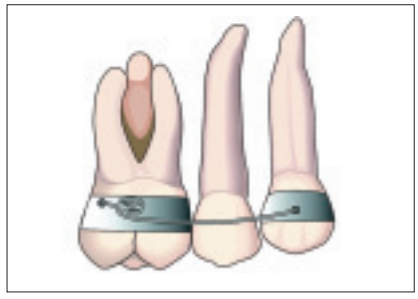

Figure 12: *A spring welded to a band (molar anchor) can be used to activate extrusion of the first premolar.*

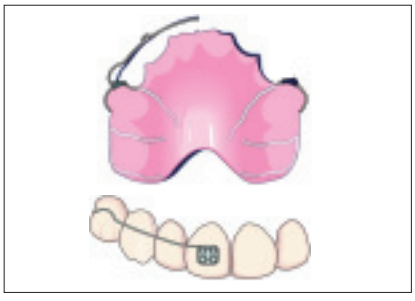

Figure 13: *Removable device (Hawley retainer with spring) and bracket on the tooth that is to be extruded.*

tooth from interfering with the movement.

An extrusion device can also be prepared from a band and a soldered spring (**Fig. 12**); however, this method is more labour-intensive.

A removable Hawley device and an anchoring tip cemented to the buccal aspect is a good mechanical alternative (**Fig. 13**). This method is useful when the adjacent teeth are mobile or offer inadequate anchorage because of trauma or when mild force is required.

The number of teeth required for anchoring depends on the type of tooth to be extruded, root number and conformation, and the quantity of periodontal attachment. Follow-up evaluations should be done every 2 weeks to ensure adequate oral hygiene and to correct any changes in occlusion as movement occurs. As well, it is important to ensure that movement of the tooth being treated actually occurs, because tooth ankylosis will cause the anchoring mechanism to be intruded.

Evaluation and Preparation of Cases

Before any therapeutic decision can be made, a detailed dental history, including that of any potential dental trauma, must be obtained. The evaluation must also take into account oral hygiene; bacterial plaque control must be exceptional before starting orthodontic extrusion treatment, so as to reduce the risk of dental demineralization and periodontal inflammation, which would adversely affect marginal bone gain or induce hyperplasia of the soft tissues.

Before starting treatment, the dentist must evaluate the following:

- periodontal status
- quality and quantity of attached gingiva
- depth of periodontal (or gingival) pockets for the targeted teeth
- esthetic appearance of the site
- gingival clearance when smiling
- gingival contour line
- occlusion
- overjet and overbite

- interference with movement (occlusal excursion)
- postextrusion prosthetic space
- general condition of the dentition.

It is imperative to maintain an appropriate crown–root ratio (at least 1:1 after extrusion) and to ensure adequate width of the pulpal canal (a wide pulpal canal may indicate root fracture) so as to provide a favourable prognosis for the restored tooth. Periodontal probing, radiographic analysis and examination of the fragment of the fractured tooth (if available) can help in determining the extent of the fracture or carious lesion or in detecting a vertical root fracture.

The informed consent form must describe, among other items, the risks of ankylosis, root resorption, relapse, movement of adjacent teeth and failure of treatment, any of which could lead to extraction of the tooth and another treatment option, such as a dental implant or other prosthetic replacement. As well, the consent form should point out the advantages and disadvantages of each alternative solution, specifying the duration of therapy, the approximate number of visits required and the costs.

Conclusions

In spite of the relative difficulties, orthodontic extrusion remains an accessible technique for general practitioners and a beneficial technique for the patient who wishes to keep a tooth, if only to keep the bone ridge volume intact and thereby to maximize the benefits of dental implants. ➧

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Point of Care

The Point of Care section answers everyday clinical questions by providing practical information that aims to be useful at the point of patient care. The responses reflect the opinions of the contributors and do not purport to set forth standards of care or clinical practice guidelines. Readers are encouraged to do more reading on the topics covered. If you would like to submit or answer a question, contact editor-in-chief Dr. John O'Keefe at jokeefe@cda-adc.ca.

Question 1

There is conflicting advice on how to place increments of composite in posterior restorations. Can you suggest a reliable technique?

A serious drawback associated with posterior resin composite restorations is related directly or indirectly to shrinkage during polymerization. Resin composites undergo volumetric shrinkage that is a direct function of the volume fraction of polymer matrix in the composite. The volumetric polymerization shrinkage of modern resin composites ranges from 1.8% to 4.42%.[1]

Polymerization shrinkage occurs regardless of the system used to initiate the setting reaction, chemical or light curing (with low-power, high-power or modulated light sources).[2]

However, there are differences of opinion regarding the direction of the force vectors and the stresses that develop in a composite restoration.[3] During the setting process, shrinkage stresses develop because the material is constrained by its adhesion to the cavity walls. These stresses at the tooth–composite interface may exceed the strength of the bond between the composite and the tooth structure, which can result in gaps.

The shrinkage problem can be partially overcome by technique. The most commonly used method is incremental addition and polymerization of thin layers of resin composite, which decreases the effect of setting contraction by reducing the bulk of resin cured at one time. Insertion of large amounts of composite or bulk placement tends to promote formation of a gap at the resin–dentin interface.[4] The difficulty of placing sticky resin composite in bulk and of perfectly adapting the material to the tooth structure, as well as the contraction due to polymerization of a large volume of composite, are probably responsible for these gaps. Also, the degree of curing of thick layers of composite is not as good as for thin layers.[5] In addition, incremental insertion reduces the ratio of bonded to unbonded surface area, which helps to relieve the stress that develops at the bonding interface between tooth and resin composite.

The use of a more flowable, low-viscosity resin composite, which would wet and adapt closely to the prepared tooth surface, thereby acting as a stress breaker, has been proposed. Researchers are still debating the advantages of this technique.[6,7]

One thing is certain: the ideal cervical margin of a Class II restoration is on enamel. Therefore, every effort should be made to preserve the enamel during tooth preparation.[8]

Research is still being conducted to develop a low-shrinkage or nonshrinking polymer matrix, but it is unclear if the methacrylate-base resin will permit such evolution.

Suggested Technique

Today's most accepted insertion technique is based on the incremental addition of thin layers of resin composite. The first increment is the most critical, so it is placed into the proximal box of the preparation and packed with a

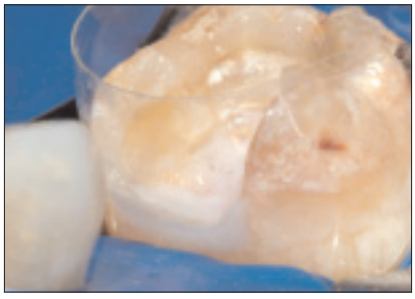

Figure 1: *The first increment is placed into the proximal box and packed so that it is adapted to the cervical margin and the floor of the preparation.*

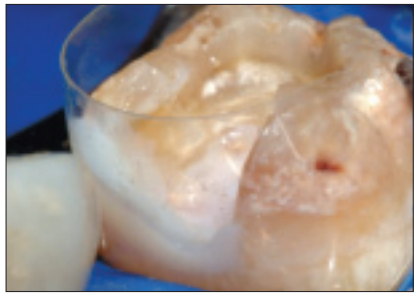

Figure 2: *After light-curing of the first increment, subsequent additions are placed parallel to the cusp slopes by means of an oblique incremental technique.*

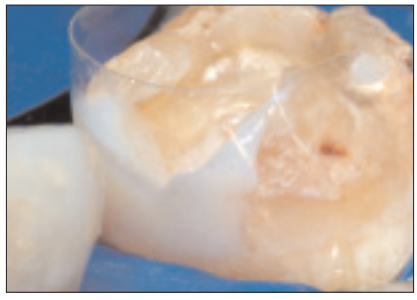

Figure 3: *The oblique incremental technique gradually reproduces the anatomic cusp incline.*

smooth-ended instrument to adapt the floor and the gingival margin of the preparation (**Fig. 1**). After light-curing of the first increment, subsequent layers are placed parallel to the cusp slopes by means of an oblique incremental technique, so as to gradually reproduce the anatomic cusp incline (**Figs. 2** and **3**). The advantages of these wedge-shaped increments become clear when the final occlusal adjustment is made; this approach reduces the effort and time required for finishing and polishing. ✦

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Question 2

What do we mean by "bonded amalgam," and does it have any advantage over tried-and-true, less expensive procedures?

There are 2 types of bonding procedures for amalgam: self-cured bonding and light-cured bonding with adhesive dentin sealant.

Self-Cured Bonding

With self-cured bonding, amalgam is condensed into the prepared cavity lined with a mixture of adhesive and catalyst applied to primed dentin. The initially liquid adhesive becomes intermingled with the first layer of amalgam (**Fig. 1**). The bond between amalgam and resin is weaker than that between resin and dentin; however, there is evidence that this bond adds significantly to the adhesion of the amalgam and the strength of the restoration, in part because of the large surface area.[1,2] The primary indications for bonded amalgam are large, complex preparations and endodontically treated teeth that require amalgam cores. Amalgam bonding can be used as an alternative to pins during cusp replacement. This is one reason why the use of pins in operative dentistry is declining; the use of composite resin is another reason for this decline.

