



JCDA

Journal of the Canadian Dental Association

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January 2004



Painting by Dr. Jack Sherman

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Third Molars and Mandibular Angle Fractures
Weight of Dental Amalgam Restorations
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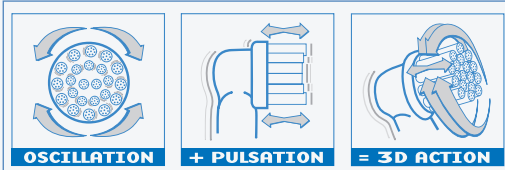


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¹ Heanue et al. Manual versus powered toothbrushing for oral health (Cochrane Review). In: The Cochrane Library, Issue 1, 2003, Oxford: Update Software. Full report online at www.update-software.com/toothbrush. BRAA32111 © 2003 Oral-B Laboratories

Editorial

COMING IN FROM THE COLD



Dr. John P. O'Keefe

I'm sure some of you watched the historic outdoor hockey games that took place in Edmonton in late November. In freezing temperatures that plummeted to -23° C, some 56,000 brave souls sat through 2 hockey games played in the Commonwealth Stadium.

That same weekend in Edmonton, indoors thankfully, I attended a 2-day symposium organized by the University of Alberta to celebrate its 85th anniversary. In those 85 years, the dental school has gone from being part of the medical faculty to being a separate faculty; now it's part of the new faculty of medicine and dentistry.

While the dental school seemed in danger of being closed within the past decade, the profession in Alberta rallied to the cause and was very influential in turning around the fate of the school. Such is the

commitment of the profession to support dental education that each dentist registered in Alberta pays a part of his or her licence fee each year towards endowments to support the dental school.

At an anniversary dinner, the dean of the faculty of medicine and dentistry, Dr. Lorne Tyrrell, assured the audience that the future of the Alberta dental school is in good hands. (Dr. Tyrrell is stepping down at the end of this academic year.) He noted that one of the criteria for selecting the next dean of the faculty will be a commitment to keep dental education alive and thriving at the university. Our profession owes much to Dr. Tyrrell for his commitment to the continued development of dental education in Alberta.

There is much to be hopeful for at that dental school, despite the problems faced by all such institutions. The subhead for the symposium was *Facing the future with confidence*; this confidence is fully justified, on the strength of the talents of the young faculty members who made presentations at the symposium.

I was also impressed by Dr. John Woronuk of Edmonton, one of my favourite characters in Canadian dentistry, who continues to amaze me. The first time I met him, about 5 years ago, he reminded me of a spring lamb at a time in his career when most would have been considering retirement. Dr. Woronuk delighted in showing me how he was designing a new type of silent high-speed turbine and that he was dusting off his high-school calculus to calculate the angles of the fins of the turbine. He also took great pride in showing me the telehealth facilities at the dental school, where faculty members could provide consultation services to colleagues in rural areas.

On my most recent visit, Dr. Woronuk and his colleague Yvonne Pinchbeck took me to visit the University of Alberta Satellite Outreach Clinics in northern Alberta, where dental and dental hygiene students spend time providing care to patients in underserved communities. I believe the university can be very proud of the excellent learning opportunity that these clinics provide for their students and the quality of care received by the residents of these northern communities. The patients I met at those clinics told me they were very happy with the service they received.

I was particularly struck by the fact that a new community hospital is being built in the town of High Level and that the dental outreach clinic will be prominently located just inside the main entrance, in a very high-traffic part of the building. This is in stark contrast to the current clinic in a prefab building, which has seen better days, on the grounds of the community hospital. The dental clinic can truly be said to be coming in from the cold by being fully integrated with medical and other services in the hospital.

On this visit to Edmonton, I felt I was getting a glimpse of the future of dental education: a dental school that is integrated with the medical school, staffed by vibrant and talented young faculty members, where students are getting at least part of their education out in the community. With proper vision and support, they could create a "dental school without walls" in Alberta. Such an operation could serve the profession and the public very well indeed!

John O'Keefe
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President's Column

UP AND RUNNING



Dr. Louis Dubé

Last September, your team of CDA representatives was elected under a whole new electoral system. Since then, we can truly say that every province is represented on our Board of Directors. Each director will bring to the table issues, concerns and ideas from a local, regional or national perspective. On the other hand, it is well understood that when a decision has to be made, it will be from the perspective of the Association — that is, from a national perspective.

In the next few weeks, one of the major tasks of CDA's new Board will be to re-examine the committee structure, in order to synchronize input to the decision-making process. Over the years, our committee members or experts were often "tagged" to a certain committee and could not be used to their full potential. Our new

format and structure will address these problems: participants will be able to work to their full potential in a cost-effective manner.

A knowledge-based governance model will better serve the interests of CDA members. New standing committees will be developed and a bank of expert advisors set up. When a "hot button" issue comes up or when the General Assembly mandates that action be taken, the Association's Board of Directors will be able to set up a task force or working group comprising the best experts, who will in due course come up with a solution. This means that whoever is best suited for a particular job will be used; nothing will prevent an expert from working on several important or time-sensitive issues covered by different committees. Once a working group's mandate is fulfilled, the experts' names will remain in our data bank until a new mandate is issued. This structure will permit CDA to respond rapidly and effectively to emerging and fast-breaking issues, while also ensuring that funds are always spent judiciously.

At the last CDA Board meeting in North Hatley, Quebec, we set up a working group mandated to start the process of organizing this structure. It will also consider appointing liaisons for each corporate member. This would allow 2-way communication and ensure that national and provincial issues are dealt with rapidly and effectively.

Knowledge-based decisions imply that 4 critical questions must be asked before any action is attempted: 1. Is this in our mandate? 2. Do our members need it? 3. What is already available out there on this issue? 4. What are the ethical aspects involved? All our decisions at CDA are based on these 4 questions; this approach allows us to be more

responsive and accountable to our members, whether corporate or individual. One other important activity at our planning session was to do an orientation session for the Board members. Some had been recently elected for the first time and we need to have everybody at the same level of understanding if we want to make informed decisions. The outcomes of this session will be to shape the different task forces and working groups needed to find solutions to issues and initiate the process for establishing next year's budget.

CDA is equipped, like never before, to deal with issues in a way demanded by the fast-paced world of today. I can hear many of you asking the question — "How will all this affect me in my dental practice?" The answer: "In many ways." First and foremost will be our ability to react even faster to the threats that our profession has to deal with. When issues like the *Personal Information Protection and Electronic Documents Act (PIPEDA)*, the Society of Composers, Authors and Music Publishers of Canada (SOCAN) and Severe Acute Respiratory Syndrome (SARS) hit CDA's radar screen, a task force can be assembled to quickly prepare a strategy or a response. Then, with communication vehicles such as *CDAAlert*, CDA members will be notified about these developments almost instantly.

CDA is also raising its media profile to ensure that the point of view of the Canadian dentist is made known across the land, in keeping with our vision: "Leadership in oral health care for Canadians: Ethical and contemporary, caring and responsive."

À la prochaine.

Louis Dubé, DMD
president@cda-adc.ca

The Canadian Dental Association (CDA)
Invites nominations for a position on its
BOARD OF DIRECTORS

In March 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*)

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)

Members will be elected at the Annual General Meeting on April 23, 2004 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.

The Nominating Committee requests your cooperation to submit 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 February 10, 2004 to:

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



The Canadian Dental Association is the authoritative national voice of dentistry, dedicated to the representation and advancement of the profession, nationally and internationally, and to the achievement of optimal oral health.



A Salute to Our Reviewers

The peer review process is the cornerstone of *JCDA*. It ensures that the material presented in the publication meets certain criteria of quality, accuracy and relevance to practice. In my opinion, the reviewers listed below are the unsung heroes of the *JCDA*. They are all very busy professionals, yet they cheerfully provide me with high-quality advice with regard to the manuscripts they evaluate. They give their valuable time and expertise without monetary compensation. I extend to them, on behalf of the Canadian dental profession, a profoundly felt thank you.

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If I have failed to recognize publicly the efforts of anyone I have approached to review manuscripts in the past year, I apologize. I am always on the lookout for more help with reviewing manuscripts. If you would like to contribute to the profession by reviewing English or French submissions, please don't hesitate to contact me.

Dr. John O'Keefe, Editor-in-Chief

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.

November JCDA

To editor-in-chief Dr. John O'Keefe: My congratulations and compliments on your latest issue. I think it is fantastic, exactly what I want. Since you have put your mark on *JCDA*, it has gone from one I might look at to the one I try to read first. When others stand around saying it can't be done, you get going and do it. Please continue with this format. I think it is excellent.

Dr. B. Larry Pedlar
Burlington, Ontario

If you decide to publish only abstracts or summaries of "scholarly" articles submitted to *JCDA*, it would be important to inform prospective contributors about this major change. I suspect that many authors would not wish to have the full text of their article published in an electronic version only; they would rather submit their article to another journal which would publish a paper version and possibly an electronic version as well.

On the other hand, I suspect that because of the increasing costs of printing and distribution, many journals owned by scientific societies (such as the *Journal of Dental Research/JDR*, owned by the International and American Associations of Dental

Research) will eventually only be published electronically.

Dr. Colin Dawes
Winnipeg, Manitoba

Please accept these comments on the November 2003 *JCDA* 'experiment' — as you have termed it. Quite simply, I think it is a fabulous format and hope you will continue with it.

My rationale is that consumers these days (dentists included) want more in the way of one-stop service. Just look at the proliferation of so-called Big Box retail outlets across the country, selling everything from clothing to groceries, pharmaceuticals and financial services — and all at one convenient location. Why should the delivery of news and information be any different? Let's get that all under one roof too. I think the revised *JCDA* format is a good start in this direction.

If there are those who don't want the CDA 'political' update, as you contend, then they can simply choose not to read it. Some would argue that you have taken valuable space away from the various scientific inclusions sought after by many readers. But, as you rightfully point out, the full version of any scientific article can be accessed through the CDA Web page for those who want more detail.

With vast amounts of information flowing out there, thanks to electronic forums, targeted mailing lists, more specialized niche communications, and newer modes of delivery, I really think that by changing *JCDA* in this manner, you are going to make it that much more readable. I know that I will often put something aside for 'later,' because I have neither the time nor the mindset to deal with it at that moment. Unfortunately, as we have all experienced, sometimes 'later' never comes. With a 'quicker read' format, I'll know right away if I want to save a

publication for later, more in-depth consideration.

My fellow readers will find comfort in knowing that CDA is spending our membership dollars in the most efficient manner. So from this perspective, one could posit that it must be less expensive for CDA to produce and distribute one print version (versus a separate journal and newsletter).

In closing, although I don't read them with as much attention as I would if I were still in practice, I deem the *Point of Care*, *Clinical Showcase* and *New Products* sections to be very valuable inclusions, and vote that they be continued.

Dr. Jeff Williams
Associate for Atlantic Canada
ROI Corporation
Tatamagouche, Nova Scotia

Decay

I practise in a middle-to-upper-middle-class area in a Vancouver suburb, and many children receive treatment at my practice. In my first 18 years of practising, it was usual for most children to be consistently cavity-free; it would be most unusual for any child to have more than 2 cavities at any given time. About 3 years ago, I noticed a gradual increase in decay, which has since developed into a truly worrisome phenomenon. I routinely see children (from ages 5 to 18) with 6, 8 and 12 cavities, usually interproximal, but also many occlusals. Much of this decay is rapidly progressive.

A recent article in the *National Post* described a similar pattern across North America. At a recent symposium, I had a chance to speak to Dr. Max Anderson (an expert in the bacterial basis of decay). I asked if he was aware of this increase in caries. He confirmed that he was aware of this trend.

So my question is *why*? I suspect a major cause is a diet heavy in carbonated beverages. Coke machines are prevalent in schools and access to candy has probably never been easier. The *Post* article suggested the cause might be the increase in drinking of nonfluoridated bottled water, but I doubt this is true. Are you aware of any up-to-date statistics? I suspect that most of the data does not yet show this trend.

*Dr. Harold H. Punnett
Fort Langley, British Columbia*

Amalgamating Dentistry and Medicine

With reference to the *News* item about the amalgamation of the Colleges of Dentistry and Medicine at the University of Saskatchewan,¹ and with admiration for Dr. Charles Baker's attempts to make a virtue out of necessity, I would like to comment on his (and others') recent credibility-stretching justifications for submerging dental schools into the open maw of medical schools in Canada.

While this trend may well be irreversible, let us describe the situation in real-world terms — i.e.: it's a retrograde step. Dental faculties developed historically out of a need for us to provide a sound, independent education and research base for the ultimate benefit of our patients. I would suggest that nothing has changed (other than financial upper campus dictates) to detract from the need for this independence.

I would caution the profession that dentistry (as a whole) does not receive a high "consideration profile" from medicine, perhaps due to our focus on quality of life and not on life and death. I would also suggest that the profession of medicine (in particular academic medicine) has little or no concept of the driving force of our profession: quality fee-for-service private practice.

I would much rather we retain a clear vision on the issue of folding

dental schools into medical faculties and not don one of Dr. Baker's rose-coloured spectacles. He and other leaders of our "absorbed" dental schools may appreciate being reminded of an old Scottish proverb: "If you sup wi' the devil, use a long-handled spoon."

*Dr. Andrew Thompson
Halifax, Nova Scotia*

Reference

1. U of S College of Dentistry to join Medicine. *J Can Dent Assoc* 2003; 69(10):637.

Another Type IV Double Palatal Root Canal Case

Congratulations on the article about bilateral 4-rooted maxillary second molars with double palatal roots.¹ This adds to the growing body of information on an unusual anomaly. The incidence is still significant, if rare, but anyone attempting treatment on a second maxillary molar should be aware of its occurrence.

*Dr. William H. Christie
Winnipeg, Manitoba*

Reference

1. Alani AH. Endodontic treatment of bilaterally occurring 4-rooted maxillary second molars: case report. *J Can Dent Assoc* 2003; 69(11):733-5.

Thank You

I wish to thank all those who gave me their generous support upon the death of my wife, Mary, at St. Michael's Hospital in Toronto on March 12, 2003. The hospital recognized your generosity by placing Mary's name on the Donor Recognition Wall at a special ceremony on November 12.

*Dr. M. Reginald Lyn
St. Catharines, Ontario*

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For more details about member benefits, visit www.cda-adc.ca or call 1-800-267-6354.



News

ISO / TC 106 at CDA

After lobbying Health Canada successfully for funding, CDA has been awarded the Secretariat for the International Organization for Standardization Technical Committee 106 for Dentistry (ISO / TC 106). The federal government has committed \$40,000 a year for 5 years to assist with this important initiative, with the possibility of renewing this financial assistance for another 5 years.

Canada has been an influential participant with ISO / TC 106, with Dr. Dennis C. Smith serving as its chair for the past several years. CDA believes that this enhanced role in the development of standards for dental materials and devices will be of great benefit to the Canadian dental profession, Health Canada and the public, by facilitating the continued access to quality dental materials and equipment.

(For more information about the new ISO / TC 106 Secretariat at

CDA's National Office, see *CDA Tackles the "Hot Button" Issues* on page 47.) ♦

Researchers Identify Cleft Palate Gene

Scientists have identified a gene that plays a critical role in the development of cleft palates and other skull malformations, which account for the most common congenital birth defects in humans.

The transforming growth factor-beta — or TGF- β — gene sends critical instructions to neural crest cells, which form the bony part of the palate. When such signals are not there, the palate does not form properly. The disruption in the process occurs when the TGF- β gene produces a defective form of the protein needed for healthy craniofacial development. If the molecule is missing in the palate itself, the cell proliferation process is disrupted.

When researchers created a mutation in the TGF- β gene in mice, 100% of their 200 offspring were born with cleft palates similar to those found in humans.

Research was carried out by a team at the University of Southern California School of Dentistry in Los Angeles and at Vanderbilt University in Nashville. The team's findings appear in *Development* 2003; 130(21):5269–80. ♦

A Breakthrough in Tissue Engineering

Scientists report that they have created a mandibular condyle from rat adult stem cells that is the precise 3-dimensional shape of the human joint. The team of clinicians, dentists, surgeons, cell biologists and materials scientists — headed by Dr. Jeremy Mao of the University of Illinois at Chicago — produced a structure from a single population of stem cells, forming 2 distinct layers of bone and cartilage, a first in the field of tissue engineering.

For those with severe damage to the temporomandibular joint itself, a tissue-engineered mandibular condyle could have tremendous clinical benefits, Dr. Mao said.

Enhancing the tissue-forming capacity of engineered mandibular condyles will be the central focus of the team's work over the next few years. The project is supported by a grant from the National Institute of Dental and Craniofacial Research.

The scientists' report appears in the *Journal of Dental Research (J Dent Res* 2003; 82(12):951–6). ♦

The Internet's Impact on Cancer

In the developed world, 4 out of 10 people with cancer use the Internet, but the impact of the Web on cancer outcome is still uncertain, according to a report entitled *The Impact of the Internet on Cancer*

COVER ARTIST

Dr. Jack Sherman of Lethbridge, Alb., took up watercolour painting in 1995. He especially enjoys painting outdoors. The work that graces the cover of this month's *JCDA* (titled *Cameron Creek – Winter*) is a half-sheet (15" x 22") painted onsite at Waterton Lakes National Park. "My mentor and teacher, Robert Croskery, and I snowshoed in to the location about half a kilometre from the nearest road, set up our easels in the deep snow, sat on our snowshoes and painted," Dr. Sherman recalls. "We returned to this spot and others many times. The concern with watercolours, of course, is that water freezes at zero degrees centigrade, so we could usually only paint for an hour or less before the paint would freeze on the paper. On returning home, we were often surprised by the end result, as the melting and drying created unexpectedly dramatic effects! Someone advised me to use gin in the water to prevent freezing, and I might just give that a try someday!" Dr. Sherman has maintained a general practice in Lethbridge since graduating from the University of Alberta in 1967. He is currently vice-president of the Alberta Dental Association and College. ♦



Outcomes, which appears in the November-December 2003 edition of *CA: A Cancer Journal for Clinicians* (*CA Cancer J Clin* 2003; 53:356–71).

The author distinguishes 4 areas of Internet use: communication (electronic mail), community (virtual support groups), content (health information on the Web), and e-commerce. Virtual communities are probably the one Internet application area with the greatest effect on persons with cancer, the author notes. Although inaccurate information about cancer and its treatment does appear on the Internet, the positive impact of this technology presents unprecedented opportunities for researching and purchasing complementary or alternative treatments online, the author sums up.

The report was prepared by Dr. Gunther Eysenbach, associate professor, department of health policy, management and evaluation, University of Toronto, and senior scientist, Centre for Global eHealth Innovation, Division of Medical Decision Making and Health Care Research, Toronto General Research Institution of the UHN (University Health Network), Toronto General Hospital.

The report can be accessed online at <http://caonline.amcancersoc.org/cgi/content/full/53/6/356> ♦.

Use of Adrenaline

Post-Anaphylaxis

We refer you to an excellent article in the December 6, 2003 edition of *BMJ* (*British Medical Journal*), entitled *Adrenaline in the treatment of anaphylaxis: what is the evidence?*

This review (prepared by a team of specialists from the Regional Department of Immunology and Allergy, Royal Victoria Infirmary, Newcastle-upon-Tyne) discusses the safety and efficacy of adrenaline (epinephrine) in the treatment of anaphylaxis, based on the currently available evidence. A pragmatic

approach to the use of adrenaline auto-injectors is suggested.

This review can be found online at <http://bmj.bmjournals.com/cgi/content/full/bmj;327/7427/1332>. ♦

Ethics and SARS

The outbreak of severe acute respiratory syndrome (SARS) in the Toronto area in early 2003 showed how easy it is for infectious diseases to spread around the world. Ethical and clinical issues need to be resolved to improve the response to the next epidemic.

These are the conclusions drawn in a report entitled *Ethics and SARS: lessons from Toronto*, which appears in the December 6, 2003 edition of *BMJ*. The online version of the report can be found at <http://bmj.bmjournals.com/cgi/content/full/327/7427/1342>.

As the authors write in their introduction: “The (SARS epidemic) forced medical and government workers to make hard choices, often with limited information and short deadlines. Health care providers were on the firing line, and were the people most affected by the disease. Decision-makers had to balance individual freedoms against the common good, fear for personal safety against the duty to treat sick people, and economic losses against the need to contain the spread of a deadly disease. Such decisions have to be guided by scientific knowledge and ethical considerations. The SARS outbreak showed that Canadian society was not fully prepared to deal with the ethical issues.”

This article was prepared by a working group that included professors from the University of Toronto’s department of public health sciences, division of neurosurgery and faculty of law; a bioethicist from U of T’s Joint Centre for Bioethics; the director of the primary care research unit at the Sunnybrook and Women’s College Health Sciences Centre in Toronto; and an insurance company executive. ♦

Repetitive Strain Injury Report

Statistics Canada has issued a Health Report on *Repetitive Strain Injury* (RSI). The article describes the characteristics of people who report an RSI, although no specific references are made to dental personnel, and examines the association of an RSI with chronic pain and psychological distress.

In 2000–01, 10% of Canadians aged 20 or older reported having had an RSI serious enough to limit their usual activities at some point in the previous 12 months. Work-related activities were most often the cause of these injuries. The data are from Statistics Canada’s 2000/01 Canadian Community Health Survey and the 1994/95 to 2000/01 National Population Health Survey.

For more information, contact the report’s author: Michael Tjepkema, Health Statistics Division, Toronto Regional Office, Statistics Canada, 25 St. Clair Ave. E., Toronto, ON M4T 1M4; tel. (416) 952-4620; e-mail: Michael.Tjepkema@statcan.ca. ♦

Health Days Calendar

Health Canada offers a calendar of health-related events through 2004 at http://www.hcsc.gc.ca/english/calendar_2004.html. The calendar also provides Web addresses where more information about the events can be found. ♦

2004 Cochrane Colloquium Slated for Ottawa

Bridging the Gaps will be the theme of the 12th Cochrane Colloquium, to be held in Ottawa October 2–6, 2004.

The colloquium is the annual scientific conference of The Cochrane Collaboration (www.cochrane.org), an international non-profit and independent organization (based in Oxford, United Kingdom), dedicated to making up-to-date, accurate information about the effects of health care readily available worldwide. This

year's colloquium will serve as an opportunity to bridge gaps between The Cochrane Collaboration and clinical practice, high- and low-income countries and individuals, methodologists and reviewers, and producers and users of health care information.

The CDA is an affiliate member of the Canadian Cochrane Network and Centre (CCN/C). The CCN/C consists of a central office at McMaster University in Hamilton, Ont., and 16 sites at academic health science centres across the country. The CCN/C is affiliated with 21 Canadian health care organizations that work with the CCN/C to promote evidenced-based health care decision-making by consumers, health professionals and policy-makers.

For more information, visit www.colloquium.info. Online registration, meeting bookings and abstract submissions will be available in the coming weeks. ♦

CAPHD Awards

The Canadian Association of Public Health Dentistry (CAPHD) has presented Distinguished Service Awards to Dr. Patricia Main and Dr. James Leake (both with the University of Toronto) in recognition of their outstanding commitment to national leadership, teaching, research



Dr. Patricia Main was unable to attend CAPHD's meeting in Charlottetown to receive her award, so this re-enactment of the awards presentation took place a few weeks later in Halifax during a meeting of the Royal College of Dentists of Canada. From left to right are: Dr. James Leake, Dr. Aaron Burry (presenting the awards), and Dr. Patricia Main.

and mentoring in Public Dental Health. The presentation was made during CAPHD's recent annual meeting in Charlottetown. ♦

A P P O I N T M E N T S



Dr. Bernard Dolansky

New Chair at DCF

Dr. Bernard Dolansky of Ottawa became the new Board chair of the Dentistry Canada Fund (DCF) on January 1, 2004. He succeeds Dr. Douglas B. Smith of Belleville, Ont., who ended an 8-year term as the charity's chair on December 31, 2003.

Dr. Dolansky has been involved in leadership positions in the dental profession for over 25 years, including terms as president of the Ottawa Dental Society (1976), Ontario Dental Association (1986-87) and CDA (1992-93). His numerous contributions to dentistry have been recognized by ODA's Barnabus Day Award for Distinguished Service and an Honorary Life Membership in CDA.

Dr. Dolansky has an active endodontic practice in Ottawa and is currently a member of Ash Temple's Board of Directors and president of Equity Professional Services Ontario, an Ash Temple division that provides dental practice transition services.

CARDP's New President

Dr. William Sehl of Waterloo, Ont., was elected president of the Canadian Academy of Restorative Dentistry and Prosthodontics during its recent annual meeting in Toronto.



Dr. William Sehl

Dr. Sehl has a private general dentistry practice and is an adjunct clinical professor at the University of Western Ontario's School of Dentistry. ♦

APC's New President



Dr. Izchak Barzilay

Dr. Izchak Barzilay was recently elected president of the Association of Prosthodontists of Canada.

Dr. Barzilay heads the Division of Prosthodontics and Restorative Dentistry at Toronto's Mount Sinai Hospital, and is an assistant professor at the University of Toronto. He has published on various topics, including immediate implants, bonding plastics to various metals, and other material- and implant-related topics. ♦

CAO Elects New President

Dr. Paul H. Korne of Montreal has been elected president of the Canadian Association of Orthodontists (CAO). Dr. Korne received a Master of Clinical Dentistry degree in Orthodontics from the



Dr. Paul H. Korne

University of Western Ontario in 1990. He maintains a private practice and is an assistant professor in the department of orthodontics at McGill University's faculty of dentistry. Dr. Korne has also served as the Quebec representative on CAO's Board of Directors since 1998. ♦

E R R A T U M

In a recent *Diagnostic Challenge* (on page 668 of the November 2003 *JCDA*) titled *CAOMR Challenge No. 11*, the patient was described as an 8-year-old. The patient was actually 19 years old. ♦

O B I T U A R I E S

Duke, Dr. Charles Gavin: Dr. Duke of Edmonton passed away on July 14, 2003, at the age of 93. A 1941 graduate of the University of Alberta, Dr. Duke practised dentistry in Edmonton for many years. He was also a part-time instructor at the University of Alberta School of Dentistry and later (until his retirement) head of the Department of Veterans Affairs Dental Clinic at the University of Alberta Hospital. Dr. Duke was a life member of CDA.

Kluzak, Dr. Arthur G.: A 1956 graduate of the University of Alberta, Dr. Kluzak of Calgary passed away on October 20 at the age of 72.

Riskin, Dr. Samuel: Dr. Riskin of Edmonton graduated from the University of Alberta in 1932. He died on September 20 at age 92. Dr. Riskin was a life member of CDA.

DIAC's 8th Annual Future of Dentistry Survey in Next *JCDA*

JCDA will carry the Dental Industry Association of Canada's (DIAC) 8th Annual Future of Dentistry Questionnaire in the February 2004 edition.

Your input is valuable in assisting DIAC's members to continue to develop products and services to satisfy the fast-paced, market-driven, technologically challenging world of today.

For more information, contact Eric Jones, president, Eric P. Jones & Associates Inc., 90 Welland Avenue, St. Catharines, ON L2R 2N1; tel.: (905) 684-2771; fax: (905) 684-4601; e-mail: ejones@vaxxine.com. ♦

For direct access to the Web sites mentioned in the News section, go to the January *JCDA* bookmarks at <http://www.cda-adc.ca/jcda/vol-70/issue-1/index.html>.

Visit the CDA Booth for Advice

The CDA Booth will be travelling across Canada yet again in 2004.

Well-trained, knowledgeable staff from the national office in Ottawa will be on hand to answer all your questions about the Association.

Upon request, they will take you on a virtual tour of CDA's new Web site, acquainting you with its many interactive features.

So, come and meet your staff at this one-stop resource and learn all about CDA's vast array of products, programs and services.

CDA Booth Schedule for 2004

March 4-6: Pacific Dental Conference in partnership with CDA, Vancouver

May 6-8: Ontario Dental Association Annual Spring Meeting, Toronto

May 31, June 1-2: Les Journées dentaires internationales du Québec Annual Convention, Montreal



Dentin Hypersensitivity

Taking the Pain Seriously

Canadian Advisory Board on Dentin Hypersensitivity

The high prevalence of dentin hypersensitivity, combined with continued underreporting and underdiagnosis, has intensified the need to focus on the management of this condition. Responding to that need, the Canadian Advisory Board on Dentin Hypersensitivity, a committee representing a broad range of dental care specialties, convened to determine best-practice recommendations.¹ Collectively, they evaluated the scientific evidence as well as condition-related knowledge gaps that were identified by an extensive national survey of 8,000 dental professionals (7% response rate). By contributing their own diverse expertise, the committee produced the first ever “Consensus-Based Recommendations for the Diagnosis and Management of Dentin Hypersensitivity,” to provide direction to the dental care profession.



Howard C. Tenenbaum
DDS, Dip. Perio., PhD,
FRCD(C)

Associate Dean, Biological
and Diagnostic Sciences,
Professor and Head,
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“Unreported” pain does not mean “unimportant” pain

The pain of an aching tooth still propels patients to the dentist’s chair faster than any other complaint. With pain as such a powerful driving force, the pain of dentin hypersensitivity is surprisingly underreported. The dichotomy of the condition’s high prevalence and the lack of patient acknowledgement is a challenge to comprehend, and has increasingly garnered attention in the academic dental community. It is hypothesized that many patients with dentin hypersensitivity assume their condition is a natural occurrence developing with age and that it is therefore untreatable. They may also perceive the pain as trivial due to its intermittent or transient nature. For these reasons, the Canadian Advisory Board emphasized that communicating with patients about the pain of dentin hypersensitivity is important and should be encouraged by dental care professionals – even if patients may not present with this condition as a chief or initial complaint.

While relieving unnecessary suffering is of utmost importance, and concern for patient satisfaction is always a professional goal, research indicates that all pain needs to be treated diligently. If left untreated, pain elicits specific physiological responses that further increase its intensity and extent.² Dentin hypersensitivity “satisfies all the criteria to be classified as a true pain syndrome”, and therefore needs to be treated accordingly.³ Dentin hypersensitivity presents as a short, sharp pain arising from exposed dentin in response to stimuli – typically thermal, evaporative, tactile, osmotic or chemical – that cannot be ascribed to any other form of dental defect or disease. For many patients, this acute pain is recurrent and, for some, it is severe enough to affect normal oral hygiene and eating behaviour. Even gentle brushing or ingestion of certain foods can trigger or exacerbate this pain condition. Pain presenting as dentin hypersensitivity requires greater attention; it should and can be treated, and it should never be considered trivial.

New recommendations appeal to the dental profession for an attitude change

The International Association for the Study of Pain defines pain as “an unpleasant sensory and emotional experience arising from actual or potential tissue damage...”² The definition itself highlights the reason pain assessment can present a challenge to the dental or medical professional. The assessment of pain cannot rely totally on the presence or absence of visible lesions, because the relationship between physical disease and the intensity of pain is not always straightforward.² To confound the challenge even more, pain is a complex and subjective perception, uniquely experienced by each individual. It can be assessed

only indirectly, based on the patient’s overt communication, both verbal and behavioural. Eliciting descriptions of pain from the patient in terms of intensity, quality, time-course, impact and personal meaning can be particularly difficult.

The Canadian Advisory Board on Dentin Hypersensitivity acknowledges that dental, and even medical professionals’ training in the diagnosis and management of chronic pain is limited and offers little preparation for the complexities of assessment and counseling. Dentin hypersensitivity is a painful condition subject to these complexities. For this reason, the board identified a list of recommendations for the dental profession’s development in the area of pain. They concluded that dentistry needs to incorporate a universal index combining an analogue pain measure with the patient’s own rating of the effect of pain. Academic members of the board, both dentists and dental hygienists, recommended that school curricula should provide greater focus on the diagnosis and management of pain in general, with increased emphasis on dentin hypersensitivity. *Above all, dental care professionals are encouraged to screen routinely for dentin hypersensitivity and take the initiative in the dialogue on pain.*

Personal commitment is key in meeting today’s growing expectations

In healthcare today, new attitudes and expectations, fostered by research, motivate healthcare professionals to treat pain decisively, even pre-emptively.²

Fortunately, treatment for the majority of dentin hypersensitivity cases can be simple. After confirming the diagnosis and educating the patient about the removal of risk factors, proper use of desensitizing toothpaste is recommended as first-line treatment. This convenient, inexpensive, non-invasive and reversible treatment choice can be initiated easily by patients at home and, with ongoing use, can prevent pain from returning. Considering comfort, convenience and cost, invasive and

irreversible procedures such as mucogingival surgery, pulpextomy or the use of resins, should be reserved for severe cases.