Copal resin degrades fairly rapidly within months of placement[3]; hence, there is a reliance on corrosion of the alloy at the alloy–dentin interface of conventionally placed amalgams to fill the resulting gap. However, modern high-copper alloys corrode less than their predecessors, and my colleagues and I believe that dentin bonding should (with emphasis on "should") provide a better seal. However, evidence shows that conventional amalgam techniques can produce durable restorations lasting many years.[4]

Light-Cured Bonding with Adhesive Liners

At the College of Dentistry, University of Saskatchewan, and in my own professional practice we have been routinely bonding amalgam using light-cured adhesive liners for most amalgam preparations with ideal isolation (rubber dam and moisture control) for 8 years or so. Whether we are using fifth-generation one-bottle or syringe systems or fourth-generation multibottle systems (with separate primer and adhesive), the bonding system is applied to acid-etched, conditioned dentin and enamel and then light-cured before condensation of the amalgam. **Figures 2** to **5** illustrate the procedure in a simulation with extracted teeth and PermaQuik dentin bonding system (Ultradent Products Inc., South Jordan, Utah), with methylene blue incorporated into the bonding agent for visualization. The adhesive tends to pool in the retentive features of the preparation (**Fig. 3**), yet we have experienced few, if any, fractured or displaced restorations, presumably because of the bonding effect. Light-cured adhesive liners are used in an identical manner for the preparation of cavities for composite resin. Under the amalgam, such a liner should in theory provide a seal for the dentinal tubules and enamel tags that is superior to copal resin and other, less expensive dentin sealants. However, there is some evidence that postoperative sensitivity is not eliminated by this procedure.[5] An air-

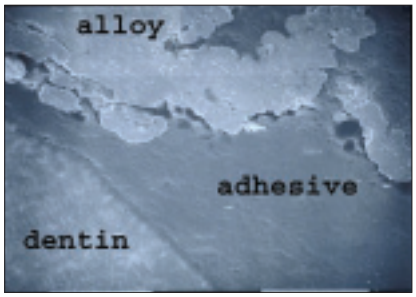

Figure 1: *Scanning electron micrograph of Valiant alloy condensed into 3M Scotch-Bond Multipurpose resin (3M ESPE Dental Products, St. Paul, Minn.), showing intermingling and "islands" of initially liquid resin within the alloy at the dentin surface.*

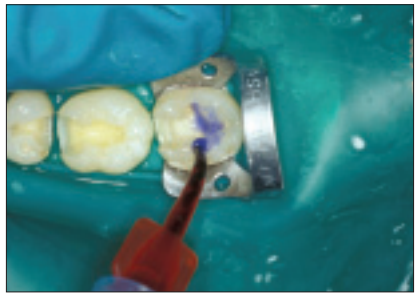

Figure 2: *Etching of enamel and dentin with the PermaQuik bonding system.*

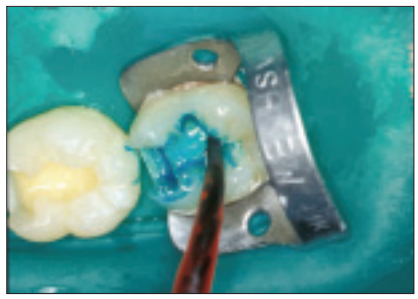

Figure 3: *Methylene blue is added to PermaQuik adhesive for visualization in laboratory studies.*

Figure 4: *Light-curing of the adhesive layer.*

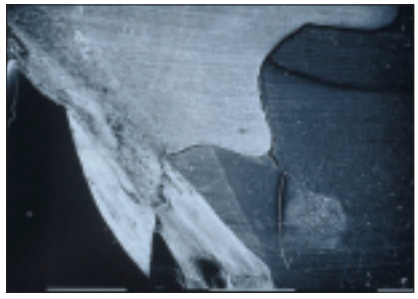

Figure 5: *Low-power scanning electron micrograph of a cross-section of a tooth with a light-cured adhesive-bonded amalgam.*

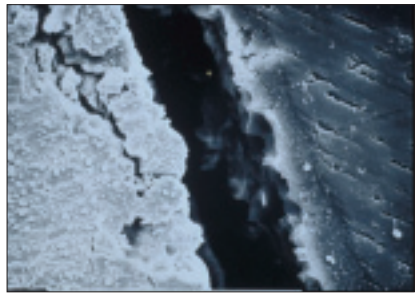

Figure 6: *Scanning electron micrograph showing a spherical alloy amalgam (Valiant; Ivoclar Vivadent Inc., Amherst, NY) "fingerprint" in the air-inhibited layer of the PermaQuik adhesive.*

inhibited layer forms, into which amalgam particles condense. There is intimate contact "fingerprint" between the particles of amalgam and the resin, which is revealed when the layers have become separated as an artifact of preparing the sample for microscopy (**Fig. 6**).

The cost of an adhesive liner is considerably more than the cost for copal resin. Obtaining reimbursement through insurance can be problematic, because some plans will not pay for use of a composite resin in molars if an amalgam would have been more economical; likewise, a bonded amalgam may be reimbursed as a conventional amalgam. I have never had a complaint about this issue, because I always explain that the procedure I am performing *should* provide an even more durable restoration than would have been the case with the previous generation of amalgams. However, whether this new generation of "super-amalgams" will prove even more durable than their predecessors remains to be shown. Evidence to verify any perceived advantages of light-cured adhesive liners is lacking, although evidence is now accumulating that bonded amalgams are effective alternative to pins during cusp replacement.[3] I can say that we have had few problems, in terms of either postoperative sensitivity or restoration failure. ◆

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Question 3

In the case of a porcelain fracture on a porcelain-fused-to-metal crown, what is the most reliable protocol for effecting a repair with composite, and is any repair method really reliable in these circumstances?

Any fracture, anterior or posterior, is alarming for the patient and requires prompt treatment. Fractured porcelain-fused-to-metal (PFM) crowns on posterior teeth may cause occlusal disturbances, masticatory discomfort, or lacerations of the tongue and oral mucosa, or they may jeopardize the affected restoration and the underlying natural tooth or implant abutment. With anterior teeth, the situation is exacerbated by poor esthetic appearance (**Fig. 1**). Although repair with composite resin is relatively simple, ascertaining the cause of the fracture is mandatory to avoid recurrence and to safeguard the longevity of the restoration, abutment and surrounding teeth. The cause of the fracture ultimately determines whether an abutment is salvageable (**Fig. 2**) and influences repair protocols.[1]

Causes

Because of its high modulus of elasticity, porcelain is inherently brittle and predisposed to fracture. A fracture can be initiated as the result of either trauma or incorrect clinical and laboratory procedures; in the latter situation, the fracture manifests as superficial or intaglio surface flaws. In the oral cavity, such flaws are compounded by occlusal stresses and the aqueous environment.

Repair

The method of repair depends on the location of the prosthesis in the mouth and the depth of the fracture lesion (**Fig. 3**). The literature suggests numerous repair techniques (direct and indirect), including overcasting restorations,[2] mechanical pin retention, laboratory-fabricated porcelain "patches," "reimplantation" of intact detached porcelain at the fracture site with a resin cement[3] and composite resin. It is important to emphasize that any repair should be regarded as ephemeral, with the survival period ranging from 1 week to 10 years.[4] The longevity of the repair depends on mastication, further trauma, marginal leakage (and subsequent staining), deterioration of the adhesive or the composite, and clinical technique.

The most expedient and rapid repair techniques are those performed at chairside with composite resins. For good survival of direct repairs, isolation with a rubber dam is mandatory, both to protect the soft tissues from hazardous chemicals (e.g., the caustic porcelain etchant) and to maintain an arid field for adhesive bonding. The process involves sequential application of various chemicals, culminating with a superficial layer of composite resin filling material. Salvaging fractured porcelain crowns involves 2 distinct processes: surface preparation and surface activation of the metallic substructure, porcelain and composite resin. The protocol for porcelain repair is as follows (**Fig. 4**).

1. Preparation of surface of exposed metal or fractured porcelain by one of the following methods:
   a. diamond bur[5]
   b. air abrasion with 50-μm aluminum oxide powder[6]
   c. etching with either 9.5% hydrofluoric acid or 1.23% acidulated phosphate fluoride

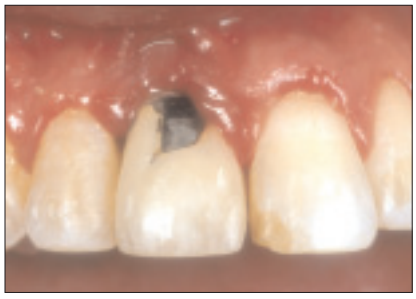

Figure 1: *Porcelain fracture at the cervical region of a porcelain-fused-to-metal crown on an implant-supported abutment. The fracture severely compromises the esthetic appearance.*

Figure 2: *Elucidating the cause of fracture determines the treatment protocol. In this case, a superficial porcelain fracture on a porcelain-fused-to-metal crown plus a horizontal fracture of the underlying abutment necessitates extraction.*

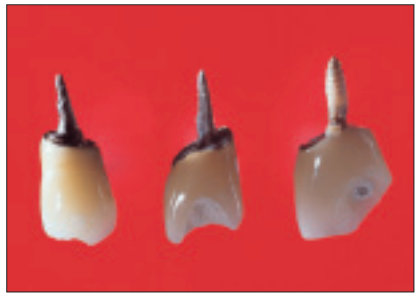

Figure 3: *Three failed post crowns showing various depths of porcelain fractures. The failure shown at left is superficial, the one shown in the middle is deeper but does not expose any metal, and the one shown at right has blatant exposure of the substructure (so-called "metal island" fracture).*

Figure 4: *Schematic representation of direct repair of a porcelain fracture on a porcelain-fused-to-metal crown with composite resin. From left to right, surface preparation with a diamond bur, porcelain etchant, silane, dentin bonding agent, condensable composite, composite connecting liquid, universal hybrid composite, composite connecting liquid and microfill composite.*

2. Surface activation:
   a. of porcelain with a silane coupling agent
   b. of metal with a dentin bonding agent containing 4-META (4-methacryloxyethyl trimellitate anhydride)
   c. of composite resin with the residual oxygen inhibition layer or a "composite connecting agent" such as CompoConnect Liquid (Heraeus Kulzer, Hanau, Germany), which not only activates the bonding surface but also reinstates the dispersion layer after modelling and curing of a composite, which allows subsequent incremental layers to "connect" during the buildup process.
3. Incremental composite layering to minimize polymerization shrinkage. The choice of composite depends on the depth of fracture. If metal is exposed, the first increment is a condensable composite, with a high filler content to mask the metal and emulate the porcelain opaque layer. This is followed by a universal hybrid, emulating the dentin porcelain.[7] Finally, a microfill is used as the superficial layer, with high polishability for superior esthetic appearance and to prevent accumulation of plaque.
4. Sealing of surface irregularities with a surface sealant such as Biscover (Bisco, Schaumburg, Ill.), which is devoid of an oxygen inhibition layer, after the finishing and polishing procedures.