Development of more comprehensive dental educational programs, addressing the diagnosis and management of both acute and chronic pain, could further help alleviate or possibly eliminate most patients’ painful symptoms.

The *Consensus-Based Recommendations for the Diagnosis and Management of Dentin Hypersensitivity*, published in the April 2003 issue of the *JCDA*, is a welcome beginning. As a result of this effort, dental care professionals now have a practice guideline for dealing with dentin hypersensitivity. This report promotes professional awareness of the condition and greater responsibility for initiating communication with patients who may have dentin hypersensitivity. In meeting this challenge, dental practitioners will effectively manage one of the most common and misunderstood pain conditions in dentistry.

Pain is complex, subjective, and assessed only indirectly, based on the patient’s overt communication, both verbal and behavioural.

The Canadian Advisory Board on Dentin Hypersensitivity was supported by an unrestricted educational grant from GlaxoSmithKline Consumer Healthcare.



1. Consensus-Based Recommendations for the Diagnosis and Management of Dentin Hypersensitivity. Canadian Advisory Board on Dentin Hypersensitivity. *J Can Dent Assoc* 2003;69(4):221-6. 2. Pain Control: The New “Whys” and “Hows”. Pain: Clinical Updates, International Association for the Study of Pain. Carr DB (Ed). Vol 1, Issue 1, May 1993. www.iasp-pain.org. 3. Dababneh RH, Khouri AT, Addy M. Dentin hypersensitivity – an enigma? A review of terminology, epidemiology, mechanisms, aetiology and management. *Br Dent J* 1999;187:606-11.

Statement by the FDI World Dental Federation

Oral and Dental Care of People with Disabilities

1. The FDI Mission Statement supports the principle that all people should have access to the best possible care to achieve optimal oral health.
2. The FDI International Principles of Ethics for the Dental Profession states that the professional dentist will safeguard the oral health of patients irrespective of their individual status.
3. The FDI supports the United Nations declaration that people with disabilities should have access to medical treatment without discrimination.
4. Oral and dental care for people with disabilities should be offered the same standard as for people without disabilities, mindful of the consequences of oral disease and/or its treatment for people with disabilities.
5. The oral health of people with disabilities should be maintained through oral health education and the prevention of oral diseases.
6. Collaboration with policy makers and other stakeholders should be part of the overall strategy for developing and implementing oral and dental services for people with disabilities

Main author: Dr Peter Swiss

Submitted by: FDI Special Committee of Disability and Oral Health
FDI Special Committee of Ethics and Dental Legislation

Reference: Korean Dental Association Statement "Dental Professional Codes of Ethics for People with Disabilities"

*FDI Statement
General Assembly 2003*

Statement by the FDI World Dental Federation

Tuberculosis and the Practice of Dentistry

Tuberculosis and Occupational Exposure

Tuberculosis is a contagious disease caused by inhalation of airborne particles containing the bacterium *Mycobacterium tuberculosis*. Overall, one third of the global population is infected with this mycobacterium or its variants. The advent of the human immunodeficiency virus pandemic has accelerated its spread inexorably whilst the multi-drug resistant strains of the bacillus have hampered disease management. Given the alarming spread of the disease there appears to be a potential for occupationally acquired tuberculosis infection amongst health care workers, including dental care workers. However current and generally accepted epidemiological information supports the conclusion that there is no significant risk of contracting tuberculosis through the provision of dental treatment when appropriate infection control procedures are followed.

FDI urges all its Member Associations and all oral health professionals to be cognisant of this pandemic disease and stay current with regard to its demographic features in each locale, as the prevalence of the disease varies widely in global terms.

Controlling the Spread of Tuberculosis

A key element of infection control in dentistry is the concept of universal precautions centered on the premise that medical history and examination cannot reliably identify all patients or carriers of infections. All patients, therefore, must be regarded as potentially infectious. Recently however, universal precautions have been combined with guidelines intended to reduce the risk of transmission of pathogens by droplets, aerosols or direct contact into a unified set of clinical practices known as 'standard precautions'. Additional precautions or deferral of care may be indicated when patients present for dental treatment with diseases such as tuberculosis, that may be transmitted through these routes of exposure.

The FDI strongly reaffirms the importance of adherence to current infection control recommendations as set forth by the appropriate local and international bodies, in minimising spread of respiratory and other disease in dentistry. Particular emphasis in this context should be placed on vaccination, use of particulate respirators and adequate ventilation as follows:

Vaccination

The BCG vaccine is an effective measure that can help control the spread of tuberculosis.

FDI endorses the policy of BCG vaccination for dental care workers in geographic regions or clinical settings where there is a high prevalence of tuberculosis.

Facemasks and Ventilation

There is consensus that common sense precautions such as good surgery ventilation, control of aerosols by high volume externally vented aspirators and, wearing of particulate respirators are important in curbing the transmission of respiratory diseases including tuberculosis. There is evidence however, that facemasks routinely used by health-care workers may not always provide an effective means of preventing infection.

FDI supports all measures that control the quality of air in the dental surgery environment. These include the use of particulate respirators, externally vented aspirators and good surgery ventilation.

Diagnosis and Referral for Medical Evaluation

Oral health professionals should be alert to signs and symptoms of tuberculosis that may be identified during the provision of dental care. Patients with medical histories or conditions possibly indicative of tuberculosis should be referred to their physicians for diagnosis, counselling

and follow-up. Patients who are skin-test positive for tuberculosis but do not have symptoms of active tuberculosis are not contagious and may be treated using standard precautions.

FDI urges all oral health professionals to be alert to signs and symptoms of tuberculosis, and refer such individuals for appropriate medical health care.

Access To Care

Individuals with tuberculosis should be treated with compassion and dignity and should have access to dental treatment based on current and generally accepted scientific knowledge. Oral health professionals should not refuse to provide dental health care solely because the patient has tuberculous infection. Dental health care providers may elect to defer non-emergency treatment until patients exhibiting symptoms of active disease have received medical treatment and are non contagious.

The FDI believes that individuals with tuberculosis should be treated with compassion and dignity and should have access to dental treatment within the realm of the care provider's competence.

Main author: Prof L P Samaranayake

Submitted by: FDI Science Commission

Reference: FDI Science Commission Project 1-99: Re-emergence of Tuberculosis and its Variants: Implications for Dentistry

Samaranayake L P. Re-emergence of tuberculosis and its variants: implications for dentistry. *Int Dent J.* 2002 Oct;52(5):330-6

*FDI Statement
General Assembly 2003*

Statement by the

Topical and Systemic Fluorides in Children with Renal Diseases

Following the ingestion of fluoride approximately 50% is normally excreted through the kidneys within 24 hours and most of the remainder is taken up by calcified tissues such as bones and teeth. Patients with renal dysfunction and especially young children may have an increased requirement for water intake. However there is no evidence of any risks to children with renal disease from fluoride at the doses recommended for the fluoridation of water supplies.

Patients on renal replacement therapy requiring dialysis may be on haemodialysis or peritoneal dialysis. The fluids used in peritoneal dialysis are specially prepared and do not use local water supplies, so fluoridated water is not a factor. Patients on haemodialysis are exposed to large amounts of

water, three times a week. The dialysis equipment and facilities have very strict standards and controls and any fluoride in the water used is removed as part of these procedures. Maintenance of this equipment and the application of appropriate standards is important in controlling fluoride intake in patients on haemodialysis.

There is no evidence that fluoride intake from sources other than water fluoridation, such as fluoride supplements, rinses and toothpastes, pose any risk to patients with renal disease, once the normal precautions applying to the use of these products are carried out.

Main authors: Prof John J Clarkson, Dr Mary Waldron

Submitted by: FDI Science Commission

*FDI Statement
General Assembly 2003*

Topical and Systemic Antibiotics in the Management of Periodontal Diseases

Background:

The realisation, over the past three decades or so, of the microbial specificity of periodontal disease has led to an increasing use of antimicrobial agents in the management of periodontal infections. These include systemic antibiotics, topical antibiotics and topical antiseptics. Despite such frequent use of antibiotics in the management of periodontal diseases, the literature indicates only a few good controlled trials that compare the efficacy of adjunctive antibiotic use to mechanical therapy alone. Currently there is much ongoing research and interest in this topic amongst the dental profession, especially in view of the global problem of the emergence of antibiotic resistant organisms. Hence, the knowledge base on the subject is increasing rapidly and, at the time of writing FDI takes the following position:

Present Position:

- Scientific evidence indicates that mechanical periodontal treatment alone is adequate to ameliorate or resolve the clinical condition in a vast majority of patients with periodontal diseases.
- Adjunctive antibiotics should only be used after careful clinical evaluation of the condition, being cognisant that unwarranted use may be of negligible benefit to the patient whilst, in the longer term, may promote the emergence of antibiotic resistant organisms in the community.

- However, adjunctive antimicrobial agents delivered either locally or systemically, may enhance the effect of therapy in specific situations.
- Systemically delivered antibiotics may be considered for aggressive (early onset and refractory) periodontitis and in patients with generalised systemic disease that may affect host resistance.
- Locally delivered antibiotics or antiseptics together with mechanical debridement may be indicated for non-responding sites of local infection or in localised recurrent disease.
- The dentist should place the patient on an individually tailored post-treatment maintenance care programme, after resolution of the particular periodontal condition.
- Optimal plaque control by the patient is of paramount importance for a favourable clinical and microbiological response to any form of periodontal therapy.

Main authors: Prof L P Samaranayake, Prof A Mombelli, Prof N Johnson

Submitted by: FDI Science Commission

Reference: FDI Science Commission Project 2-99: Indications and Contra-Indications for Topical and Systemic Antibiotics in the Management of Periodontal Disease

Samaranayake LP and Johnson N Guidelines for the use of antimicrobial agents to minimise the development of resistance FDI Commission Project 2-96. International Dental Journal 1999; 49: 189-195

Mombelli A and Samaranayake

LP Topical and systemic antibiotics in the management of periodontal diseases: FDI Commission Project 2-99, International Dental Journal (in preparation)

*FDI Statement
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The *Titanic* Disaster: Dentistry's Role in the Identification of an 'Unknown Child'

- Keith C. Titley, BDS, MScD, FRCD(C) •
- Bruce R. Pynn, MSc, DDS, FRCD(C) •
- Robert Chernecky •
- John T. Mayhall, DDS, PhD •
- Gajanan V. Kulkarni, BDS, PhD, FRCD(C) •
- Alan Ruffman, P Geo •

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The Royal Mail Ship (RMS) *Titanic* had a brief and inglorious history that culminated with her striking an iceberg and sinking at 0220 on April 15, 1912, while on her maiden voyage.¹ The Cunard liner *Carpathia*, steaming a distance of 47.3 nautical miles in 3.5 hours, was the first ship to arrive at the disaster scene at 0400.² By 0830, the *Carpathia* had picked up 712 survivors and steamed on to New York, where she docked at Cunard's pier 54 at around 2100 on April 18, 1912.¹ Meanwhile, a call went out to Halifax, N.S., for body-recovery ships. Before sailing, these ships were equipped with coffins, ice, embalming fluid and undertakers. A total of 4 Canadian vessels were involved: the *Mackay-Bennett*, the *Minia*, the *Montmagny* and the *Algerine*. These ships respectively recovered 306, 17, 4 and 1 bodies.³ Some of these bodies were buried at sea, while others were transported back to Halifax for possible identification and burial. A further 9 bodies were recovered and buried at sea by other ships.

Captain Frederick H. Larnder of the *Mackay-Bennett*, on arriving at the disaster scene, described it as, "Like nothing so much as a flock of gulls resting upon the water... all we could see at first would be the top of life preservers. They were all floating upwards, apparently standing in the water."³ An 'Unknown Child', a male child of an estimated age of 2 years, was the fourth body recovered by the crew of the *Mackay-Bennett* in the first boatload of bodies early on the morning of Sunday, April 21, 1912. As reported in the *Halifax Morning Chronicle* from a member of the crew of the *Mackay-Bennett*, "The little body floated up alongside the searchers' boat and it was tenderly taken on board. The sight of this little form floating face upwards brought tears to the eye of many of the hardy sailormen."³ The crew

vowed that if the body was unclaimed, they would be responsible for its burial and they were true to their word.³ Body number 4, an 'Unknown Child' was buried — along with 120 other victims of the disaster — in Fairview Lawn Cemetery in Halifax (Fig. 1). Of the 2,208 people on board the *Titanic*, 1,496 lives were lost in the disaster.⁴

The *Titanic* Ancient DNA Project

The *Titanic* Ancient DNA Project was begun in the late summer of 1998.⁵ Dr. Ryan Parr, vice-president of research and development of Genesis Genomics Inc. (on the campus of Lakehead University in Thunder Bay, Ont.) and Alan Ruffman, president of Geomarine Associates Ltd. in Halifax, applied for and received permission to excavate and exhume the remains from the graves of bodies number 240, 281 and 4 at the Fairview Lawn Cemetery. This application was made on behalf of 3 different groups of families who were hoping to identify a particular body as a member of their family. Body number 4 was that of the 'Unknown Child'. The exhumations occurred on May 17 and 18, 2001, under strict forensic conditions.⁶

The request for exhuming body number 4 was made by the Pålsson family from Sweden. It had been speculated that two-year, three-and-a-half-month-old Gösta Leonard Pålsson could have been the 'Unknown Child.' Owing to the nature of the soil and the slightly acidic (pH 5.04) groundwater, the remains associated with graves of bodies number 240 and 281 had all decomposed and dissolved. A "small fragment (6 cm) of poorly preserved bone" and 3 teeth were recovered from burial number 4, the 'Unknown Child'.⁶



Figure 1: Grave of an 'Unknown Child,' Fairview Lawn Cemetery, Halifax, Nova Scotia. Photo courtesy of Scott I. Fairgrieve.

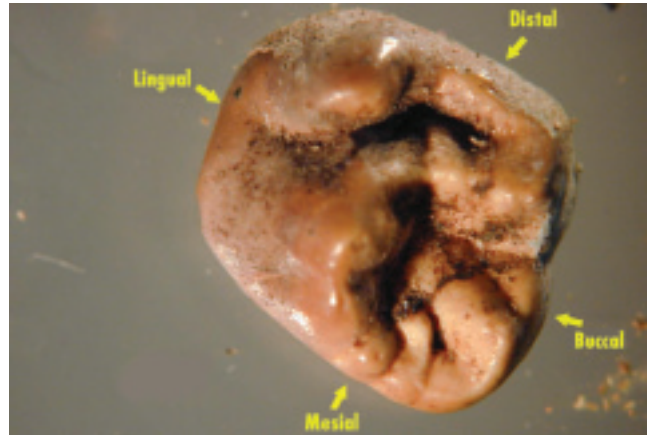


Figure 2a: Photograph of the occlusal surface of tooth 55 showing lack of occlusal wear.

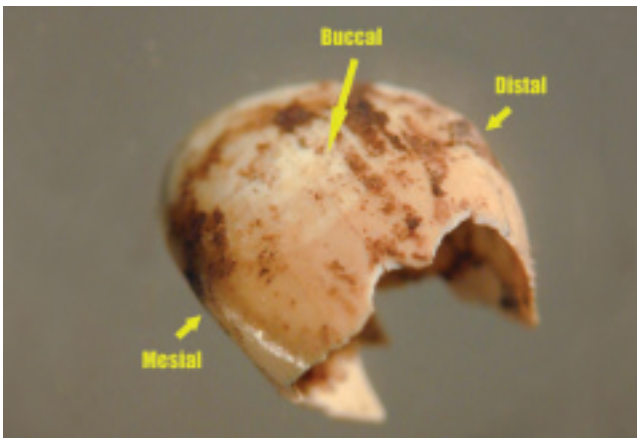


Figure 2b: Photograph of the buccal surface of tooth 73 showing lack of incisal wear.

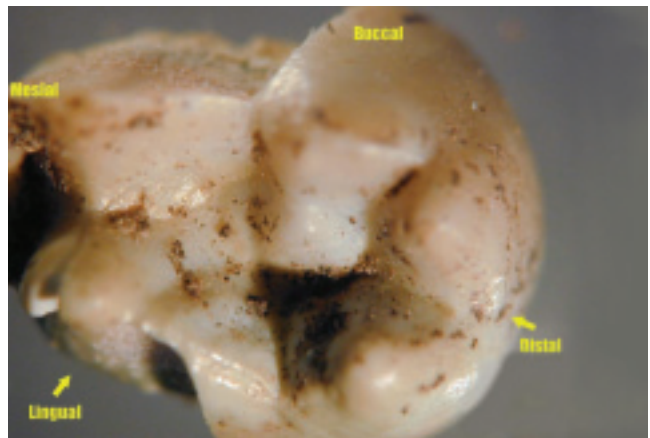


Figure 2c: Photograph of the occlusal surface of tooth 84 showing flaking away of mesiobuccal and distolingual enamel and lack of occlusal wear.

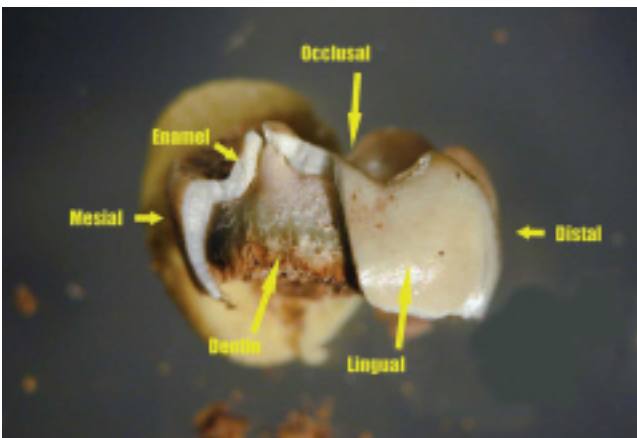


Figure 3: Photograph of the lingual surface of tooth 84 showing the underlying dentin where lingual enamel has been lost.

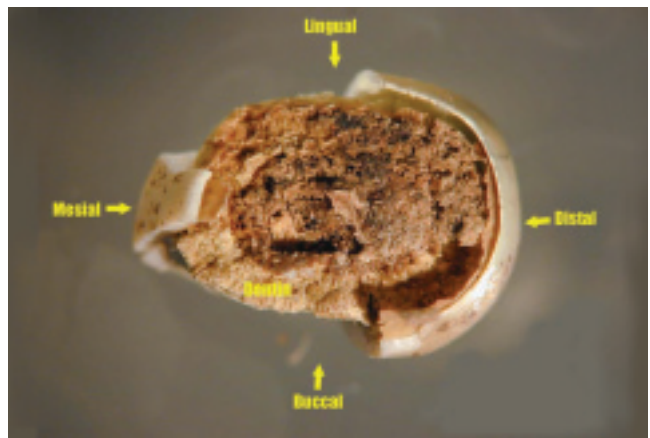


Figure 4: Photograph of a ventral view of tooth 84 showing the dentin on the periphery and debris filling the pulp chamber.

By the spring of 2002, Parr and Ruffman were able to conclude that the 'Unknown Child' was not Gösta Pålsson, based on a mitochondrial DNA comparison between the bone fragment and living direct maternal descendents in

Sweden.^{6,7} At this point, the teeth began to play a role in the investigation. Dr. J. El Molto, an anthropologist and the director of the Paleo-DNA Laboratory at Lakehead University, suggested that the 3 teeth were the deciduous

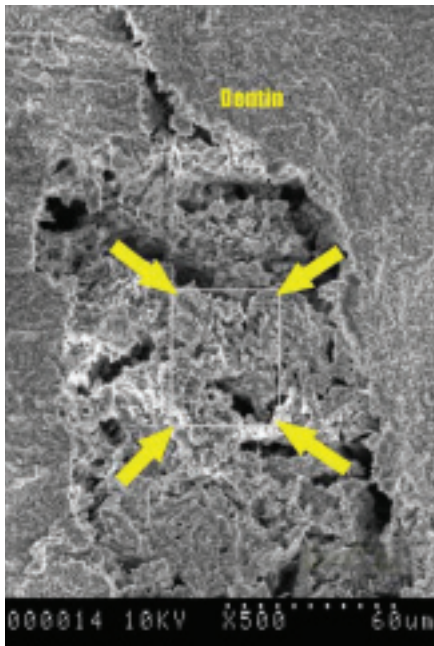


Figure 5a: SEM (x500) of the lingual surface of tooth 84, denoting an area where dentinal structure was identified at higher magnifications.

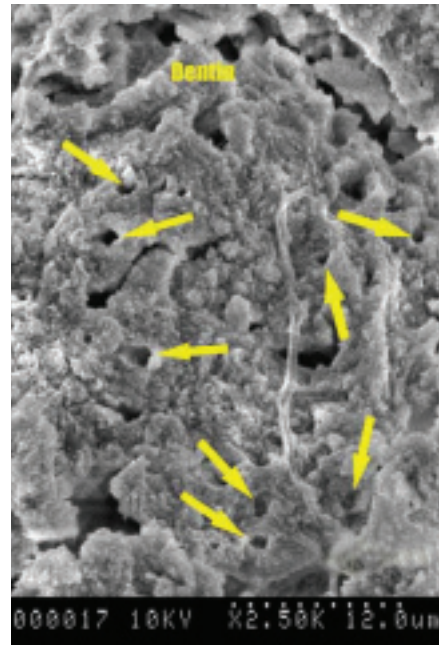


Figure 5b: SEM (x2500) of the lingual surface of tooth 84. The arrows point to dentinal tubule orifices.

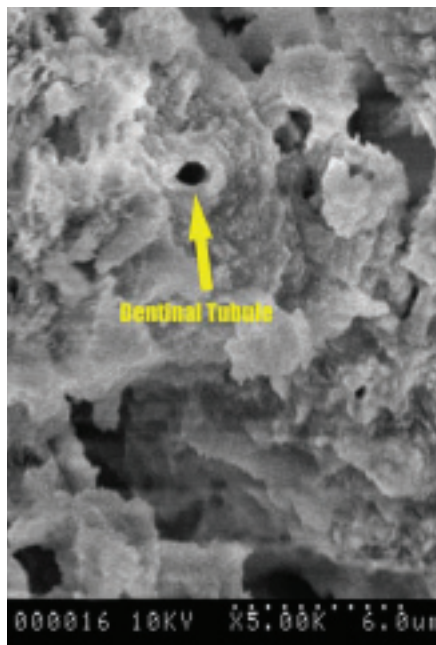


Figure 5c: SEM (x5000) clearly showing the orifice of a dentinal tubule.

teeth of a quite young child. The teeth were sent to Dr. Christy Turner II at the State University of Arizona in Tempe, and he too agreed. Ruffman then concentrated on finding direct descendents of the 2 youngest of 6 male children who had died during the sinking of the *Titanic*. Relatives were found and they participated in the study by donating 6 or 7 drops of blood. These were then processed at Genesis Genomics in Thunder Bay; by the early summer of 2002, Parr and Ruffman knew that these 2 young males

were not the ‘Unknown Child.’ Ruffman then began to search out the direct maternal descendents of the remaining candidate male children. Parr and Ruffman also looked for help with the teeth since “we really began to have doubts as to what the teeth were telling us.”⁸

The University of Toronto

Following a discussion with Parr, the teeth recovered from body number 4 were brought from Lakehead University to the University of Toronto by Bruce Pynn, an oral and maxillofacial surgeon. He suspected that one of the teeth contained dentin. The teeth were in a very fragile condition and handled at all times using rubber gloves and sterile dental forceps, so as not to contaminate any residual DNA that might be in the teeth, which consisted of crowns with no visible evidence of root formation (Figs. 2a, 2b and 2c). Pediatric dentists Keith Titley and Gajanan Kulkarni and dental anthropologist John Mayhall, with the use of an appropriate dental anatomy text, identified them as being:⁹

- maxillary right second primary molar: 55
- mandibular left primary cuspid: 73
- mandibular right first primary molar: 84

Because of the stage of development of their crowns, their lack of root development and lack of wear, the teeth were tentatively estimated as coming from a child of 9 to 15 months of age (Table 1).⁹

The teeth were photographed with a digital camera at magnifications of x30 to x60 on an Olympic model SZX-ILLD100 binocular light microscope (Olympic

Table 1 Chronology of tooth development (adapted from Scott and Symons⁹)

Primary teeth	Formation of crown complete	Appearance in oral cavity
Incisors	2–3 months	6–9 months
Cuspids	9 months	16–18 months
First molars	6 months	12–14 months
Second molars	12 months	20–30 months

Optical Co. Ltd., Mito City, Japan). Teeth 55 and 73 were simply enamel shells with no evidence of any internal structure. Some solid debris was noted inside the crown of tooth 84 where enamel had flaked away from the distolingual and buccolingual surfaces, revealing the possible presence of underlying dentin (Figs. 2c and 3). A ventral view of the crown showed a considerable amount of debris in the pulp chamber with material that could be considered to be dentin (Fig. 4).

As a result, the teeth were carefully mounted on aluminum scanning electron microscopy (SEM) stubs with double-sided tape, sputter-coated with 1 nm of platinum in a Polaron E5100 coating unit (Polaron Equipment Ltd., England) and examined with a Hitachi S-2500 SEM (Hitachi Ltd., Mito City, Japan) at an operating kilovoltage of 10 kV. The buccal and lingual surfaces that had been denuded of enamel were scanned at increasing magnifications of $\times 500$, $\times 2500$ and $\times 5000$ until the presence of tubular orifices that were consistent with those of dentinal tubules were confirmed and photomicrographs taken (Figs 5a, 5b and 5c).

The 'Unknown Child' Identified

Following the work performed in this laboratory, confirming the presence of dentin in tooth 84, the teeth were returned to Parr at Lakehead University. From there, tooth 84 was taken to the ancient DNA laboratory of Dr. Scott Woodward of Brigham Young University in Utah, Colorado, where non-nuclear DNA, known as mitochondrial DNA (mtDNA), was recovered from the dentin. All mtDNA is inherited from our mothers and, within the molecule, is archived a biochemical 'family name' that is not only stable but persists in maternal family lines for generations.^{7,10} Parr and Woodward also obtained a new extraction of mtDNA from the bone fragment that had none of the contamination problems previously encountered. As a result, the mtDNA from tooth 84 and from the bone fragment were found to match, so that the researchers knew they had the true mtDNA of body number 4. Geneologists were able to track down living maternal relatives of all the children under age 3 who perished on the *Titanic* and were able to obtain DNA samples from them.¹¹ There were 2 of the candidate male children within the estimated age-range who had the same mtDNA: Sidney

Leslie Goodwin, aged 19 months, from Melksham in southern England; and Eino Viljam Panula, aged 13 months, from Ylihärmä in Finland. When the mtDNA results came in from the direct maternal descendants of the Goodwin and the Panula children, both had the same mtDNA. As it turned out, their mtDNA is found in over 15% of indigenous Caucasians of northern Europe, indicating that somewhere in the past 2,000 years, the 2 families had a common maternal antecedent. Because of the early stage of dental development of body number 4, however, the Finnish child (13-month-old Eino Viljam Panula) was finally identified as the 'Unknown Child'.^{12,13} The press release by Genesis Genomics announcing the identification of the 'Unknown Child' subsequently received extensive coverage in the Canadian press.^{14–16} Teeth 55 and 73 will be re-interred at the burial site; tooth 84 was consumed in the DNA extraction at Brigham Young University in August of 2002.

In conclusion, the teeth were instrumental in determining the identity of the 'Unknown Child' and the University of Toronto was able to play a pivotal role in the interdisciplinary solving of this mystery, allowing the team of dentists to distinguish between the 2 male candidate children who carried the same mtDNA. Given the 6 months age difference between the 2 children, the teeth will now allow a name to be placed on the grave of an 'Unknown Child' in Halifax's Fairview Lawn Cemetery: Eino Viljam Panula. ♦

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Dr. Kulkarni is associate professor, department of pediatric dentistry, University of Toronto.

Mr. Ruffman is a professional geologist and president of Geomarine Associates, Halifax, Nova Scotia.

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

References

- Eaton JP, Haas CA. *Titanic, triumph and tragedy*. 2nd ed. New York and London: W.W. Norton and Co.; 1995.
- Ruffman A. The position of *Titanic's* lifeboats on recovery. *Voyage* 2000; No. 33, Autumn, 42–43. Titanic International Society Inc., Freehold, New Jersey.
- Ruffman A. *Titanic remembered, the unsinkable ship and Halifax*. Halifax (NS): Formac Publishing Co. Ltd.; 1999.

4. Soldner H. RMS Titanic passenger and crew list (10 April 1912 – 15 April 1912). 2000; ä wie Ärger Verlag, Rüti, Switzerland, ISBN 3-9521715-1-4, 48pp plus Errata and Supplementary Information RMS Titanic passenger and crew list. August 13, 2001, 8pp.
5. Ruffman A, Parr RL. An update on the ancient DNA identification of Titanic victims [Extended Abstract]. *Argonauta*, 2002; 19(3):13–16. The Newsletter of the Canadian Nautical Research Society.
6. Ruffman A, Parr RL. The last of the lost: a preliminary report on the paleo-DNA project and the unidentified Titanic victims in Halifax (Nova Scotia) Cemeteries [Abstract]. *Voyage* 2002; No. 40 p. 57. Titanic International Society, Inc., Freehold, New Jersey.
7. Parr RL, Ruffman A. DNA test results from Fairview Cemetery 'Unknown Child' identification continues. *Atlantic Daily Bulletin*. No. 2, p. 27. The British Titanic Society, Leigh, Lancashire.
8. Ruffman A. Personal communication. July 7, 2003.
9. Scott JH, Symons NBB. Introduction to dental anatomy. 4th edition, E and S Livingston Ltd., Edinburgh and London. 1964.
10. Haas CA, editor. Researchers identify 'Unknown child' and Secrets of the dead: Titanic's ghosts. *Voyage* 2002; No 41, Fall, 20-28. Titanic International Society, Inc., Freehold, New Jersey.
11. Genesis Genomics. The last of the lost. November 5, 2002. Press release.
12. Genesis Genomics. Titanic's 'Unknown Child' identified. November 6, 2002. Press release.
13. Genesis Genomics. 'The last of the lost', The Titanic Ancient DNA Project. *Argonauta* 2003; 20(1):4–5. The newsletter of the Canadian Nautical Research Society.
14. Cox K. DNA sleuthing reveals name of child lost in the Titanic. *The Globe and Mail* 2002 Nov 7; Sect. A:3.
15. Halifax (CP). 'Unknown Child' DNA solves identity of toddler — a Titanic victim — 90 years after doomed ship sank. *The Toronto Sun* 2002 Nov 7; Sect. News:50.
16. Auld A. Mystery Titanic baby identified by DNA. Relative in Finland proves blood match for 13-month-old boy. *The Toronto Star* 2002 Nov 7; Sect. A:23.

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Estimating the Weight of Dental Amalgam Restorations

- Albert O. Adegbenbo, BDS, DDPH, MSc, FRCD(C) •
- Philip A. Watson, DDS, MScD •
- Shanin Rokni, DDS •

A b r i d g e d V e r s i o n

The complete article can be viewed on the eJCDA Web site at: <http://www.cda-adc.ca/jcda/vol-70/issue-1/30.html>

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This article has been peer reviewed.

It is impossible to estimate dentistry's contribution to the annual flux of anthropogenic mercury because data on the weights of amalgam restorations are lacking. The aim of this study was to determine these weights and to develop criteria to help in their estimation.

The weight of amalgam restorations removed from 155 natural teeth and 359 anatomical replicas was determined to a precision of 0.01 g. Four separate regression models with 4 covariates in various combinations were used to estimate these weights. Model I estimated the weights of 514 restorations from both natural and anatomical replica teeth using 3 of the covariates: number of restored surfaces (covariate A), type of tooth (covariate B) and whether the restoration had been removed from a natural tooth or an anatomical replica tooth (covariate C). Model II, based on 359 restorations from anatomical replicas, used 2 covariates: A and B. Model III, based on 155 restorations from natural teeth, used 3 covariates: covariates A and B and whether the natural teeth had been extracted in 2002 or at least 15 years previously (covariate D). In model IV, covariate D was removed from model III.

The mean weight (and standard deviation [SD]) of the amalgam restorations was 0.48 g (SD 0.42 g) for all 514 teeth, 0.42 g (SD 0.39 g) for the 359 anatomical replicas, 0.60 g (SD 0.46 g) for the 104 natural teeth collected 15 or more years ago and 0.67 g (SD 0.43 g) for the 51 natural teeth collected recently. The mean weights of restorations removed from natural teeth recently and 15 or more years ago were similar, but they differed significantly from those removed from anatomical replicas (Tukey's test, $p \leq 0.05$). The mean weight of restorations increased with

the number of restored surfaces (analysis of variance, $p < 0.001$). The mean weights in each class of restoration were significantly different (Tukey's test, $p \leq 0.05$). The mean weight (and 95% confidence interval [CI]) of amalgam restorations with 1, 2, 3, and 4 or more restored surfaces was 0.26 g (0.23–0.28 g), 0.50 (0.43–0.56 g), 0.77 g (0.70–0.85 g) and 1.73 g (1.52–1.95 g), respectively.