The severity of the fracture will determine whether all 3 types of composites (condensable, hybrid and microfill) are necessary. If the fracture is limited to enamel porcelain in esthetically sensitive areas, a microfill alone is adequate. Conversely, deeper fractures on posterior crowns require condensable and hybrid composites for strength and resilience. ◆

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Question 4 What is the impact of nonvitality on acid etching of coronal enamel and dentin?

The answer to this question is rather simple, given that most bonding studies reported in the literature were performed on extracted teeth, which are in essence nonvital dental hard tissues. Within limits, we may comfortably apply what is known from these in vitro studies to the bonding of nonvital teeth in vivo. For example, studies on the application of the moist-bonding technique on extracted teeth have shown that it is possible to leave dentin in nonvital teeth visibly moist after acid-etching.

From a clinical perspective, the real source of concern should be the impact of *vitality* on acid etching of coronal enamel and dentin. By this, I mean the influence of the permeability of dental tissues on dentin bonding and the effect of the positive pulpal pressure that is present in nonanesthetized, vital teeth.

As far as enamel is concerned, some studies have shown a slow outward flow of fluid through the enamel of vital human teeth.[1] This can easily be demonstrated by taking an

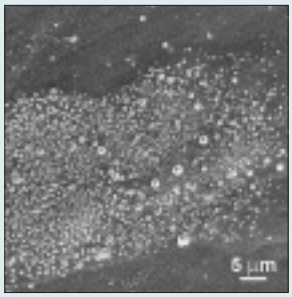

Figure 1: *Scanning electron micrograph of an epoxy resin replica of the surface of a vital central incisor of the author. Water droplets can be seen emanating from the enamel surface.*

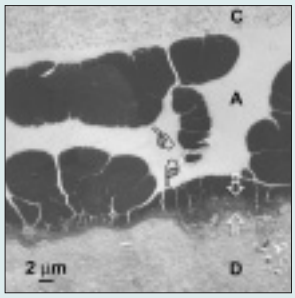

Figure 2: *Transmission electron micrograph of an undermineralized, silver-impregnated section of a single-bottle, one-step self-etching adhesive bonded to sound dentin. Extensive silver-filled water channels or water trees (pointers), caused by evaporative water flux, can be identified within the adhesive (A). Likewise, silver deposits are present within the entire hybrid layer (between the open arrows); these represent entrapment of water within the inter-fibrillar spaces of the collagen matrix. C = composite, D = sound dentin.*

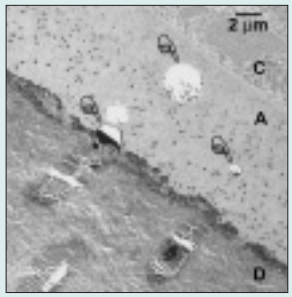

Figure 3: *Transmission electron micrograph of a section similar to that shown in* ***Fig. 2****, but in this case, a different single-bottle, one-step self-etching adhesive not containing HEMA is bonded to sound dentin. Water droplets emerging from the dentinal tubules (pointers) were caused by convective water fluxand were trapped by the adhesive (A).*

impression of one's own incisors using a slow-setting polyvinylsiloxane wash (**Fig. 1**). Although this phenomenon occurs more readily in young vital teeth, there have been no reports that this fluid flow adversely affects enamel bonding, even when hydrophobic resins such as pit-and-fissure sealants are used.

Vital dentin, in particular deep vital dentin, is highly permeable because of the presence of dentinal tubules and positive pulpal pressure. Two types of fluid movement may occur through the dentin: evaporative water flux and convective water flux. The former is induced by air blasts,[2,3] such as those that occur during air-drying of a crown preparation. Because nonvital dentin also contains water, evaporative water flux may occur irrespective of the tooth's vital status, even when smear plugs are retained within the dentinal tubules. The effect of evaporative water flux is usually not detectable clinically. Nonetheless, it may be an important issue in dentin bonding, particularly when simplified self-etch adhesives that lack hydrophobic resin coatings are applied to dentin. Although it is mandatory to remove solvents from these water-containing adhesives before light-curing, the same air-drying process induces outward evaporative water flux from the smear-layer-covered dentin. This may result in entrapment of the water vapour, which creates water-filled channels or water trees[4] within the polymerized adhesives (**Fig. 2**). These water channels permit rapid water sorption and leaching of incompletely polymerized resin components, which may in turn expedite the degradation of the resin–dentin bond. Evaporative water flux may be eliminated when bonding is performed on natural dentin tissues in which the dentinal tubules are heavily blocked by intratubular mineral deposits,[5] such as the transparent zone of caries-affected dentin or sclerotic dentin.

In the presence of smear plugs, only slow convective water flux occurs in vital dentin.[6] Even this slow convective water flux is adequate to permit the blebbing of dentinal fluid through simplified self-etching adhesives not containing 2-hydroxyethyl methacrylate (HEMA) (**Fig. 3**). Convective water flux is considerably more significant when smear plugs are removed by acid-etching. Many researchers have attempted to duplicate these convective water fluxes in vitro by bonding to dentin via perfusion at physiological pulpal pressure (pressure of about 15–20 cm water).

With simplified single-bottle adhesives, water movement by convective flux has been shown to occur both in vitro and in vivo during the polymerization of the adhesives (**Fig. 4**).[7–9] Water droplets trapped between the adhesive and the resin composite account for the apparent incompatibility that occurs when acidic versions of these adhesives are used with slow-setting, chemical-cured resin composites.[10] These water droplets act to increase stress,

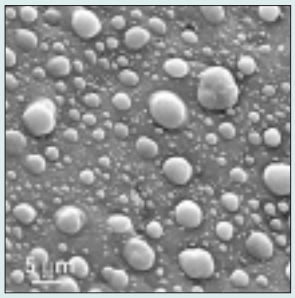

Figure 4: *Scanning electron micrograph of an epoxy replica of the surface of vital deep dentin after use of a simplified single-bottle adhesive as a dentin desensitizer. Innumerable fluid droplets can be seen along the adhesive surface.*

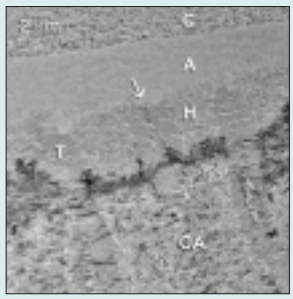

Figure 5: *Transmission electron micrograph of a silver-impregnated section of caries-affected dentin (CA) bonded with a simplified one-step self-etching adhesive. Unlike* ***Figs. 2*** *and* ***3****, no evaporative or convective water flux was present to contribute to silver deposition within the adhesive (A) or hybrid layer (H). The latter was considerably thicker than the hybrid layer that is created in sound dentin because of the highly porous nature of the CA dentin, where silver deposits can be identified (pointers). The absence of water flux was due to the occlusion of the dentinal tubules (T) by intratubular mineral deposits and caries crystals (arrow).*

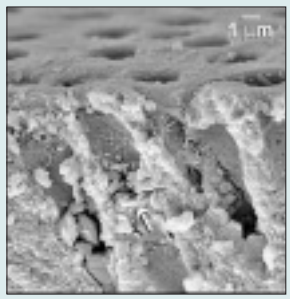

Figure 6: *Application of potassium oxalate desensitizers to sound dentin after acid-etching. Calcium oxalate crystals have formed deep inside the dentinal tubules (arrow). Occlusion of the dentinal tubules by these crystals helps to reduce the adverse effects of dentin permeability during dentin bonding.*

which may result in premature dislodging of the resin composites during function.

Clinically, convective water fluxes from vital dentin can be reduced by simulating what nature does for caries-affected dentin (**Fig. 5**) and sclerotic dentin: block the dentinal tubules before bonding. This may be achieved by applying oxalate desensitizers to acid-etched dentin.[11] The formation of calcium oxalates requires calcium ions. However, after acid-etching, the surface of dentin is completely devoid of calcium ions. When oxalate desensitizers are applied to acid-etched dentin, the oxalate ions must diffuse further down the dentinal tubules to seek calcium ions. The oxalate ions must diffuse further down the dentinal tubules to seek calcium ions. The dentinal tubules become blocked by calcium oxalate crystals, but the dentinal surface is free of crystals that might interfere with resin infiltration into the demineralized collagen matrices (**Fig. 6**). ◆

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CALL FOR ENTRIES!

• 2005 Oral Health Promotion Award •

The Canadian Dental Association (CDA) is seeking nominations for the 2005 Oral Health Promotion Award. This award recognizes individuals or organizations who have improved the oral health of Canadians through oral health promotion.

Oral health promotion aims to increase the control of individuals and communities over their oral health. It involves members of those communities and adopts a number of complimentary approaches. These include building healthy public policy, creating supportive environments, strengthening community action, developing personal skills, and increasing the prevention of oral diseases and disorders.

Programs, projects, and policies recognized by the Oral Health Promotion Award would include, but not be limited to, those that:

- meet the oral health needs of the growing number of older Canadians;
- increase the prevention of oral diseases and disorders in special populations and high-risk groups; and
- reduce inequalities by improving the oral health status of disadvantaged groups and communities.

Entry Criteria

1. Any individual or organization responsible for creating and implementing a project, program, or policy concerned with oral health promotion may submit an entry.
2. Programs or projects that are developed to promote a commercial product or service are not eligible.

Evaluation Criteria

Programs (or projects or policies) will be evaluated using the following criteria:

1. Goals and objectives of the program;
2. Oral health care needs addressed by the program;
3. Number of people served by the program, as compared to the size of the target populations;
4. Level of community and/or volunteer involvement;
5. Documented accomplishment of the program goals;
6. History of, or potential for, continuous program operation; and
7. Ease of duplication by other individuals/organizations.

The CDA Nominating Committee will review all nominations and supporting documents and make recommendations on suitable award winners to the Association's Board of Directors.

Nominations

For an application form, contact the CDA Nominating Committee at 1-800-267-6354, ext. 2273, or e-mail kacs@cda-adc.ca.

Please note that nominations for the Oral Health Promotion Award should be submitted no later than **January 25, 2005** to:

Nominating Committee
Canadian Dental Association
1815 Alta Vista Drive, Ottawa, ON K1G 3Y6

All nominations should be kept in confidence until a final decision regarding the award has been made.

Clinical Showcase

Clinical Showcase is a series of pictorial essays that focus on the technical art of clinical dentistry. The section features step-by-step case demonstrations of clinical problems encountered in dental practice. This month's article is by Dr. David French. If you would like to propose a case or recommend a clinician who could contribute to Clinical Showcase, contact editor-in-chief Dr. John O'Keefe at jokeefe@cda-adc.ca.

Extraction and Immediate Placement of the NobelPerfect Scallop Implant: A Novel Technique for Cement-Retained Provisional Crowns

David French, BSc, DDS, Dip Perio

The immediate placement of an implant into an extraction socket along with immediate placement of a temporary crown represents a significant advance in therapy for patients who have lost an upper anterior tooth. This procedure does not interfere with the patient's lifestyle and provides a functional and esthetically pleasing result that cannot be matched by a temporary removable prosthesis. Given the anxiety that patients feel on loss of a critical, highly visible tooth, they usually have high expectations for both the interim and final results.

Placement of implants into extraction sockets is still an emerging technology, and several implant designs have been developed recently for this purpose. Most are tapered implants with roughened titanium to improve primary fixation and to facilitate osseointegration. One of the most recent designs is the NobelPerfect scalloped implant (Nobel Biocare, Goteborg, Sweden). The advantage of the scalloped implant is that it positions the implant–crown margin apically at the facial and palatal surfaces, which allows for placement of the margin 1–2 mm subgingivally on the buccal, lingual and interproximal margins simultaneously. This reduces the need for deep interproximal margins (to ensure no display of the facial margins) and in theory will limit the depth of interproximal bone loss caused by the microgap between implant and prosthesis. The scallop design should be particularly beneficial when 2 adjacent implants are planned, because it may allow for preservation of inter-implant bone height.

Ideally, immediate implant placement is performed with the implant engaging the palatal wall of the socket and the implant axis directed just palatal to or at the incisal edge. The NobelPerfect implant was designed with a screw-retained temporization coping. This type of temporary coping may not be favourable in all cases, as it may lead to facial or incisal screw access that will affect the esthetic quality of the temporary crown (**Fig. 1**). We have found that the final abutment of the NobelPerfect implant, used as an interim abutment (in conjunction with the coping as a base for a resin-fabricated temporary crown), provides a better esthetic result by allowing for a cement-retained immediate temporary crown. Because the NobelPerfect system requires a fixture-level impression, this interim ("final") abutment should not be positioned with 35 Ncm torque. The use of a cement-retained temporary crown increases the cost because of the need for an additional abutment but is considered appropriate, given the high expectations of patients for good temporary esthetic appearance.

We present a case in which we chose the scalloped implant because we suspected possible long-term loss of a tooth adjacent to the site of immediate implant placement. The cement-retained temporary crown provided good esthetics, and, through preservation of the soft-tissue form, an excellent final result was achieved.

Case Report

The patient presented with radiolucent areas associated with previously retrofilled teeth 21 and 22. The prognosis for tooth 21 was hopeless and that of tooth 22 was questionable; however, the patient opted to retain tooth 22, as it was symptomless. A bridge from tooth 11 to tooth 22 was an option; however, the uncertain endodontic prognosis for tooth 22 precluded this as a valid long-term choice. An immediate implant technique was chosen to preserve the soft-tissue contours. The patient had a high smile line and was concerned about the impact of a partial denture on her speech if traditional extraction and delayed implant placement were performed (**Figs. 2** and **3**).

The NobelPerfect scallop implant was selected to preserve the papilla in anticipation of the eventual loss of tooth 22 and its replacement with an implant. The use of a scallop implant is beneficial primarily in situations where adjacent implants are present because it allows preservation of interdental bone.

To preserve the thin buccal plate, the extraction was performed without incisions or a flap; a buccal flap would compromise the vascularity and lead to recession, and elevation of the papilla might lead to some loss of papilla height. The use of a periotome is critical for this type of extraction, as it requires minimal luxation and thus allows preservation of the buccal plate. As shown in **Fig. 4**, the buccal plate was intact about 2 mm below the facial gingival margin.

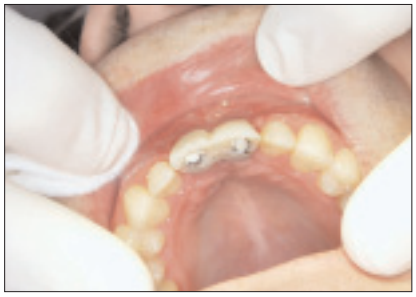

Figure 1: *The conventional screw-retained temporization coping of the NobelPerfect implant is convenient only if the access hole is lingual to the incisal edge.*

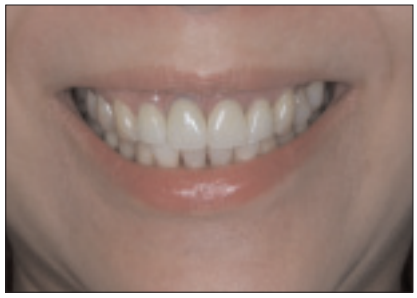

Figure 2: *Pretreatment photograph showing natural high smile line.*

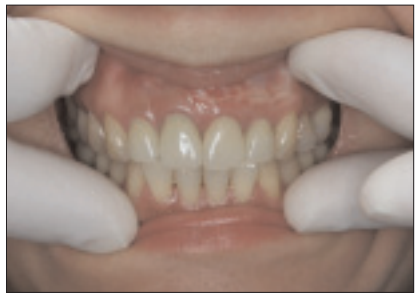

Figure 3: *Pretreatment photograph with lips retracted. Vestibular scar tissue from the previous retrofilling is visible.*

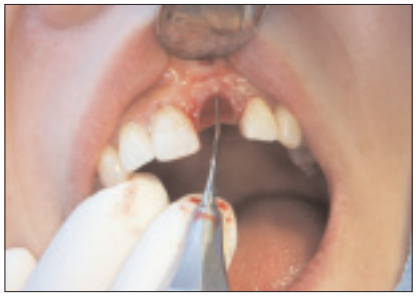

Figure 4: *Extraction of tooth 21 with assistance from periotome device allows preservation of the buccal plate.*

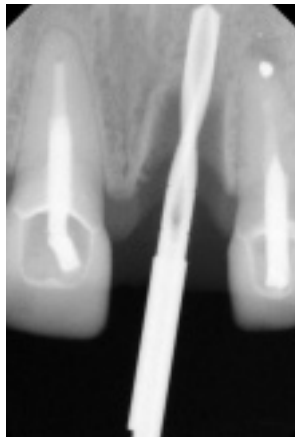

Figure 5: *Pilot drill engaging the bone beyond the apex of the socket.*

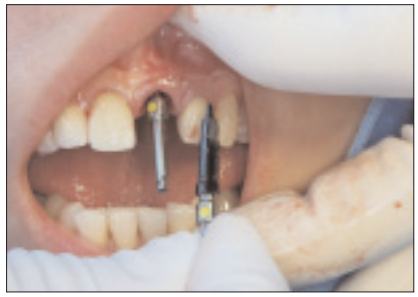

Figure 6: *The use of a tapered drill reduces the risk of perforation of the apical undercut during the osteotomy procedure.*

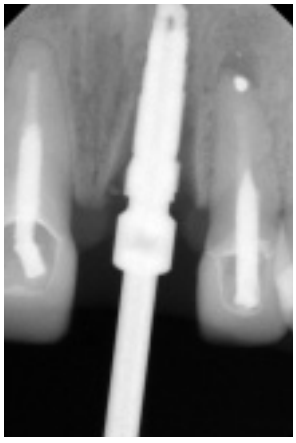

Figure 7: *Tapered drill in socket.*

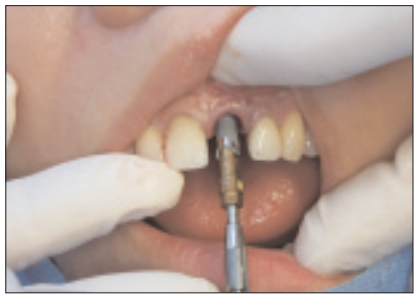

Figure 8: *Insertion of a tapered scallop implant in socket. The scallop design allows for only 2 positions of rotation on final insertion.*

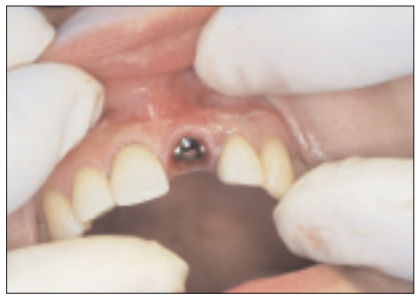

Figure 9: *The implant is seated with the facial implant shoulder positioned 1–2 mm subgingivally from the facial margin. The insertion torque is sensitive to technique; it must be adequate for immediate loading (over 35 Ncm) but not so great that it causes compression necrosis.*

For immediate implant placement, the pilot hole is started on the palatal wall of the extraction socket to avoid perforating the undercut that is typically found at the apex of the maxillary anterior teeth (**Fig. 5**). A tapered drill (**Figs. 6** and 7) is recommended, as it has a narrow apical profile, which reduces the risk of perforation of the buccal plate beyond the apex of the socket. The insertion of all tapered implants is sensitive to technique, as compression necrosis may arise if excess torque is used when the implant is inserted. Placement of the NobelPerfect implant is particularly difficult, because the implant has only 2 positions of rotation that are clinically acceptable (**Figs. 8** and **9**) and the implant shoulder is equivalent to the crown margin, so depth of placement is critical.