Both models III and IV explained 54% of the variation in the weight of restorations, whereas models I and II explained 72% and 84%, respectively. In all 4 models, covariate A (the number of surfaces restored) independently accounted for at least 80% of the variation explained. Covariate D did not influence the weight of amalgam restorations. On the basis of the results of least squares regression in model I, the least square mean weight of restorations with 1, 2, 3, and 4 or more restored surfaces (and 95% CI), adjusted for the effects of covariates B and C, was 0.31 g (0.28–0.34 g), 0.49 g (0.45–0.53 g), 0.81 g (0.76–0.86 g) and 1.38 g (1.31–1.45 g), respectively. Restorations in premolars, maxillary molars and mandibular molars had estimated weights of 0.67 g (0.62–0.71 g), 0.68 g (0.64–0.72 g) and 0.90 g (0.86–0.93 g), respectively, with model I. Similarly, estimated weights for restorations from natural and anatomical replica teeth were 0.86 g (0.82–0.90 g) and 0.64 g (0.61–0.66 g), respectively, with model I. Covariate A provided the best estimate for the weight of amalgam restorations. This study provides data that should assist others to develop reliable estimates of the flux of mercury associated with dentistry. ♦

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Implant Imaging for the Dentist

• Muralidhar Mupparapu, DMD •
• Steven R. Singer, DDS •

A b r i d g e d V e r s i o n

The complete article can be viewed on the eJCDA Web site at: <http://www.cda-adc.ca/jcda/vol-70/issue-1/32.html>

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This article has been peer reviewed.

Dental implants have become part of routine treatment plans in many dental offices because of their increasing popularity and acceptance by patients. Appropriate preplacement planning, in which imaging plays a pivotal role, helps to ensure a satisfactory outcome. The development of precise presurgical imaging techniques and surgical templates allows the dentist to place these implants with relative ease and predictability. This article gives an overview of current practices in implant imaging for the practising dentist, with emphasis on selection criteria. Imaging protocols for site assessment and restorative evaluation are discussed. This information will enable the dentist to select and use appropriate radiographic images (digital or film) for implant treatment planning, restoration and postoperative follow-up. Modalities presented include intraoral and panoramic projections, linear and complex motion tomography and computed tomography (CT).

Periapical projections aid in the assessment of bony architecture of the implant site in great detail. They are useful initially, in assessing caries and periodontal disease in adjacent natural teeth. Panoramic radiographs allow one to view the entire maxilla and mandible, along with adjacent anatomic structures. Relations between anatomic structures such as sinuses and neurovascular canals can be seen in these views. The limitations of these views are that they provide only a 2-dimensional image of the 3-dimensional anatomy. In addition, uneven magnification of structures in the panoramic views makes them less valuable for direct bony measurements.

To visualize the buccolingual (third) dimension, there is a need for some form of cross-sectional imaging. Linear tomography and complex motion tomography provide this

essential cross-sectional information. Although both of these modalities impart adequate information for implant site assessment, complex motion tomography provides better images as it is associated with fewer inherent artifacts. The magnification in these views is predictable and measurable.

When multiple implants are anticipated, large areas of the maxilla or the mandible are to be restored, sinuses or canals are near or in the implant site, or normal anatomy has been altered, CT imaging is indicated. CT images of the maxilla and mandible are obtained using special software (e.g., Dentascan) to reformat into the cross-sectional and panoramic views and obtain useful views and 3-dimensional reconstructions for implant placement. In addition, these images can be used for interactive simulated placement of implants using software such as SimPlant. Magnification and distortion in CT views is minimal and direct measurements are possible from the images provided. CT enhances the contrast of structures, providing a readily interpreted image. Although CT subjects the patient to a higher dose of ionizing radiation compared with conventional tomography, the dose can be minimized by limiting the scanning protocol to include only the arch of interest.

Clinical follow-up and radiographic re-examinations are indicated when signs suggest inadequate osseointegration. Saucerization of peri-implant crestal bone indicates early bone loss at the crestal level. Assessment of implant placement, restorative procedures and long-term follow-up can be aided by the use of periapical, vertical bitewing and panoramic projections. Radiographic evidence of successful osseointegration can be obtained from intraoral periapical and vertical bitewing views. ♦

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- Michael A. Layug, BSc, DDS, MSc, FRCD(C) •

A b s t r a c t

Purpose: To compare ferric sulfate (FS) pulpotomy and primary tooth root canal therapy (RCT) in cariously exposed vital pulps of primary incisors.

Methods: A total of 133 incisors in 50 children were randomly selected to be treated by FS pulpotomy (64) or RCT (69).

Results: Two years after treatment, 77 incisors (41 FS pulpotomy, 36 RCT) were available for clinical and radiographic examination. There was no clinical evidence of pathosis in 78% of FS pulpotomy-treated and 100% of RCT-treated incisors. Two independent pediatric dentists evaluated periapical radiographs of the treated incisors. Incisors were classified into 1 of 4 treatment outcomes: N, normal treated incisor; H, nonpathologic radiographic change present; P_o, pathologic change present, but not requiring immediate extraction; P_x, pathologic change present, extract immediately. Survival analysis was applied. A moderate level of agreement between raters was found for incisors with outcome P_x (K = 0.54). Intra-rater reliability was substantial for incisors with outcome P_x (K = 0.61). No difference was demonstrated in the proportion of FS pulpotomy- and RCT-treated incisors rated P_x at the 2-year recall ($\chi^2 = 0.6$). RCT incisors demonstrated a significantly higher survival rate than FS pulpotomy incisors at 2 years ($p = 0.04$).

Conclusions: Treatment outcomes for RCT incisors were not significantly different from FS pulpotomy-treated incisors at 2 years; however, at 2 years the survival rate of RCT incisors was statistically greater than that of FS pulpotomy-treated incisors.

MeSH Key Words: dental pulp exposure/therapy; pulpotomy/methods; root canal therapy

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Formocresol (FC) pulpotomy and zinc-oxide eugenol (ZOE) root canal therapy (RCT) have both been advocated as techniques for managing inflamed vital pulp in primary incisors.^{1,2} Concerns about the safety of FC for vital pulp therapy have led to investigations of alternative techniques and materials.³ Ferric sulfate (FS) pulpotomy has resulted in outcomes comparable to those of FC pulpotomy in primary molars.^{4,5} One study of RCT demonstrated favourable outcomes in vital primary incisors.¹ No prospective investigations have directly compared outcomes of RCT and FS treatments for vital pulp exposure in primary incisors. This investigation

compared outcomes 2 years after FS pulpotomy or RCT with ZOE.

Methods

The subjects selected for this investigation were treated at The Hospital for Sick Children, Toronto, Ontario, between October 1998 and March 1999. Healthy children with 1 or more carious primary incisors, where removal of dental caries was likely to expose vital pulp, were invited to participate in the study. The procedures, possible discomforts or risks as well as possible benefits were explained fully to the subjects and their parents or

guardians, and informed consent was obtained and recorded before their participation in this investigation. The Research Ethics Board at The Hospital for Sick Children approved this investigation.

A total of 133 primary incisors in 50 subjects (29 male, 21 female) were identified for this study. FS pulpotomy was carried out in 64 primary incisors in 24 subjects (13 male, 11 female). RCT was the treatment for 69 primary incisors in 26 subjects (16 male, 10 female). Of the enrolled participants, 64% returned for at least 1 evaluation. The final sample consisted of 77 incisors (41 FS, 36 RCT) in 23 subjects for whom clinical and radiographic data were available for analysis at the 2-year reassessment.

After induction of general anesthesia, periapical radiographs were acquired for each incisor tooth that was likely to have carious pulp exposure. Incisors included in the study exhibited no radiographic evidence of physiologic or pathologic root resorption, periapical radiolucencies or pulp stones. Incisors with an associated swelling or sinus tract were excluded.

Three pediatric dentists (DJK, DHJ, PLJ) completed all treatment over 22 weeks. All incisors were treated under rubber dam isolation. Children whose incisors met the inclusion criteria were randomly selected to receive FS pulpotomy or RCT. Treatment data were recorded daily on preprinted data collection sheets and entered into a database. Quality assurance checks were performed by 1 of the investigators (MAL), who did not provide treatment or review postoperative radiographs, to ensure that the investigators who provided treatment complied with the randomization protocol.

Primary Incisor Root Canal Therapy Procedure

The RCT technique used was described by Payne and others.¹ Access into the pulp chamber was achieved using a sterile #56 fissure bur in a high-speed handpiece, then refined with sterile round burs in a low-speed handpiece. The coronal pulp was amputated with a round bur. Radicular pulp tissue was removed by inserting two #15 or #20 Hedström files, one at a time, down opposite sides of the root canal to a point close to, but short of the apex. The files were then rotated 2 or 3 times to engage the pulp tissue and remove it. In most cases, the pulp tissue was removed *en bloc* on the first attempt. If the first attempt was unsuccessful, the procedure was repeated until all of the pulp tissue was removed.

The canal was then irrigated and gently air-dried using an air–water syringe. The canals were obturated using a viscous mixture of Sedanol (Dentsply DeTrey, Addlestone, UK), a fine-grained, non-reinforced ZOE preparation. The paste was delivered to the root canal with a spiral paste filler (Lentulo, Dentsply DeTrey) inserted into the canal to a point just short of the apex. On completion of canal obturation, the incisor was immediately restored with an

acid-etch resin restoration (Spectrum TPH, L.D. Caulk, York, Penn.).⁶

Ferric Sulfate Pulpotomy Procedure

The FS pulpotomy procedure was similar to the technique described by Coll and others.² Access to the pulp chamber was achieved using a sterile #56 fissure bur mounted in a high-speed handpiece, then refined with round burs in a low-speed handpiece. The coronal pulp was removed using a sterile low-speed round bur (#6 or #8). A 15.5% FS solution in an aqueous vehicle (Astringedent, Ultradent Products Inc., Salt Lake City, Utah) was gently applied to the radicular pulp for 15 seconds with the syringe applicator supplied by the manufacturer. The pulp chamber was flushed with water supplied by an air–water syringe. If the bleeding had not stopped after the initial application of FS, the incisor was eliminated from the study. If hemostasis was achieved, the pulp chamber was sealed with a fortified ZOE mixture supplied in premeasured capsules (L.D. Caulk, Milford, Del.). The incisor was then immediately restored with an acid–etch resin restoration (Spectrum TPH, L.D. Caulk).

Clinical and Radiographic Evaluation

All subjects were offered clinical and radiographic assessments 12 and 24 months after treatment. Subjects who returned for a follow-up examination were asked to report any history of pain related to the treated incisors. Each incisor was classified as present, exfoliated, lost to trauma or extracted. If the incisor was still present, the following observations were recorded: missing restoration, recurrent caries, mobility and percussion sensitivity. The surrounding gingiva and mucosa were also examined for any signs of erythema, swelling, parulis or the presence of a fistulous tract.

Periapical radiographs were taken of all treated incisors. The radiographs were taken on size 0 film using a Rinn holder (Dentsply Rinn, Elgin, Ill.) and bisecting angle technique. All radiographs taken during follow-up sessions were screened for their diagnostic quality before being included in the radiographic evaluation. Acceptable radiographs had nondistorted images of the treated incisors and the osseous structures immediately adjacent to the roots. Radiographs that did not meet these criteria were excluded.

Two independent pediatric dentists who were not otherwise involved in the investigation evaluated the radiographs. Before the review, the raters participated in a calibration exercise using sample radiographs of incisors that had received FS pulpotomies and RCT. The raters were encouraged to reach consensus on radiographic assessment. After the calibration exercise, the raters were separated and evaluated the radiographs alone under standardized viewing conditions. The raters' scores were subjected to inter-rater reliability testing. One reviewer reassessed a subset of the

Table 1 Pathologic findings by radiographic assessment at 2-year follow-up examination of vital incisors treated by FS pulpotomy or RCT

Pathologic finding	FS pulpotomy (n = 12)		RCT (n = 11)	
	Number	%	Number	%
Pulp canal obliteration	3	25	n/a	n/a
Widened periodontal ligament space	8	67 ^a	2	18
Periapical radiolucency	7	58	3	27
Internal resorption	2	17	n/a	n/a
External resorption	4	33	3	27
Caries	4	33	4	36

FS = ferric sulfate; RCT = root canal therapy; n/a = not applicable

^a $\chi^2 = 5.4$; $p < 0.02$

Table 2 Classification by radiographic assessment of incisors treated by FS pulpotomy or RCT at 2-year follow-up examination

Category ^a	FS pulpotomy (n = 12)		RCT (n = 11)	
	Number	%	Number	%
N	2	17	8	73
H	3	25	0	0
P _O	2	17	1	9
P _X	5	42	2	18

FS = ferric sulfate; RCT = root canal therapy

^aN = normal incisor; H = changes associated with normal physiologic root resorption; P_O, pathologic radiographic change present, but not requiring immediate extraction; and P_X, pathologic radiographic change present and immediate extraction recommended.

radiographs 2 weeks after the initial assessment so that intra-rater reliability could be calculated.

All radiographs included in this investigation were subjected to identical evaluation criteria regardless of treatment. The raters were asked to determine the presence or absence of widened periodontal ligament space, furcation or periapical radiolucency, pulp canal obliteration and pathologic internal or external root resorption. The raters classified each incisor according to 1 of 4 outcomes: N, normal incisor without evidence of radiographic change; H, radiographic changes associated with normal physiologic root resorption; P_O, pathologic radiographic change present, but not requiring immediate extraction; and P_X, pathologic radiographic change present and immediate extraction recommended.⁷

Data Analysis

In subjects with more than 1 treated incisor, a single incisor was randomly selected for analysis to preserve the statistical independence of the observations. Discrete variables for radiographic findings and treatment outcomes were tested for statistical differences using the χ^2 test. Percentages were used to summarize categorical data. A Wilcoxon test was conducted to compare the survival of incisors treated by FS pulpotomy with those undergoing RCT. Graphical representations of survival were produced for both groups using the Kaplan-Meier method. Inter-rater and intra-rater agreement for dichotomous responses were measured using the Kappa statistic.

Results

Clinical and Radiographic Findings

Twelve subjects (41 incisors) in the FS-treated group returned for assessment when contacted 2 years after treatment; the average recall interval was 25.8 ± 3.1 months. Their average age at time of treatment was 3.3 years \pm 0.8 years (standard deviation [SD]). Clinical examination revealed associated gingival swelling or parulis in 9 of the 41 FS-treated incisors (22%). No subjects reported pain from FS-treated incisors at the 2-year recall appointment.

Eleven subjects (36 incisors) in the RCT group attended a recall examination when contacted 2 years after initial treatment; the average recall interval was 26.8 ± 2.2 months. Their average age at time of treatment was 3.1 ± 0.7 years. There were no soft tissue swellings or fistulae or reports of pain associated with any of the 36 RCT-treated incisors. Radiographic findings for FS and RCT incisors are listed in Table 1.

At the 2-year assessment, FS-treated incisors had a significantly higher prevalence of widened periodontal ligament space ($\chi^2 = 5.4$; $p = 0.02$) than RCT-treated incisors. No statistically significant differences in external root resorption, periapical radiolucencies or coronal caries were detected.

Nonpathologic radiographic outcomes (categories N and H) were observed in only 42% of the incisors treated with FS and 73% of RCT incisors (Table 2). There were no

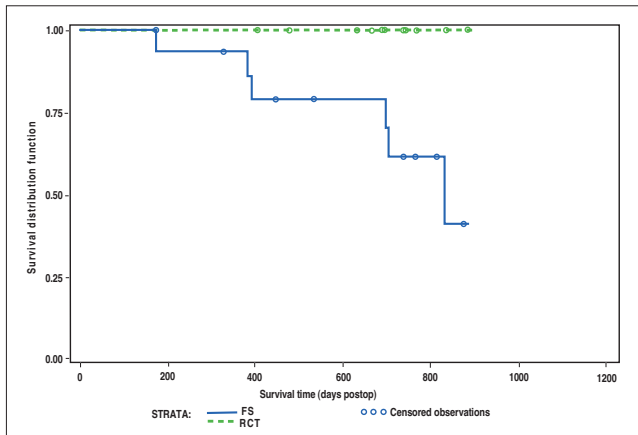


Figure 1: Kaplan-Meier survival curves for FS- and RCT-treated incisors

significant differences between the 2 treatments in the number of incisors classified P_X at 2 years after treatment ($\chi^2 = 0.6$) (Table 2). FS-treated incisors had 59% acceptable outcomes on radiographic examination, which was not statistically different from the 82% acceptable outcomes for RCT incisors (χ^2 [Yates corrected] = 0.59; $p > 0.05$). A sample-size estimate predicted that 54 RCT and 17 FS incisors would be required to demonstrate a statistically significant difference in outcomes between the 2 groups at 2 years.