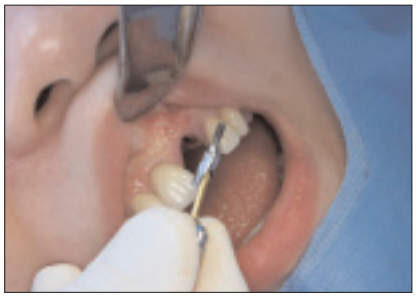

Figure 10: *The interim "final" abutment with a temporary abutment screw.*

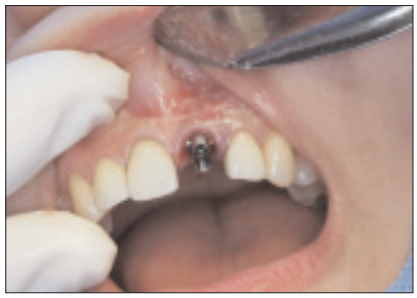

Figure 11: *The angled abutment is in position, and the screw has been placed with minimal insertion torque of about 10 Ncm.*

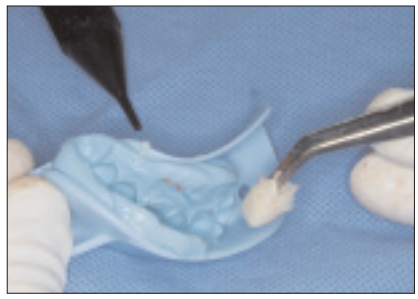

Figure 12: *The Protemp crown on removal from the bite registration placed over the burnout coping.*

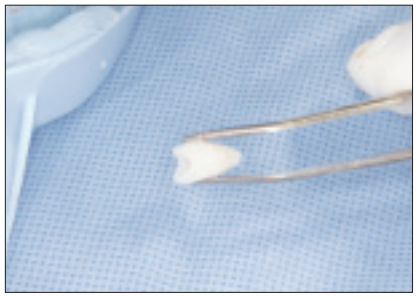

Figure 13: *The Protemp crown after removal of the flash. Note the scalloped form of the temporary crown.*

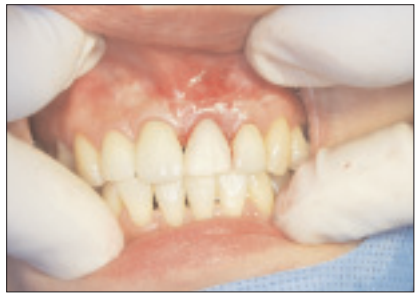

Figure 14: *The temporary crown seated in place.*

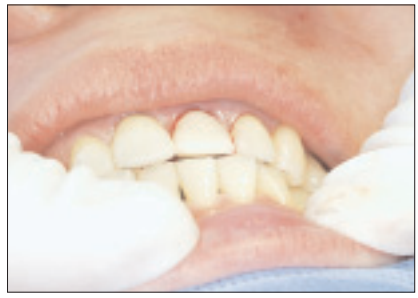

Figure 15: *The temporary crown must be checked for occlusal clearance.*

The implant should be placed with a small gap between the facial surface of the implant and the buccal plate. If this is not done, the buccal plate may be compressed, which could result in loss of the buccal plate and significant recession.

The manufacturer now provides a screw-retained temporary abutment for the NobelPerfect system, but when this case was treated, such a screw-retained temporary abutment was not available. We have found that using a final abutment with the burnout coping as a base worked well for temporization; however, a second "final" abutment must be purchased for the laboratory to use after a fixture impression is made. This cement-retained system works better than the screw-retained temporary crown designed for the NobelPerfect system, as it alleviates problems related to screw access.

If the implant is placed ideally for soft-tissue support, the point of screw access will be at the incisal edge (**Figs. 10** and **11**); therefore, the interim "final" abutment was used in this case to avoid the need for a screw access hole. There are 2 abutment selections: straight and angled. The selection of abutment type is made at chairside to allow the best compromise between facial clearance for porcelain thickness and occlusal clearance. The abutment is not torqued into position at a full 35 Ncm so that the abutment can be changed after the laboratory procedures.

Before the extraction, an impression was taken with bite registration material in a stock tray; this impression was used as a template for the temporary crown. The burnout coping provided for the selected abutment was scored to improve retention of the composite and was placed on the abutment intraorally. The temporary crown was made by injecting Protemp II composite [3M ESPE, St. Paul, Minn.] into the bite registration and seating the impression over the abutment. A direct methylmethacrylate temporary restoration is not advisable because of the risk of heat damage to the implant (**Figs. 12** and **13**).

The temporary crown was seated in place with a minimal amount of cement, to reduce the possibility of cement being forced into the residual gap between the socket bone and the implant (**Fig. 14**). The temporary crown was kept out of occlusion, and the patient was counselled to avoid hard foods for 4 weeks (**Figs. 15**). The patient must have no parafunctional habits and must have a favourable occlusion for immediate placement of a provisional crown. The patient must be reminded that although the implant feels normal and is not painful, implant fixation is weakest between 2 and 3 weeks after the procedure, as the bone undergoes initial resorption and remodelling before final osseointegration. In this case, the patient was seen for standard 1-week (**Fig. 16**) and 3-week postoperative follow-up.

At 12 weeks a radiograph (**Fig. 17**) was obtained to confirm successful integration and bone fill in the socket (**Fig. 18**). The temporary crown and abutment were

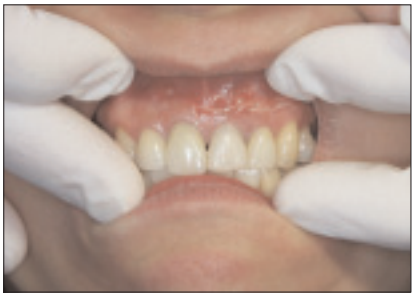

Figure 16: *One week after the procedure, the tissues were healthy, there was no recession, and the patient reported no pain.*

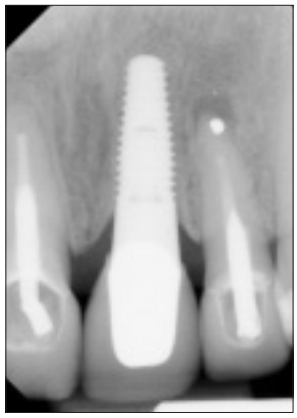

Figure 17: *Twelve weeks after the procedure, there is successful integration and bone fill in the socket.*

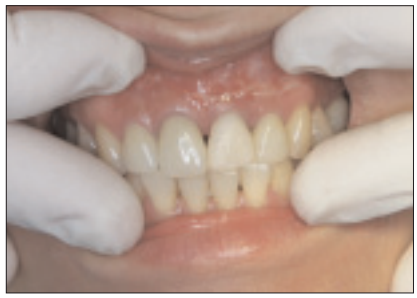

Figure 18: *Temporary crown at 12 weeks after the procedure; no recession is visible.*

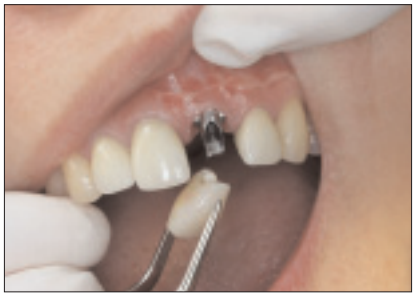

Figure 19: *The temporary crown and the abutment were removed, and the implant torque was tested to 35 Ncm.*

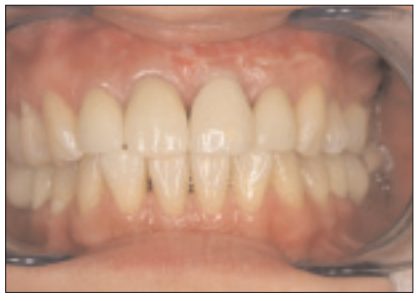

Figure 20: *Final crown (photo courtesy of Dr. Roy Andrassy).*

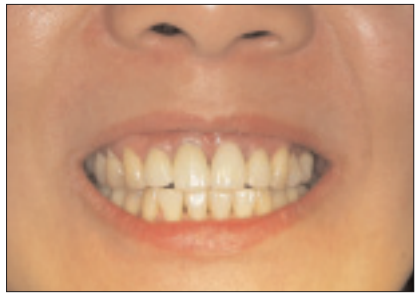

Figure 21: *Eight months after the procedure, the soft tissues are stable and healthy.*

removed (**Fig. 19**) to allow the surgeon to torque test the implant; the abutment and the temporary crown were then replaced with minimal insertion torque, and the patient was referred to the restorative dentist. The restorative dentist removed the temporary crown and abutment for the final fixture-level impression. The abutment and the temporary crown were re-inserted while the laboratory prepared the fixture analogue, final abutment and final crown.

The laboratory returned the final crown with a "new" final abutment and abutment screw. The restorative dentist removed the interim abutment and screw and returned these materials to the surgical office. The final abutment was seated to 35 Ncm torque with a new abutment screw. The access hole was filled, and the final crown cemented in place (**Fig. 20**).