Measures of Reliability

The level of agreement between the raters was moderate in classifying incisors in the P_X category ($K = 0.54$ using Landis and Koch's⁸ interpretation of reliability). Raters agreed on combinations of radiographic features that indicated when extraction of an incisor was indicated. Intra-rater reliability was substantial for classifying an incisor as P_X ($K = 0.61$).

Survival Analysis

Any incisor rated P_X , exfoliated prematurely or extracted during the recall interval of the investigation was classified as not meeting the criteria for survival. Survival analysis was carried out for 16 subjects in the FS group and 13 subjects in the RCT group who had a follow-up visit at any point in the investigation. In 63% (10/16 observations) of FS-treated incisors and 85% (11/13 observations) of RCT-treated incisors, the tooth survived until the completion of the investigation. Kaplan-Meier survival curves for both groups are similar until about 7 months after treatment (Fig. 1). Beyond 7 months, the survival curve for the FS pulpotomy incisors diverges from the RCT curve and demonstrated an overall statistically lower survival (Wilcoxon, $p = 0.04$).

Discussion

This investigation provided an opportunity to replicate the work of Payne and others¹ for RCT using an identical

prospective study design and evaluation method for outcome classification. Of the incisors treated by RCT, 82% had acceptable outcomes, comparable with the 90% reported by Payne and others.¹ However, this assessment is the only prospective clinical outcome study that compares FS pulpotomy with another non-aldehyde form of primary incisor pulp treatment.

Based on clinical examination alone, RCT produced very favourable outcomes. At the 2-year follow-up, no pathosis was detected in any of the RCT-treated incisors on clinical examination; 78% of FS-treated incisors had no pathosis on clinical examination at 2-year follow-up. However, radiographic examination showed favourable outcomes for 59% of the FS group and 82% of the RCT-treated incisors. This suggests that radiographic follow-up of primary incisor pulp therapy is indicated, as the clinical appearance alone may not reveal the true status.

The most common pathologic finding for FS pulpotomy-treated incisors was widened periodontal ligament space (in 67% of FS-treated incisors but only 18% of RCT incisors).

Internal resorption was observed in 17% of FS-treated incisors, and was sufficiently severe in some incisors to be rated unacceptable. These incisors did not meet the criteria for survival on the basis of clinical examination.

Unlike FC, FS is not a tissue fixative. FS produces hemostasis at the amputated pulp stump by mechanically sealing cut blood vessels. This leaves vital pulp tissue in contact with ZOE. The irritating properties of eugenol have been shown to result in internal resorption when it is applied to the vital pulp of primary molars.^{9,10} Fixation of pulpal tissue by FC may prevent pulpal reaction to eugenol, thereby reducing the prevalence of internal resorption in FC pulpotomies. Future investigations of FS pulpotomy would benefit from the use of materials that do not stimulate internal resorption.

Nonpathologic radiographic outcomes (categories N and H) were observed in only 42% of the incisors treated with FS and 73% of RCT incisors. Teeth with radiographic evidence of pathosis were classified into P_O and P_X outcomes as clinicians do not regard all pathologic changes as an absolute indication for extraction of pulp-treated incisors. Pediatric dentists are likely to leave pulp-treated primary incisors that exhibit a limited degree of radiolucency or pathologic root resorption in the absence of clinical signs and symptoms in situ. Pathosis confined within the tooth, such as internal resorption or pulp canal obliteration, should not be considered harmful to the underlying permanent tooth and are acceptable outcomes following pulp therapy.^{4,5} Protocols that classify incisor outcomes as acceptable (normal or minor pathosis present) or unacceptable (major pathosis present) are more clinically relevant than protocols that classify outcomes as normal versus

pathologic or successful versus unsuccessful as they more closely mimic clinical decision-making.¹

A limitation of this investigation is the sample size available for assessment of treatment outcomes at 2 years. Fifty-six of 133 incisors were lost to follow-up over the period of the investigation. To ensure independence of the observations for appropriate application of statistical analysis, each of 23 subjects (41 FS and 36 RCT incisors) contributed only a single incisor to the analysis of treatment outcomes. This effectively reduced the final sample size to 23 incisors (12 FS and 11 RCT). Sample wastage and the requirement for statistical independence of observations are important limitations to assessment of treatment outcomes. Survival analysis, as employed in this investigation, can use data more efficiently than traditional outcome analysis and is preferable for clinical trials of this type.

This investigation replicated the findings of 2 previous outcome studies of vital incisor RCT.^{1,7} Vital RCT and FS pulpotomy have the advantage of avoiding the use of aldehydes in children. However, the survival of RCT-treated incisors is significantly greater than those treated by FS pulpotomy.

Conclusions

Treatment of exposed vital pulp by RCT with ZOE resulted in a significantly greater survival rate for primary incisors at 2 years after treatment than FS pulpotomy. Clinicians who wish to avoid the use of aldehydes should select RCT for restoring vital primary incisors with carious pulp exposures. ♦

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References

1. Payne RG, Kenny DJ, Johnston DH, Judd PL. Two-year outcome study of zinc oxide-eugenol root canal treatment for vital primary teeth. *J Can Dent Assoc* 1993; 59(6):528-30, 533-6.
2. Coll JA, Josell S, Nassof S, Shelton P, Richards MA. An evaluation of pulpal therapy in primary incisors. *Pediatr Dent* 1988; 10(3):178-84.
3. Ranly DM, Garcia-Godoy F. Current and potential pulp therapies for primary and young permanent teeth. *J Dent* 2000; 28(3):153-61.
4. Casas MJ, Layug, MA, Kenny DJ, Johnston, DH, Judd, PL. Two-year outcomes of primary molar ferric sulfate pulpotomy and root canal therapy. *Pediatr Dent* 2003; 25(2):97-101.
5. Fuks AB, Holan G, Davis JM, Eidelman E. Ferric sulfate versus dilute formocresol in pulpotted primary molars: long-term follow-up. *Pediatr Dent* 1997; 19(5):327-30.
6. Judd PL, Kenny DJ, Johnston DH, Yacobi R. Composite short-post technique for primary anterior teeth. *J Am Dent Assoc* 1990; 120(5):553-5.
7. Yacobi R, Kenny DJ, Judd PL, Johnston DH. Evolving primary pulp therapy techniques. *J Am Dent Assoc* 1991; 122(2):83-5.
8. Landis J, Koch G. The measurement of observer agreement for categorical data. *Biometrics* 1977; 33(1):159-74.
9. Berger JE. Pulp tissue reaction to formocresol and zinc oxide-eugenol. *ASDC J Dent Child* 1965; 32:13-28.
10. Hansen HP, Ravn JJ, Ulrich D. Vital pulpotomy in primary molars. A clinical and histologic investigation of the effect of zinc oxide-eugenol cement and Ledermix. *Scand J Dent Res* 1971; 79(1):13-25.

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The Association of Third Molars with Mandibular Angle Fractures: A Meta-Analysis

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A b s t r a c t

Objective: To estimate the relative risk of mandibular angle fractures among people with a lower third molar compared with those without a lower third molar.

Methods: Data for a case-control meta-analysis were obtained by performing a literature search in MEDLINE and EMBASE to identify suitable observational studies. To be included, studies had to present data on patients with mandibular fractures, incorporate cross-classified information about the presence of a lower third molar and indicate whether the fracture was a mandibular angle fracture on the ipsilateral side.

Results: Six studies, involving 3,002 patients with mandibular fractures, met the inclusion criteria. Crude relative risk estimates for an angle fracture, comparing patients with a third molar with those without, ranged from 1.2 to 12.7. There was evidence of heterogeneity across the 6 studies ($p = 0.001$), but when 2 studies with less methodologic rigour were excluded, a test of homogeneity was no longer statistically significant ($p = 0.22$). The estimated relative risk across the remaining 4 studies was 2.4 (95% CI 1.9 to 3.0).

Conclusions: The presence of a lower third molar may double the risk of an angle fracture of the mandible. This could have a bearing on any clinical decision on whether to extract the molar.

MeSH Key Words: mandibular fractures/etiology; meta-analysis; molar, third/physiopathology

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Mandibular fractures are common; the reported rate of occurrence is 11.5 per 100,000 person-years.¹ People between the ages of 16 and 30 years account for 50.2% of these fractures. Mandibular fractures follow a pattern common to many injuries in that males and young adults are predominantly affected. Fractures of the mandibular angle account for about 40% of mandibular fractures.²

Because the lower third molar is located near the angle of the mandible, it has been hypothesized that its presence increases the risk of fracture. It is possible that a mandibular third molar weakens the jaw by decreasing the cross-sectional area of bone. If this is true, extracting the third molar and allowing the tooth socket to fill with bone may reduce the risk of an angle fracture. However, third molars

are common, and extraction is costly and controversial in terms of both risks and benefits.³⁻⁹

Several published studies of patients with mandibular fractures have examined the relation between the presence of a third molar and the risk of fracture. Many are not formal case-control studies, but some can be analyzed as such providing that certain assumptions are met.^{10,11} Patients with an angle fracture of the mandible can be considered to be cases. A randomized sample of the population from which the cases arose would constitute ideal controls; few would have a mandibular fracture. Published case series do not have such controls; however, provided that the presence of a third molar is not related to the risk of mandibular fracture in locations other than the angle and the referral or admission of people with mandibular fractures at sites other than the angle is not related to the

Table 1 Characteristics of included studies

Authors	Year of publication	Years data collected	Location	No. of cases and controls	Mean age of patients (years)	Data source	Males, %	Injury mechanism (as described in paper)
Tankersly and Abubaker ¹⁶	1995	No information	Virginia, USA	215	No information	Patient case records and panoramic radiograph	No information	No information
Lee and Dodson ¹³	2000	January 1993–1998	Atlanta, USA	367	31.7	Patient chart and panoramic radiograph	79	Altercation Motor vehicle crash Fall Gunshot Occupation Other
Ma'aïta and Alwrikat ¹⁸	2000	January 1993–July 1997	Amman, Jordan	615	33.2	Patient records and panoramic radiograph	79	Motor vehicle crash Fall Fight Other
Ugboko and others ¹⁷	2000	January 1976–July 1997	Ile-Iife, Nigeria	490	30.9	Patient case records and panoramic radiograph	75.3	Motor vehicle crash Fall Sports Gunshot Other
Fuselier and others ¹⁹	2002	1990–2000	Dallas and Atlanta, USA	1,210	30.8	Patient chart and panoramic radiograph	81	No information
Meisami and others ²⁰	2002	1995–2000	Toronto, Canada	105 ^a	No information	Patient chart and panoramic radiograph	83	Assault Fall Sports Motor vehicle crash Other

^aData are for left angle fractures only.

presence of a third molar, then patients with mandibular fractures at locations other than the angle can be used as controls and should reflect the prevalence of third molars in the general population.

We employed these assumptions to estimate the relative risk of mandibular fracture among people with a third molar compared with those without a third molar, using available data from the published literature.

Methods

Search Strategy

A search of MEDLINE was conducted for articles published from 1966 to July 2000 and of EMBASE for publications from 1980 to July 2000. To identify relevant studies, the MEDLINE search was performed using the keywords “angle fracture” and “third molar.” The EMBASE search used the term “third molars.” No additional articles were identified in EMBASE that had not been found in the MEDLINE search. The reference lists of the relevant studies were examined and one additional study was identified.

Inclusion Criteria

To be included in this meta-analysis, studies had to meet one of the following criteria:

- A cohort study that reported the number of angle fractures among people with and without third molars.
- A case–control study that provided information about the proportion of those with a third molar among patients with angle fractures compared with those without angle fractures.
- A case series with information about the presence of a third molar in patients with fractures at the angle of the mandible and fractures elsewhere in the mandible.

An angle fracture was defined as a fracture located posterior to the second molar and extending from any point on the curve formed by the junction of the body of the mandible with the posterior border of the ramus.¹²

Study Identification

The search yielded 71 possible articles, all of which were obtained and examined. No cohort or case–control studies were found. Nineteen case series were identified, the original articles were reviewed and 7 were selected. These

Table 2 Primary statistics from all studies with 95% confidence interval

Authors	Year of publication	No. patients	Cases (those with angle fracture)		Controls (those with other mandibular fractures)		Odds ratio	95% confidence interval
			No. (%) with third molars	Total	No. (%) with third molars	Total		
Tankersly and Abubaker ¹⁶	1995	215	96 (81)	118	42 (43)	97	5.7	(3.1–10.6)
Lee and Dodson ¹³	2000	367	79 (80)	99	170 (63)	268	2.3	(1.3–4.0)
Ma'aita and Alwrikat ¹⁸	2000	615	127 (84)	152	299 (65)	463	2.8	(1.7–4.5)
Ugboko and others ¹⁷	2000	490	65 (86)	76	343 (83)	414	1.2	(0.6–2.4)
Fuselier and others ¹⁹	2002	1,210	269 (82)	326	568 (64)	884	2.6	(1.9–3.6)
Meisami and others ^{20 a}	2002	105	50 (78)	64	9 (22)	41	12.7	(4.9–32.8)
Total		3,002	686 (82)	835	1,431 (66)	2,167	2.8	(2.3–3.5)

^aData are for left angle fractures only.

7 studies contained information about the relation between the mandibular third molar and angle fracture. Subsequently, studies that investigated this relation in exposure or outcome *subgroups* were excluded. One study¹² was excluded because the same patients were also part of a study by Lee and Dodson.¹³ Two others were excluded because one was restricted to sports injuries,¹⁴ and the other only included subjects with incompletely erupted third molars.¹⁵ One additional study,¹⁶ published only as an abstract, was found by searching the bibliographies of the 4 studies identified in MEDLINE. Four studies that presented cross-tabulated information about angle fracture and third molars were included.^{16–19} In addition, 2 studies published in 2002 and recommended during review of this manuscript were included.^{20,21}

Subanalysis of Original Data

Data from the 4 published studies allowed calculation of only crude odds ratios. Because these estimates might be affected by confounding, the authors were contacted and asked to provide their original data. One original data set was received from T.B. Dodson.¹³

Analysis

Information regarding the location of mandibular fracture and the presence of a lower third molar was extracted from each study and used to calculate odds ratios for the association of fracture with the presence of a third molar. Odds ratios were used to approximate relative risks, and 95% confidence intervals (CIs) were calculated. Results were summarized across studies using the Mantel-Haenszel

method.²¹ This fixed-effect method was considered appropriate, but random-effects estimates were also calculated using the method of DerSimonian and Laird.²² A formal test of homogeneity was undertaken to establish whether it was reasonable to assume that the estimate of relative risk across studies was consistent.^{23,24} All analyses were carried out using the statistical package Stata (v. 6.0, Stata Statistical Software, College Station, Texas, 1997).²⁵

Using original data from one study, logistic regression was used to determine whether the crude association between the presence of a third molar and angle fracture might be affected by age, sex or mechanism of injury. Age was categorized as < 29 years, 29–49 or > 49 years. Mechanism of injury was categorized as a fight, motor vehicle crash, gunshot, occupational injury or other.

Results

Of the 6 studies^{13,16–20} accepted for the main analysis (Table 1), 3 were conducted in the United States,^{13,16,19} one in Jordan,¹⁸ one in Nigeria¹⁷ and one in Canada.²⁰ These studies were published between 1995 and 2002. The total number of patients was 3,002: 835 with an angle fracture (cases) and 2,167 with some other fracture of the mandible (controls). The crude relative risk estimates in the 6 studies ranged from 1.2 to 12.7. The summary relative risk ratio across all 6 studies was 2.8 (95% CI 2.3–3.5) (Table 2). The random-effects estimate was slightly higher (relative risk ratio 3.1), and the 95% CI was greater (2.0–5.0).

There was evidence of heterogeneity across the 6 studies ($p = 0.001$). The possible reason for this was explored by

eliminating each study in turn in addition to eliminating the study by Tankersly and Abubaker,¹⁶ because these results were published as an abstract, allowing us only limited ability to assess the methods. Discarding the study by Meisami and others²⁰ resulted in nonsignificant homogeneity ($p = 0.22$). Summary relative risk estimates for the remaining 4 studies were 2.4 (95% CI 1.9–3.0) using the Mantel-Haenszel method and 2.3 (95% CI 1.7–3.1) using the random-effects method.

Individual level data from one study¹³ showed little confounding by sex (adjusted odds ratio 2.3) or age (adjusted odds ratio 2.4). The risk ratio adjusted for mechanism of injury (2.8 with 95% CI 1.5–5.2) differed slightly from the crude risk ratio.

Discussion

In this meta-analysis, the results from 6 case series were analyzed as if they were case–control studies to estimate that the risk of an angle fracture of the jaw in people with a lower third molar is approximately double that in people without a third molar.

One mechanism by which third molars have been hypothesized to increase the risk of angle fractures is by occupying osseous space and, thereby, weakening the angle region. In support of that hypothesis, mandibular fractures have been reported to occur occasionally (at a very low incidence of 0.0046%) after wisdom tooth removal (when the angle region is weakened further because the tooth is extracted) when usual food is consumed.²⁶

The identified studies were case series, not case–control studies. However, assuming that in patients with a mandibular fracture at nonangle locations, the presence of a lower third molar does not influence either the risk of fracture or the likelihood of referral or admission, it is reasonable to analyze these data as if they came from case–control studies. Patients with fractures at nonangle locations should, on average, represent the prevalence of third molars in the population from which the patients with angle fractures arose.^{15,17} A similar study design has been used in case–control studies of bicycle helmets and head injuries.^{27,28} However, if the presence of a third molar influences the risk of fracture to parts of the jaw other than the angle, the estimates presented here could be biased.

The available published data allowed us to calculate only crude risk estimates. Adjusted relative risk estimates might differ from the crude estimates. When this possibility was examined in one study, adjusting for age and sex revealed no confounding by these variables, whereas adjusting for mechanism of injury resulted in an estimate of 2.9. If the confounding influence of age, sex and mechanism of injury is similar in the other 5 studies, then the true summary relative risk estimate may be slightly greater than our estimate of 2.8 for all studies.

If the association that we found is causal, then this might be taken into account, along with other factors, in any decision regarding the removal of third molars. ♦

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The authors have no declared financial interests.

References

1. Azevedo AB, Trent RB, Ellis A. Population-based analysis of 10,766 hospitalizations for mandibular fractures in California, 1991 to 1993. *J Trauma* 1998; 45(6):1084–7.
2. Haug RH, Prather J, Indresano AT. An epidemiologic survey of facial fractures and concomitant injuries. *J Oral Maxillofac Surg* 1990; 48(9):926–32.
3. Meechan JG, Safdar N. Lower third molars and mandibular angle fractures. *Br Dent J* 1996; 180(5):169.
4. Brickley MR, Tanner M, Evans DJ, Edwards MJ, Armstrong RA, Shepherd JP. Prevalence of third molars in dental practice attenders aged over 35 years. *Community Dent Health* 1996; 13(4):223–7.
5. Lysell L, Brehmer B, Knutsson K, Rohlin M. Rating the preventive indication for mandibular third-molar surgery. The appropriateness of the visual analogue scale. *Acta Odontol Scand* 1995; 53(1):60–4.
6. Lysell L, Brehmer B, Knutsson K, Rohlin M. Judgement on removal of asymptomatic mandibular third molars: influence of the perceived likelihood of pathology. *Dentomaxillofac Radiol* 1993; 22(4):173–7.
7. Knutsson K, Brehmer B, Lysell L, Rohlin M. Mandibular third molars as mediated by three cues. Dentists' treatment decisions on asymptomatic molars compared with molars associated with pathologic conditions. *Acta Odontol Scand* 1997; 55(6):372–7.
8. Tulloch JF, Antczak-Bouckoms AA, Ung N. Evaluation of the costs and relative effectiveness of alternative strategies for the removal of mandibular third molars. *Int J Technol Assess Health Care* 1990; 6(4):505–5.
9. Goldberg MH, Nemerich AN, Marco WP. The impacted third molar: referral patterns, patient compliance, and surgical requirements. *J Am Dent Assoc* 1983; 107(3):439–41.
10. Cummings P, Koepsell T, Weiss NS. Studying injuries with case-control methods in the emergency department. *Ann Emerg Med* 1998; 31(1):99–105.
11. Cummings P, Koepsell T, Roberts I. Case-control studies in injury research. In: Rivara FP, Cummings P, Koepsell T, Grossman D, Maier RV, editors. *Injury control: a guide to research and program evaluation*. New York, NY: Cambridge University Press; 2000. p. 39–156.
12. Tevepaugh DB, Dodson TB. Are mandibular third molars a risk factor for angle fractures? A retrospective cohort study. *J Oral Maxillofac Surg* 1995; 53(6):646–9.

13. Lee JT, Dodson TB. The effect of mandibular third molar presence and position on the risk of an angle fracture. *J Oral Maxillofac Surg* 2000; 58(4):394–8.
14. Yamada T, Sawaki Y, Tohnai I, Takeuchi M, Ueda M. A study of sports-related mandibular angle fracture: relation to the position of the third molars. *Scand J Med Sci Sports* 1998; 8(2):116–9.
15. Safdar N, Meechan JG. Relationship between fractures of the mandibular angle and the presence and state of eruption of the lower third molar. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 1995; 79(6):680–4.
16. Tankersly K, Abubaker AO. The relationship between the presence of mandibular third molars and mandibular angle fractures. *J Dent Res* 1995; 74 AADR (Abstract #550):80.
17. Ugboko VI, Oginni FO, Owotade FJ. An investigation into the relationship between mandibular third molars and angle fractures in Nigerians. *Br J Oral Maxillofac Surg* 2000; 38(5):427–9.
18. Ma'aïta J, Alwrikat A. Is the mandibular third molar a risk factor for mandibular angle fracture? *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2000; 89(2):143–6.
19. Fuselier JC, Ellis EE 3rd, Dodson TB. Do mandibular third molars alter the risk of angle fracture? *J Oral Maxillofac Surg* 2002; 60(5):514–8.
20. Meisami T, Sojat A, Sandor GK, Lawrence HP, Clokie CM. Impacted third molars and risk of angle fracture. *Int J Oral Maxillofac Surg* 2002; 31(2):140–4.
21. Mantel N, Haenszel W. Statistical aspects of the analysis of data from retrospective studies. *J Natl Cancer Inst* 1959; 22(4):719–48.
22. DerSimonian R, Laird N. Meta-analysis in clinical trials. *Control Clin Trials* 1986; 7(3):177–88.
23. Thompson SG. Why sources of heterogeneity in meta-analysis should be investigated. *BMJ* 1994; 309(6965):1351–5.
24. Deeks J, Altman D, Bradburn MJ. Statistical methods for examining heterogeneity and combining results from several studies in meta-analysis. In: Egger M, Smith GD, Altman D, editors. Systematic reviews in health care meta-analysis in context. 2nd edition. London: BMJ Publishing Group; 2001. p. 285–312.
25. Bradburn MJ, Deeks J, Altman D. sbe24:metan an alternative meta-analysis command. *Stat Tech Bull* 1998; 44:15.
26. Perry PA, Goldberg MH. Late mandibular fracture after third molar surgery: a survey of Connecticut oral and maxillofacial surgeons. *J Oral Maxillofac Surg* 2000; 58(8): 858–61.
27. Thompson RS, Rivara FP, Thompson DC. A case-control study of the effectiveness of bicycle safety helmets. *N Eng J Med* 1989; 320(21):1361–7.
28. Thompson RS, Rivara FP, Thompson DC. Effectiveness of bicycle helmets in preventing head injuries. A case-control study. *JAMA* 1996; 276(24):1968–73.



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Diagnostic Challenge

The Diagnostic Challenge is submitted by the Canadian Academy of Oral and Maxillofacial Radiology (CAOMR). The challenge consists of the presentation of a radiology case.

Since its inception in 1973, CAOMR has been the official voice of oral and maxillofacial radiology in Canada. The Academy contributes to organized dentistry on broad issues related to dentistry in general and issues specifically related to radiology. Its members promote excellence in radiology through specialized clinical practice, education and research.



CAOMR Challenge No. 12

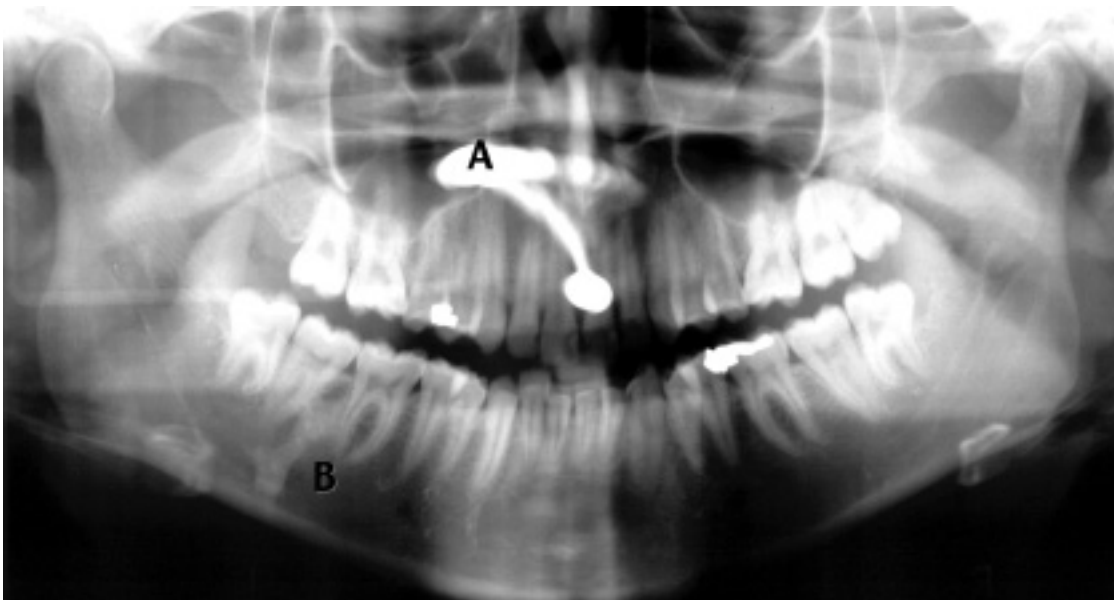
Robert E. Wood, DDS, PhD, FRCD(C)

Case History

A 19-year-old woman presents to your office for evaluation of painful third molars. After a clinical examination reveals evidence of pericoronitis around the mandibular right and left third molars, you direct your dental assistant to expose a panoramic radiograph.

Questions

1. What do you conclude is the cause of the radiopacity marked "A"?
2. You notice an area of radiopacity in the right mandibular first and second permanent molar region. What descriptive terms would you use in your conversation with the radiologist?
3. What is your radiologic differential interpretation for the region marked "B" and your determination of the identity of radiopacity "A"?
4. Why does there appear to be multiple images of the superior aspect of "A"?



(See page 46 for answers)

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Answers to CAOMR Challenge No. 12

1. What do you conclude is the cause of the radiopacity marked "A"?

The radiopacity marked "A" is a metallic foreign body that runs from the ventral to the dorsal surface in the midline of the tongue. It is characterized by 2 metallic ball-shaped ends joined by a thinner isthmus of metal.

2. You notice an area of radiopacity in the right mandibular first and second permanent molar region. What descriptive terms would you use in your conversation with the radiologist?

When describing a radiographic entity, it is useful to consider the following parameters: location, position and extent, properties of its periphery or border, internal structure and effect on adjacent structures.

The radiopacity marked "B" can be described as a polymorphous radiopacity located between the roots of the mandibular right first and second permanent molars and extending towards the inferior border of the mandible. The border of the lesion is well-circumscribed and not encapsulated. The internal structure is of the density of cortical bone or perhaps cementum. The lesion is homogeneous in nature. It may be tempting to suggest that the roots of the 2 teeth have been pushed apart; however, similar root architecture is present on the opposite side. There is no evidence of root resorption and the mandibular canal is not displaced.

3. What is your radiologic differential interpretation for the region marked "B" and your determination of the identity of the radiopacity "A"?

"A" is a dumbbell-shaped tongue piercing. "B" is likely a dense bone island but could be subclinical fibrous dysplasia or a cemental mass (although unlikely). It requires no treatment or biopsy. If you are inclined to suggest removal of anything from this woman's mouth, the jewellery would be a good start.

4. Why does there appear to be multiple images of the superior aspect of "A"?

The superior aspect of this piece of jewellery has the appearance of a ringing bell, because of the multiple images it produces on the radiograph. The ventral ball is close to the focal plane of the radiograph. In panoramic radiography, the beam comes from below the horizontal plane (i.e., it is angled slightly upwards) — hence the appearance of a single image for the ventral ball. The dorsal ball casts numerous separate shadows because it is further from the focal trough of the panoramic radiograph. This gives the ball a dynamic appearance, as if it is moving. ♦



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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.

C D A ' S D E F I N I T I O N O F O R A L H E A L T H

Oral health is a state of the oral and related tissues and structures that contributes positively to physical, mental and social well-being and the enjoyment of life's possibilities, by allowing the individual to speak, eat and socialize unhindered by pain, discomfort or embarrassment.

*Approved by Resolution 2001.02
Canadian Dental Association Board of Governors
March 2001*



CREATING VALUE FOR CDA MEMBERS

CDA Tackles the “Hot Button” Issues

CDA is working hard for its members on some very contentious issues. Here are a few examples:

✓ **CDA Works with Federal Government to Clarify Privacy Legislation for Dentists**

The federal *Personal Information Protection and Electronic Documents Act* (PIPEDA) came fully into force on January 1, 2004. CDA has been successful in clarifying dentists' obligations under PIPEDA by working directly with the federal government. CDA recognized that dentists were being inundated with multiple interpretations of what their obligations would be under PIPEDA. The Association dedicated its resources to forcing the federal government to produce straightforward information that would help Canadian dentists understand their obligations — versus simply obtaining another legal opinion on how PIPEDA applies to dentists. This information is now available to CDA members on the members-only side of the CDA Web site. [Click on the PIPEDA banner to the left of the screen.]

✓ **Non-Insured Health Benefits (NIHB) Audits**

In November, the Government of Canada released its response to *First Nations and Inuit Dental Health*, a report by the House of Commons Standing Committee on Health. The response provides the government's reaction to recommendations put forward last spring by CDA's government relations committee, and does little to suggest changes or improvements to the NIHB dental program, failing to address its inefficiencies and many of the concerns raised by CDA. The Association will forcefully communicate its position on the government's response to the federal health minister and to members of the standing committee.

✓ **Goods and Services Tax (GST)**

Canada Customs and Revenue Agency (CCRA) conducts regular dental practice GST audits. CDA is negotiating with CCRA for a moratorium on these audits until a consistent and clear interpretation of the application of input tax credits is provided (especially for GST paid on costs relating to the provision of “artificial teeth”).

✓ **Access to Quality Dental Materials and Devices at a Reasonable Price**

CDA supports reliance on international standards for dental materials and devices. For many years, it has been a strong supporter of the Canadian delegation to the International Organization for Standardization's Technical Committee 106 for Dentistry (ISO / TC 106), which sets global standards for dental materials and devices. As a result of CDA's success in obtaining financial support from Health Canada, the Association will host the secretariat of ISO TC 106. CDA will thus be able to monitor developments in standardization more closely, which will increase the Association's ability to promote the use of international standards for licensing of dental products in Canada. The knowledge and experience that CDA will gain through the activities of the secretariat will ensure continued access to the best equipment and materials for Canadian dentists.



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For information on CDA's government relations activities,

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Point of Care



This month's responses for the Point of Care section of JCDA were provided by speakers at the 2004 Pacific Dental Conference, presented in partnership with the Canadian Dental Association. The conference will take place in Vancouver, B.C., from March 4 to 6. For more information visit www.pacificdentalonline.com.

Question 1

Can you suggest some effective over-the-counter treatments for oral ulcerations?

Background to the Problem

There are many causes of ulcerations, a common condition in the oral cavity. The main etiologic factors are trauma, vesicular disease, immunologic factors (recurrent aphthae, bullous disease), hypersensitivity, leucopenia (secondary to immunosuppression, drug-induced toxicities), radiation, microbiological agents and neoplasms.