At the 8-month postoperative follow-up, the soft tissue at the implant site was healthy, with normal 2–3 mm pocket depths and no change in gingival margin position (**Fig. 21**).

Immediate implant placement into extraction sockets using the NobelPerfect implant has been a beneficial and predictable procedure in our practice. However, the screw-retained temporary system provided with the NobelPerfect implant can result in compromised temporary esthetics in some cases. We have developed a novel technique using a cement-retained provisional crown. The case presented here provides an excellent example of a cement-retained alternative to the conventional screw-retained temporization system provided for the NobelPerfect implant. ◆

Dr. David French *is a periodontist in full-time private practice in Calgary, Alberta. He is the director of the Alberta Dental Implant Academy, a not-for-profit organization of specialists dedicated to providing education on implants to the public and the dental profession. Information on ADIA courses can be found at www.adia.ca.*

Correspondence to: *Dr. David French, Alberta Dental Implant Academy, Suite 212, 3625 Shaganappi Tr. N.W., Calgary, AB T3A 0E2. E-mail: davidfrenchperio@shaw.ca.*

The author has no declared financial interests in any company manufacturing the types of products mentioned in this article.

CDSPI Reports

GETTING BETTER ALL THE TIME

Enhancements Coming to Your Insurance Program in 2005

By Susan Roberts

There is good news in 2005 for participants in the Canadian Dentists' Insurance Program — a program which provides a range of personal, professional and legal/liability insurance coverages designed especially for dental professionals and their families.

First, the majority of the Program's plans will not have rate increases. Secondly, 2 of the Program's plans will see significant enhancements. Third, when you call our licensed, non-commissioned advisors for insurance planning advice, you'll be able to gain a new level of personal service.

No Premium Increases for Life and Health Plans

All of the Insurance Program's plans that are underwritten by Manulife Financial (which includes life insurance coverages, as well as Long Term Disability Insurance, Office Overhead Expense Insurance, Critical Illness Insurance, Accidental Death and Dismemberment Insurance and Dental Office Staff Insurance) will have no premium increases*. One of the Manulife plans will have a name change in 2005 — Dependents' Life Insurance (which provides life insurance protection for a dentist's spouse and/or children) will be called Family Life Insurance.

Speaking of life insurance, about 6,400 participants in the Program's Basic Life Insurance plan were recently mailed surplus distribution cheques. The cheques, which were distributed by CDA (which sponsors the Insurance Program with 9 provincial dental associations co-sponsors), represented the eligible participants' share in a surplus of about $2 million — due to the plan's favourable claims experience in 2003. This distribution highlights just one more way the Insurance Program provides dentists with advantages not available through privately run insurance plans.

Outside of the life and health plans, premiums for the Program's Personal Umbrella Liability and Legal Expense Insurance plans will also remain unchanged from 2004's rates. Due to claims experience, 2 plans will see premium increases — TripleGuard™ Insurance and Malpractice Insurance.

Legal Expense Coverage Becomes Customizable

Beginning in 2005, you'll have 3 choices when obtaining Legal Expense Insurance protection. The plan is designed to make it financially easier to launch or defend specific legal actions, by providing coverage for costs such as lawyer fees and the expense of expert witnesses.

In the past, the plan charged a single premium to cover 2 different categories of legal actions. It provided protection for specific legal actions arising out of your practise of dentistry (for example, if you were called to appear at an investigation launched by your dental board, concerning your licensing or fitness to practise). The plan also provided broader protection for dentists and their eligible family members when launching or defending many personal legal actions (such as a dispute over a real estate transaction or a personal injury claim).

But in 2005, dentists will be able to customize their coverage by choosing 1 of 3 levels of Legal Expense Insurance protection: **Professional Coverage** only, **Personal/Family Coverage** only or **Professional and Personal Coverage** (which provides both types of coverage in one economical package).

If you wish to economize on premiums, you can choose to be protected by either Professional Coverage only or Personal/Family Coverage only. If you're an existing Legal Expense Insurance plan participant and you wish to maintain both types of coverage, you won't have to pay a higher premium next year (provided you choose the same deductible). The cost of 2005's Professional and Personal Coverage package will be the same as the plan's 2004 premium.

Note: Those who obtained Legal Expense Insurance coverage in 2004 will be invoiced for the Professional and Personal Coverage package in 2005. If you're an existing participant in the plan and you wish instead to obtain either Professional Coverage only or Personal/Family Coverage only, please notify Professional Guide Line Inc. (or CDSPI if you live in Quebec or PEI).

Protection for Your Practice — Inside and Out

For dentists who operate their practices in buildings they own, the Insurance Program now provides building insurance — an option available for an additional premium under the TripleGuard™ Insurance plan.

While a component of the core TripleGuard™ Insurance plan protects your office contents (such as your dental equipment and furniture), the Building Insurance Option provides added protection by covering your building's structure — such as the walls and roofing.

Since building coverage became available through the Insurance Program, we've received many

Continued on page 806

Certainty

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**The Canadian Dentists' Insurance Program is sponsored by the CDA and co-sponsored by participating provincial dental associations. The Canadian Dentists' Investment Program is sponsored by the CDA.*

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CDA Fund Performance (for period ending October 31, 2004)

	MER	1 year	3 years	5 years	10 years
CDA CANADIAN GROWTH FUNDS					
Aggressive Equity fund (Altamira)	up to 1.00%	6.3%	17.0%	11.7%	9.0%
Common Stock fund (Altamira)	up to 0.99%	14.7%	6.1%	4.8%	6.8%
Canadian Equity fund (Trimark)†[1]	up to 1.65%	10.8%	8.0%	6.9%	8.0%
Special Equity fund (KBSH)†[2]	up to 1.45%	8.1%	5.8%	0.1%	14.2%
TSX Composite Index fund (BGI)††	up to 0.67%	15.4%	10.1%	5.1%	8.8%
CDA INTERNATIONAL GROWTH FUNDS					
Emerging Markets fund (KBSH)	up to 1.45%	0.4%	13.5%	7.5%	n/a
European fund (KBSH)	up to 1.45%	-8.6%	-13.2%	-9.0%	n/a
International Equity fund (KBSH)	up to 1.45%	-7.7%	-7.1%	-8.5%	n/a
Pacific Basin fund (KBSH)	up to 1.45%	-9.0%	-2.9%	-17.6%	n/a
US Equity fund (KBSH)†[3]	up to 1.20%	-5.9%	-12.1%	-6.1%	8.5%
Global fund (Trimark)†[4]	up to 1.65%	-1.2%	3.1%	5.4%	9.0%
Global Stock fund (Templeton)†[5]	up to 1.77%	6.3%	-1.0%	-0.7%	n/a
S&P 500 Index fund (BGI)††	up to 0.67%	0.2%	-5.5%	-6.5%	9.2%
CDA INCOME FUNDS					
Bond and Mortgage fund (Fiera)	up to 0.99%	5.8%	5.0%	6.3%	7.2%
Fixed Income fund (McLean Budden)†[6]	up to 0.97%	6.5%	5.2%	7.0%	8.4%
CDA CASH AND EQUIVALENT FUND					
Money Market fund (Fiera)	up to 0.67%	1.7%	2.0%	3.1%	3.9%
CDA GROWTH AND INCOME FUNDS					
Balanced fund (KBSH)	up to 1.00%	5.7%	2.1%	2.9%	7.2%
Balanced Value fund (McLean Budden)†[7]	up to 0.95%	9.8%	6.1%	6.9%	9.4%

CDA figures indicate annual compound rate of return. All fees have been deducted. As a result, performance results may differ from those published by the fund managers. CDA figures are historical rates based on past performance and are not necessarily indicative of future performance. The annual MERs (Management Expense Ratios) depend on the value of the assets in the given funds. MERs shown are maximum.

† *Returns shown are those for the following funds in which CDA funds invest: [1]Trimark Canadian Fund, [2]KBSH Special Equity Fund, [3]KBSH US Equity Fund, [4]Trimark Fund, [5]Templeton Global Stock Trust Fund, [6]McLean Budden Fixed Income Fund, [7]McLean Budden Balanced Value Fund.*

†† *Returns shown are the total returns for the index tracked by these funds.*

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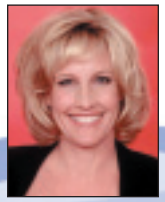

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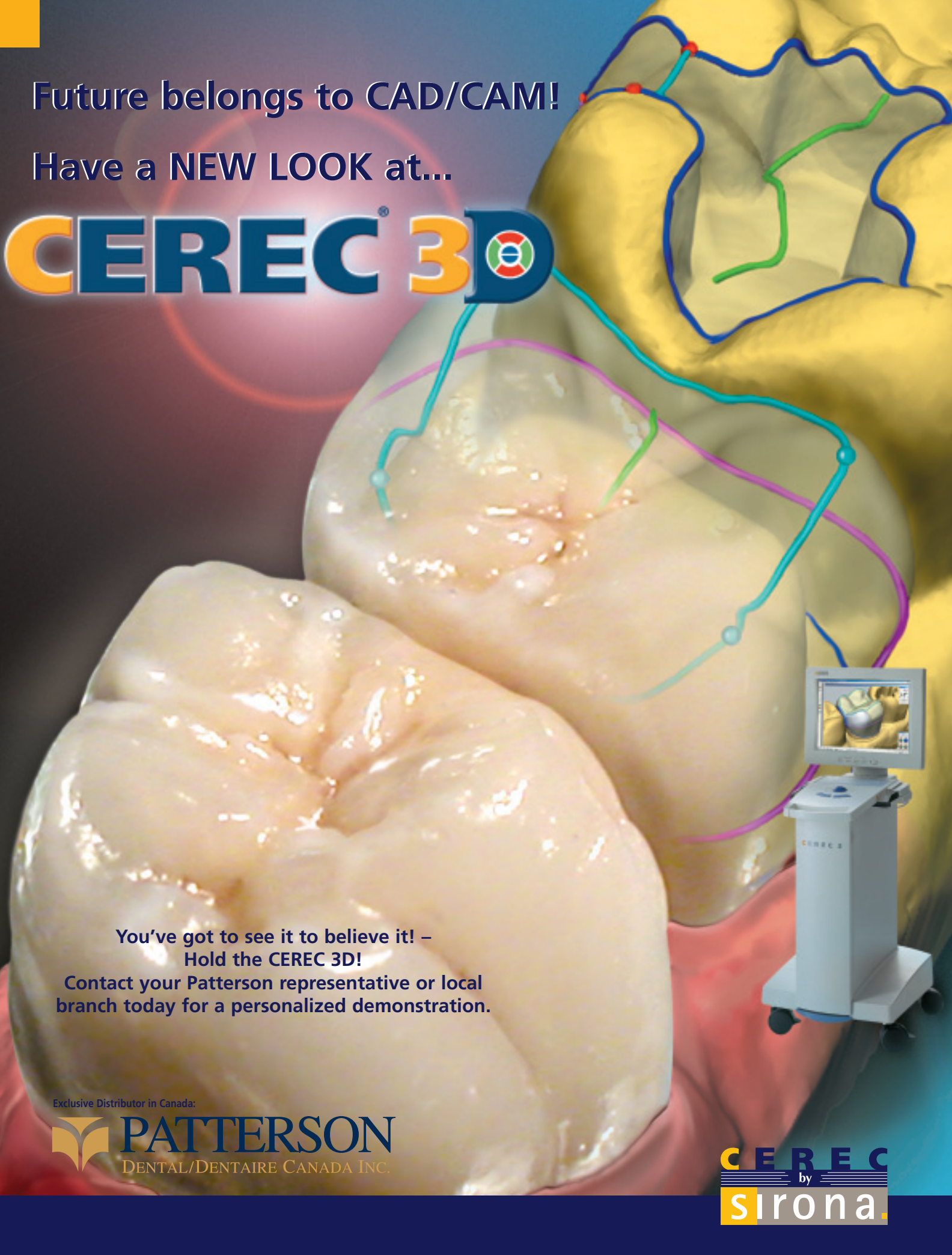

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D1598

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BRITISH COLUMBIA - Chilliwack: Full-time associate position available to dentist committed to continuing education/excellence in patient care. Area offers year-round recreation including skiing, boating, hiking, etc., 100 km east of Vancouver, mild climate. Present associate has busy practice and is leaving the area. There is potential for partnership. Reply to: Dr. Michael Thomas, 102-45625 Hodgins Ave., Chilliwack, BC V2P 1P2; tel. (604) 795-9818 (res.), (604) 792-0021 (bus.). D1553

BRITISH COLUMBIA - Invermere on the Lake: Lifestyle in paradise! Ski in the winter at Panorama Mountain Village and enjoy the lake in the summer. Full-time associate required, ultimately leading to partnership. Well-established family practice in a newly built office at a thriving resort town. Promising opportunity for right individual. Tel. (250) 342-0776, e-mail rskanan@telus.net. D1561

BRITISH COLUMBIA - Terrace: Third dentist needed for a busy practice with 2 experienced dentists and 4 hygienists. Periodontist and oral surgeon plus anesthetist schedule regular clinics in the office. In an area of exceptional natural beauty with outdoor recreation and wilderness adventure opportunities moments away, yet multiple daily flights to Vancouver provide easy access to city getaways. Our flexible practice may be the perfect fit for you if you are just starting out and seeking opportunities to learn new skills, or if you would like to slow down and enjoy a lower-stress lifestyle. Preference given to applicants willing to make a longer commitment, but shorter-term or part-time arrangements could be considered. For more information, please contact: Bonnie Olson, tel. (250) 638-0841. D1547

BRITISH COLUMBIA - Nanaimo: Associate wanted for extremely busy and established dental practice. May lead to long-term commitment (buy in) for the right person. Join a wonderful office with long-term committed staff members. Enjoy the enviable lifestyle that Vancouver Island has to offer. Please call Dr. Lynn Lueke, Dr. Patricia Crosson, (250) 754-1949. D1541

BRITISH COLUMBIA - Vancouver: Specialist periodontal practice in prime Vancouver location seeks a periodontist to associate with our progressive growing group. We emphasize ideal periodontal, dental implant, prosthetic and esthetic treatment. Close to ocean, mountains and Whistler. Long-term association for the right person. Fax resume to (604) 913-1610. D1577

MANITOBA - Winnipeg: Full- or part-time associate position available for established dental practice. Please fax resume to (204) 897-6964 (before 5 p.m. - Central Standard Time). D1618

MANITOBA - Killarney: Full-time associate to replace long-term associate leaving January 2005. To join one dentist and two hygienists in this extremely busy office and work in a relaxed atmosphere with great support staff, very competitive remuneration and full schedule from day one. Killarney, a lakeside resort town, population 2,500 and drawing area of about 7,000, is 1 hour south of Brandon and 2 hours from Winnipeg. For a great family life and outdoor lifestyle, fax resume (204) 523-8670, tel. (204) 523-4601. D1625

MANITOBA - Winnipeg: We are seeking a compassionate, hard-working associate who has good leadership skills and a commitment and ability to provide excellence in dental care. Oral surgery experience required. We offer a terrific working environment in our modern office with an exceptional support staff and strong preventive program. Buy-in for the right individual. Call Dr. Brad Stevens, (204) 257-1891, fax CV to (204) 255-9564. D1626

NORTHWEST TERRITORIES - Fort Smith: Associate dentist for Fort Smith Dental Clinic. Utilize the full range of your skills working in our modern, well-equipped clinic with skilled and experienced staff. The centre for Wood Buffalo National Park and located beside world-class whitewater of the Slave River rapids, Fort Smith is an ideal location if you love the outdoors. This is a full-time position offering an established patient base and an excellent compensation package. Opportunity for future partnership and/or succession. Tel. (867) 872-2044, fax (867) 872-5813, e-mail whill@auroranet.nt.ca or send resume to: Dr. Hill, Fort Smith Dental Clinic, PO Box 1047, Fort Smith, NT X0E 0P0. D1191

NORTHWEST TERRITORIES - Yellowknife: Associate needed to join an established, very busy, modern dental clinic (6 dentists) in a thriving community - the diamond capital of North America. The clinic offers all modern equipment including intraoral cameras, abrasion units, etc., with an excellent and friendly support staff, providing very high-quality dentistry, with the emphasis on quality rather than quantity. This is an excellent opportunity for anyone wishing to enjoy a wonderful lifestyle whilst practising dentistry at its best. Please send resume to: Administration, PO Box 1118, Yellowknife, NT X1A 2N8; tel. (867) 873-6940, fax (867) 873-6941. D1159

NOVA SCOTIA - Halifax: Associate required for a busy family practice. Please fax resume to (902) 443-5614 or e-mail dentalstaff@hotmail.com. D1542

NOVA SCOTIA - South Shore: Join Dr. Kim Mailman (Dalhousie 1984) and his excellent team in the seaside town of Shelburne. Only 2 hours from Halifax, Shelburne has the most desirable microclimate in Nova Scotia, adjacent to one of the world's best natural harbours. This full-time associateship has future buy-in potential in an extremely busy office. Practise all aspects of dentistry and enjoy the relaxed lifestyle of the beautiful south shore of Nova Scotia. Tel. (902) 875-4441. D1534

NUNAVUT - Iqaluit: Associate position(s) available for immediate start. Established clinic offers generous package and full appointment book to associates. All round clinical skills are your ticket to a wide range of recreational activities! No travel required and housing available in Canada's newest and fastest growing capital city. Please apply to: Administration, PO Box 1118, Yellowknife, NT X1A 2N8; or tel. (867)873-6940, fax (867) 873-6941. D1497

ONTARIO - Ottawa: Energetic and highly motivated associates needed for modern and progressive dental clinics in

Ottawa. Bilingualism is an asset. Please fax your resume to (613) 523-0088. D1619

ONTARIO - Central Niagara Region: We are seeking an associate dentist for a family-oriented, well-established practice in the Niagara Peninsula. We offer excellent support staff and hygiene program, in a newly renovated location. Position is either full or part time. Please fax your resume to the attention of the office manager, (905) 734-9878. D1591

ONTARIO - West of Toronto: Excellent associate dentist opportunity you don't want to pass up! Full time / part time. Working in a well-established practice with a positive environment and a foundation based on respect, equality and valuing others. From being busy and fully booked on day 1, to ongoing professional development, you will have the chance to practise dentistry at its finest! This modern and progressive practice will keep you exposed to many different aspects of dentistry, like cosmetics, implants and the ability to refer within, as we have many specialists working alongside of us. If you are a team player and are looking for the perfect practice, fax resume to (905) 846-8854. D1568

ONTARIO - Brockville and Morrisburg: Experienced associate required for 1 of 2 well-established, busy practices. Enjoy a small-town atmosphere and the scenic beauty of the 1000 Islands region with easy access to large city centres. Only 30 minutes to Kingston and 60 minutes to Ottawa. For more information contact: Dr. George Christodoulou, Altima Dental Canada, tel. (416) 785-1828, ext. 201, e-mail drgeorge@altima.ca. D1269

ONTARIO - North Toronto: Pediatric dentists wanted immediately for full-time/part-time positions in busy, modern North Toronto pediatric dental practice with in-office general anesthesia. Future buy in possible. Reply to: CDA Classified Box # 2842. D1543

ONTARIO - Fort Frances: Full-time associate needed for extremely busy family dental practice. Strong hygiene program. Newly renovated building with state-of-the-art computerized operatories, intra-oral cameras, digital x-ray, electronic handpieces etc. Excellent staff and working conditions. Practice on American border in northwestern Ontario. Ideal for person with an outdoor, active lifestyle. Emphasis on caring attitude and good-quality dentistry. An outstanding opportunity for the right candidate to become a future partner, if mutually agreeable. Present associate leaving to further education. Please call (807) 274-5365 or (807) 274-5370 (days), (807) 274-5549 (evgs. and wknds.) or fax (807) 274-1738. Write to: 1201 Colonization Rd. W, Fort Frances, ON P9A 2T6. D1516

ONTARIO - Northern: Full-time associate. Our team is currently seeking a disillusioned dentist. We require a practitioner who's still looking for the dream job or whose dream job has turned out to be nothing as expected. If you find you're spending more time sitting in the waiting room reading magazines or newspapers as opposed to treating patients, something is wrong! We are looking for an applicant who wants to relocate outside of the Greater Toronto Area (specifically northern Ontario). Someone who is interested in befriending our patients and becoming part of our community. We require a confident professional who will be excited about successfully practising all facets of dentistry, an individual who will respect/appreciate our team and expect the same back. The applicant should revel at only having to commute 5 minutes to work and be glad for the opportunity to set his or her own schedule. If you want to be part of a community that provides you the opportunity to be a successful and well-respected professional and gives you a viable choice between town living or lakeside dwelling, this may be for you. Should you meet the above criteria please e-mail your resume to natgrant@ntl.sympatico.ca or fax to (705) 335-6556. The successful applicant can expect high patient volume, low downtime, low receivables and high remuneration. D1597

QUEBEC - Eastern Townships: Windsor, near Sherbrooke. We are giving an associate the opportunity to become part of a mature and fully competent team. Pleasant and motivating work atmosphere. Please fax resume to (819) 845-7854. Tel. Dr. Jacques Vaillancourt, (819) 845-3080. D1371

SASKATCHEWAN - Regina: General dentistry practice position offered with North Regina Medical and Dental Clinic. Excellent earning capacity and opportunity for associate to establish practice in the city of Regina without any financial risk. Excellent terms. For details contact: Dr. Ronald Katz, tel. (306) 924-1494, fax (306) 585-5833, e-mail rkatzclinic@accesscomm.ca. D1600

YUKON TERRITORY - Whitehorse: Come for the beauty - mountains, lakes and rivers. Or come for the opportunity to practise dentistry where you are appreciated and well compensated. Have a look at our Web site www.klondike-dental.com. Tel. (867) 668-4618, fax (867) 667-4944. D1422

TEXAS - Dallas: Growing dental company in and around Dallas is seeking full-time associates. Must be licensed or qualified to be licensed in Texas. Highest compensation package in the state; earn $200,000 - $400,000. Company to handle all immigration matters. Please call (630) 788-7167. D1513

VERMONT, US - Burlington: Beautiful Burlington, Vermont, is calling you! Established practice is seeking a dentist for a Monday through Friday work week. Full-time compensation includes: competitive salary, bonus potential and a full benefits package (including a 401K plan with matching funds). Part-time candidates will be considered. Positions also available in other states. For a position with a future call Brian Whitley, (800) 313-3863, ext. 2290 or e-mail bwhitley@affordablecare.com. D1604

VERMONT, US: Dentists and oral surgeons. Opportunities for general dentists in Rutland, Montpelier and Lake Champlain areas. Openings available for employment, private practice and practice acquisitions. Enjoy the splendor of the Green Mountains and Lake Champlain, all part of the unbeatable Vermont lifestyle. Contact: Lynn Harris, tel. (800) 288-1730, fax (518) 266-9289, e-mail lynnharris@harrisbrand.com. D1538

HONDURAS - Roatan, Bay Islands: Wanted - dentists to volunteer. Combine volunteer dentistry in a tropical paradise with scuba diving on the best reef in the Western Hemisphere. Please respond to: Peggy Stranges, e-mail peggystranges@yahoo.com D1599

SAIPAN - COMMONWEALTH OF THE NORTHERN MARIANA ISLANDS: "Opportunity to live and work in paradise". Learn to scuba dive, wind surf and snorkel. Excellent location for children. Great private schools at affordable rates. Lower tax rates than Canada and U.S. Pay is in U.S. currency. Year-round climate of 78 to 85 degrees Fahrenheit. Laid-back island lifestyle. We are looking for an associate general dentist who has excellent chair-side manners, works well with families and children. Must be able to work with diverse cultures. Three years minimal experience. Must possess good endo, crown and bridge skills. Willing to see a minimum of 8 to 12 patients per day. New 4-operatory clinic with state-of-the-art equipment and fully computerized. After first year, potential partnership or profit sharing available. Full benefits and paid vacation included in package. Contact: Scot Thompson, Clinic Manager, PMB 807, PO Box 10001, Saipan, MP 96950; tel. (670) 233-1100, (670) 235-4577 (res.), fax (670) 233-2233, e-mail dentalcare@saipan.com or rod.stewart@saipan.com. Must send last three employer references. D1605

Equipment Sales & Service

DENTAL X-RAY MACHINE FOR SALE: MDT model HDX. Excellent condition, rarely used. HARP tested July 30, 2004. $3,000. Dr. Bill Cox, London, tel. (519) 645-2153. D1616

CDSPI Report
Continued from page 796

enquiries from dentists who recognize the advantages of obtaining contents and structure coverage from a single source. Along with one-stop convenience, you can avoid potential stress in the event you file a claim — by not having to deal with 2 different insurance companies. The cost of the Building Insurance Option varies from building to building. Call for a Building Insurance application or download it at www.cdspi.com/tripleguard-insurance.

For That Personal Touch

When you call a licensed, non-commissioned insurance agent at Professional Guide Line for assistance with your 2005 Insurance Program coverage planning, you'll be speaking with one advisor who will be personally assigned to your account. This can make your insurance planning consultations more efficient — as you'll be speaking with one professional who will have an ongoing understanding of your specific needs.

To ensure you aren't over or under-insured in 2005 — and that you'll be protected with the right types of coverages and coverage amounts best suited to you, call us for a no-cost review of your Insurance Program portfolio.

***Susan Roberts** is the service supervisor for the Canadian Dentists' Insurance Program. For insurance planning advice**, you can speak at no cost to a licensed, non-commissioned insurance professional at Professional Guide Line Inc. — A CDSPI Affiliate, by dialing 1-877-293-9455 (toll-free) or 416-296-9455, extension 5002.*

The Legal Expense Insurance, Malpractice Insurance and Personal Umbrella Liability Insurance plans are underwritten by ING Novex Insurance Company of Canada. TripleGuard™ Insurance is underwritten by Aviva Insurance Company of Canada.

** If you have moved into a different age category, your invoice may reflect a premium for a higher age bracket.*

***Restrictions may apply to advisory services in certain jurisdictions. Residents of Quebec and PEI, please call CDSPI at 1-800-561-9401, extension 5000, for insurance plan information.*

CDSPI *Information provided by Canadian Dental Service Plans Inc.*

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Listerine helps reduce and prevent the progression of gingivitis when used in a properly applied program of oral hygiene and dental care. CANADIAN DENTAL ASSOCIATION

Fluoride Listerine helps reduce and prevent the progression of gingivitis and prevents tooth decay when used in a properly applied program of oral hygiene and dental care. CANADIAN DENTAL ASSOCIATION

Listerine was shown to reduce interproximal gingivitis comparable to flossing†

† Gingivitis scores at interproximal sites were reduced 7.9% by brushing and rinsing with Listerine, vs. 8.3% by brushing and flossing ($p<0.001$ vs. control group) in a 6-month Canadian study meeting CDA guidelines. Patients (n=297) with mild-to-moderate gingivitis were randomized in three treatment groups. Plaque and gingivitis were scored at baseline, 3 months & 6 months. Diaries used to track oral hygiene and compliance assessments done monthly.[1]

1. Sharma, N.C. et al, Comparative effectiveness of an essential oil mouthrinse and dental floss in controlling interproximal gingivitis and plaque. American Journal of Dentistry 2002.

Indications: *Listerine Antigingivitis-Antiplaque-Antiseptic-Antitartar-Anticaries oral rinses* kill the germs that cause gingivitis, plaque and bad breath. Tartar Control fights tartar build-up better than brushing alone (when compared to regular toothpaste). Fluoride Listerine prevents caries.

Cautions: Keep out of reach of children. Do not swallow. In case of accidental ingestion, contact a Poison Control Centre or doctor immediately.

Dosage: Adults and Children 12 years and older: Listerine Antiseptic Mouthwash: Rinse full strength with 20 mL for 30 seconds twice a day; gargle to relieve sore throats due to colds. Tartar Control: Twice daily, brush with your regular toothpaste for 1 minute, rinse with water then rinse full strength with 20 mL Tartar Control Listerine for 30 seconds; Fluoride Listerine: Rinse full strength with 20 mL for 30 seconds twice a day. Do not eat or drink for 30 minutes after use. **Medicinal Ingredients:** All Listerine products contain eucalyptol 0.091% w/v, thymol 0.063% w/v, menthol 0.042% w/v. Tartar Control Listerine also contains zinc chloride 0.09% w/v. Fluoride Listerine also contains sodium fluoride 0.022% w/v. **Non-medicinal Ingredients:** All Listerine products contain alcohol, benzoic acid, methyl salicylate, poloxamer, sodium benzoate, water. Original Listerine also contains caramel. All others also contain flavour, propanol, saccharin sodium, sorbitol. Cool Mint Listerine contains FD&C green No. 3. Fresh Burst Listerine and Fluoride Listerine contain D&C yellow No. 10, FD&C green No. 3. Tartar Control contains FD&C blue No. 1. **NOTE:** Cold temperatures may cloud this product; its efficacy will not be affected. **SUPPLIED:** Bottles of 250, 500, 1000 and 1500 mL (no 500 mL for Fluoride).

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