The most important initial step in the management of oral ulceration is an accurate diagnosis. This often requires the patient to undergo a range of diagnostic tests. For a number of conditions, prescription medications will be necessary; for others, time is the healer.

A number of over-the-counter (OTC) products can provide effective pain relief, providing an inexpensive and effective means of palliation during the time period before a definitive diagnosis can be reached or until the lesion heals by itself. These OTC products must only be considered to provide palliation. If an ulcer doesn't heal within 2 weeks, a definitive diagnosis must be sought.

Management with OTC Products

OTC products for oral ulcerations can either be applied locally or used in the form of mouthwashes. Products applied directly can be classified as covering agents, local anesthetics, oxygenating agents, or cauteries and antiseptics.

Examples of these products include:

- covering agents
OraGard B, Orabase and Orabase Soothe-N-Seal (Colgate Oral Pharmaceuticals; **Figs. 1 and 2**) and Zilactin (Zila Pharmaceutical)
- local anesthetics
Orabase-B (with benzocaine 20%) and Zilactin-B (with benzocaine 10%).
Other products with benzocaine as the active ingredient: Anbesol Liquid Maximum Strength and Anbesol Extra Strength Gel from Whitehall-Robbins (benzocaine

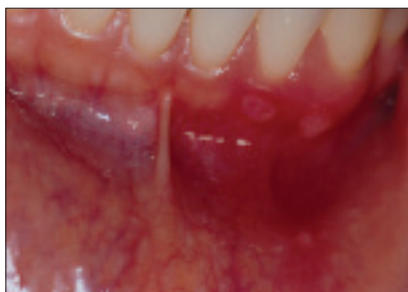


Figure 1: Oral ulceration before application of over-the-counter product.



Figure 2: Oral ulceration 10 minutes after application of Orabase Soothe-N-Seal.

20%), Anbesol Liquid (benzocaine 6.4%), Anbesol Gel (benzocaine 6.4%), Orajel Mouth Sore (Del Pharmaceuticals), Kank-A (Blistex Inc.) and Hurricaine Liquid and Gel (Beutlich Pharmaceuticals).

- oxygenating agents (with hydrogen peroxide)
Peroxyl Mouthrinse (Colgate Oral Pharmaceuticals)
- cauteries and antiseptics
Ora-5 (Premier Dental Products), available through a dental supplier or an 800 number
- mouthrinses (good when condition is multifocal)
Biotene Mouthwash (Laclede)
Orajel Perioseptic (Del Pharmaceuticals)
Amosan (Oral-B)

A mouthwash can also be created by mixing 2 OTC products such as diphenhydramine hydrochloride syrup (4 oz) and Kaopectate Liquid (12 oz; Pfizer) or Maalox suspension (12 oz; Novartis Consumer Health Canada Inc.). ♦



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Dr. Carpenter's seminar "Oral Pathology: Lesions of the Oral Mucosa" will be presented on Friday, March 5.

Suggested Reading

Carpenter WM, Silverman S Jr. Over-the-counter products for oral ulcerations. *J Calif Dent Assoc* 1998; 26(3):199-201.

Question 2 What is the relationship between abrasion, erosion and dentin hypersensitivity?

Background to the Problem

Dentin hypersensitivity has been described as an enigma — commonly occurring yet poorly understood. The condition is characterized by a short, sharp pain arising from exposed dentin in response to stimuli typically thermal, evaporative, tactile, osmotic or chemical and which cannot be ascribed to any other form of dental defect or disease.¹ Incorrect or aggressive tooth-brushing is most frequently identified as the cause of exposed dentin and resulting tooth surface loss, and thus an important causative factor for dentin hypersensitivity. An educational needs assessment study of Canadian dental professionals demonstrated that only 7% of dentists and 5% of hygienists identified erosion as the primary cause of dentin hypersensitivity, while 85% and 94% respectively cited toothbrush abrasion as a reason for dentin tubule exposure.¹

Two processes must occur for the development of dentin hypersensitivity: dentin must first become exposed, through either loss of enamel or gingival recession, and the dentin tubules must be open to both the oral cavity and the pulp.

Erosion² (loss of hard tissue by chemical action), abrasion (loss of hard tissue by physical action other than tooth-to-tooth contact) and their co-effect are very common causes of enamel and dentin surface loss leading to exposure of dentin tubules, especially at the buccocervical region (Fig. 1).³ Enamel is resistant to abrasion by tooth-brushing, with or without toothpaste, but is particularly sensitive to the effects of acid.⁴ Brushing acid-softened enamel has a much increased abrasive effect. Therefore, it is critically important to consider erosive influences (diet or gastric acid) as well as abrasive factors in the etiology and management of dentin hypersensitivity. Carbonated beverages and citrus juices are the common suspects in an erosive diet, but items such as red wine (pH 2.6), white wine (pH 2.3) and yogurt (pH 3.3) should not escape scrutiny as they readily remove the smear layer after a few minutes of exposure.⁵

Management of the Problem

Failure to consider causation in the management of dentin hypersensitivity may result in failure of treatment. All etiological and predisposing factors, particularly related to erosion and abrasion, must be investigated. Consideration should be given to obtaining a detailed, written dietary history in order to identify acidic foods and beverages. Oral hygiene habits — frequency, duration and timing, especially in relation to acid exposures, and brushing technique and force — and the appearance of the brush when it is changed should be taken into account.



Figure 1: Patient shows signs of generalized gingival recession exposing significant amounts of dentin. The exposed dentin demonstrates the typical effects of surface loss due to both erosion and abrasion.

Elimination or modification of these factors should be the principal aim of management.⁶ Dietary advice should minimize erosion and oral hygiene instruction should minimize abrasion. Opportunities for their co-effect should be avoided by ensuring that all abrasive influences, such as tooth-brushing, occur before any tooth-softening effects of erosion, i.e., tooth-brushing should occur before meals rather than after, and in any event, not within 2 to 3 hours of acid intake. In its Consensus-based Recommendations for the Diagnosis and Management of Dentin Hypersensitivity,¹ the Canadian Advisory Board on Dentin Hypersensitivity recommends tooth-brushing remote from mealtimes and avoiding overly frequent or aggressive tooth-brushing to modify or remove predisposing factors. Depending on the severity and extent of the condition, reversible procedures (such as desensitizing toothpastes) should be employed before nonreversible procedures (such as resins). ♦



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Dr. Addy's seminar "Dentin Hypersensitivity: A Toothwear Phenomenon?" will be presented on Thursday, March 4.

References

1. Canadian Advisory Board on Dentin Hypersensitivity. Consensus-based recommendations for the diagnosis and management of dentin hypersensitivity. *J Can Dent Assoc* 2003; 69(4):221–6.
2. Braem M, Lambrechts P, Vanderle G. Stress-induced cervical lesions. *J Prosthet Dent* 1992; 67(5):718–22.
3. Davis WB, Winter PJ. The effect of abrasion on enamel and dentine and exposure to dietary acid. *Br Dent J* 1980; 148(11-12):253–6.
4. Addy M, Absi EG, Adams D. Dentine hypersensitivity. The effects in-vitro of acids and dietary substances on root-planed and burred dentine. *J Clin Periodontol* 1987; 14:274–9.
5. Addy M. Dentine hypersensitivity: new perspectives on an old problem. *Int Dent J* 2002; 5:367–75.

Question 3 Why does incomplete anesthesia occur following an inferior alveolar nerve block?

Incomplete anesthesia creates painful experiences for patients and increases stress and frustration for clinicians. The incidence for incomplete anesthesia following an inferior alveolar nerve block (IANB) is reported to be 15%.¹

Skeletal anatomy plays an important role in a clinician's ability to find a bony landmark for the IANB. The external and internal oblique ridges on the ramus help to determine the location of the IAN and the entry point of the needle. Unfortunately, the shape of the internal oblique ridge varies such that, if very wide, it becomes difficult to negotiate the needle around the plate of bone. The location of the mandibular foramen (the entry point of the IAN into the mandible) also varies. Both of these anatomical factors can lead to missed blocks and incomplete anesthesia.

Unusual neuroanatomy can also affect the ability to obtain profound anesthesia. Accessory nerves can innervate the dentition from different locations arising from the IAN or the mylohyoid nerve.²

One solution to these anomalies is to use a higher block such as the Gow-Gates injection, which is likely to overcome these anatomical anomalies.

A second factor that can contribute to incomplete anesthesia is the needle. The average depth for the IANB is 25 mm. With a short needle (also 25 mm), an injection to the hub is required. If the patient is larger than average, a deeper injection is required. Some clinicians are uncomfortable with this, because of the taboo associated with injecting to or beyond the hub. A deeper injection may cause a loss of orientation of angle and depth, but this can be avoided with the use of long needles (35 mm).

Some clinicians use 30-gauge needles for their blocks. If success is not satisfactory, a 25-gauge needle can be used to increase the stability of the needle. Needles deflect when inserted into tissue. A 30-gauge needle might deflect as much as 4 mm from the straight line, whereas a 25-gauge needle only deflects 1 mm when inserted to a depth of 25 mm.^{3,4} Another issue with respect to needle gauge is aspiration. The 25-gauge needles are more reliable aspirators. Both 30- and 27-gauge needles might be in the middle of a vessel and not yield a positive aspiration when the aspirating ring is depressed. Obviously, an intravascular injection will result in no anesthesia.

Patients who are the most difficult to anesthetize are sometimes least cooperative because of past negative dental experiences. Pain experienced by virtue of being difficult to anesthetize creates anxiety. When these patients are asked to open their mouths, they exhibit a very small freeway space that makes finding a landmark and visualizing the pterygomandibular area impossible. Also, when some of

these patients feel the initial needle prick, they instinctively close their mouth, which increases the difficulty of the injection. It is important for the clinician to elicit cooperation from these patients. Phrases such as "Please point your chin up and open your mouth wide — it will really help the freezing work" may help. Other options include oral sedation or nitrous oxide with oxygen sedation.

Local anesthetic and vasoconstrictor molecules are sensitive over time to light, temperature extremes and oxygen. Incorrect storage can lead to degradation of the contents of the cartridge before the expiry date. This will obviously lead to incomplete anesthesia. Clinicians should store local anesthetics at room temperature and away from light, and should not stockpile supply.

The final factor to be considered is the environmental pH into which the anesthetic is being injected. An acidic environment is an unfavourable one for the lipid soluble molecules of the local anesthetic, as fewer local anesthetic molecules will enter the nerve. There are 2 situations where the pH of the tissues can become more acidic. The first is infection. The second is injection with a local anesthetic with vasoconstrictor that is by nature acidic. Enough of this acidic solution can actually decrease the number of anesthetic molecules able to cross the lipid membrane of the nerve, therefore decreasing the anesthetic's effectiveness. To avoid this problem, the clinician can use solutions without vasoconstrictor in areas of infection, or after 1 or 2 cartridges of vasoconstrictor-containing solution have been used and there is still a need for more anesthetic. ♦



Dr. David Isen maintains an anesthesia-based practice in Toronto, Ontario, focusing on patients with medical requirements and anxiety-related needs. E-mail: d.isen@rogers.com.

Dr. Isen's seminar "Advanced Local Anesthesia" will be presented on Thursday, March 4.

References

1. Kaufman E, Weinstein P, Milgrom P. Difficulties in achieving local anesthesia. *J Am Dent Assoc* 1984; 108(2):205–8.
2. Roda RS, Blanton PL. The anatomy of local anesthesia. *Quintessence Int* 1994; 25(1):27–38.
3. Aldous J. Needle deflection, a factor in the administration of local anesthetics. *JADA* 1968; 77(3):602–4.
4. Hochman MN, Friedman MJ. In vitro study of needle deflection: a linear insertion technique versus a bidirectional rotation insertion technique. *Quintessence Int* 2000; 31(1):33–9.

Further Reading

- Jastak J, Yagiela J, Donaldson D. Local anesthesia of the oral cavity. Philadelphia: W.B. Saunders Co.; 1995.
- Malamed S. Handbook of local anesthesia. 4th ed. St. Louis: Mosby; 1997.

Question 4 Is it safe to provide dental treatment during pregnancy?

Background to the Issue

A recent European study indicated that only 55% of dentists felt they were sufficiently informed about treating pregnant patients.¹ While the postpartum period is the absolute safest time to provide treatment, emergency dental treatment can be provided at any time during pregnancy as long as adequate precautions and care are taken. Under most circumstances, emergency treatment consisting of restorations, endodontic treatment and extractions can be performed.

For elective treatment, the preferred timing of treatment is the second trimester. During the latter part of the third trimester, the patient may find it uncomfortable to be in the supine position in the dental chair, because of pressure of the fetus on the vena cava. Dentists are advised not to perform elective dental treatment during the first trimester when fetal organs are developing.

Maintaining good oral hygiene is very important during pregnancy because of the increased risk of developing gingivitis secondary to local factors and altered blood hormone levels (Fig. 1). Hygiene appointments should be scheduled in each trimester of pregnancy. For most patients with normal pregnancy, there is no contraindication to routine scaling and polishing. If there are signs of a problem pregnancy, dentists are advised to consult with the medical professional caring for the patient during pregnancy before initiating this type of treatment.

Specific Management Advice

Dentists caring for pregnant patients should consider the following:

- There is no best or worst time of day to schedule an appointment for a pregnant patient. The time when the patient feels most comfortable is the best guide to scheduling.
- There is no contraindication to taking a prudent number of radiographs to aid in the diagnosis and treatment of specific oral problems during pregnancy. Naturally, the patient should wear a lead apron, the beam should be properly collimated and high-speed film should be used.
- Medications should be kept to a minimum during pregnancy. Most of the medications administered by dentists pose no threat to the fetus. Tetracyclines (including doxycycline) must not be administered during pregnancy. Aspirin and nonsteroidal anti-inflammatory drugs (NSAIDs) are contraindicated during the third trimester. Dentists are advised to prescribe



Figure 1 : Severe gingivitis in pregnant patient.

acetaminophen for minor pain during pregnancy. For more severe pain, a narcotic analgesic such as acetaminophen with codeine may be given in minimal doses, especially in the first trimester.

- During the third trimester, it is advisable to keep the dental chair in a semi-reclined position, to avoid the “supine hypotension syndrome” (which may cause the patient to lose consciousness) due to pressure of the gravid uterus on the vena cava. If this problem does arise, gently turn the patient on her left side.
- Finally, if you have any doubts or concerns about any aspect of treating the pregnant patient, don't hesitate to contact her attending physician. ♦



Dr. Barbara Steinberg is clinical professor of surgery at Drexel University College of Medicine, Philadelphia, Pennsylvania.

Dr. Steinberg will be presenting 2 seminars on March 4 (“Dental and Medical Considerations in Treating the Premenopausal Female Patient” and “Dental and Medical Considerations in Treating the Mature Female Patients”) and 1 seminar on March 5 (“Indications for Antibiotic Prophylaxis”).

Reference

1. Pistorius J, Kraft J, Willerhausen B. Dental treatment concepts for pregnant patients — results of a survey. *Eur J Med Res* 2003; 8(6):241–6.

Further Reading

- Lee A, McWilliams M, Janchar T. Care of the pregnant patient in the dental office. *Dent Clin North Am* 1999; 43(3):485–94.
- Livingston HM, Dellinger TM, Holder R. Considerations in the management of the medical patient. *Spec Care Dentist* 1998; 18(5):183–8.
- Miller MC. The pregnant dental patient. *J Calif Dent Assoc* 1995; 23(8):63–70.

The responses for the Point of Care 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.

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Clinical Showcase

Clinical Showcase is a series of pictorial essays that focus on the technical art of clinical dentistry. This section features step-by-step case demonstrations of clinical problems encountered in dental practice. This month's article is by Dr. Pierre Boudrias, one of the featured speakers at the 2004 Pacific Dental Conference, presented in partnership with the Canadian Dental Association. The conference will take place in Vancouver, B.C., from March 4 to 6. 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.

Anterior Single-Tooth Implant Restorations: Clinical Rules for Reducing Risk Factors

Pierre Boudrias, DMD, MSD

Implant restoration is traditionally used in clinical situations where healthy teeth are adjacent to an edentulous space and one or more diastema.¹ Today, this restorative approach is commonly used. The implant placement protocol has been simplified, and loading concepts have been enhanced.^{2,3} A well-recognized technique involves the simultaneous placement of the implant and healing abutment in good quality bone, which reduces patient discomfort and the risks of unattractive gingival scarring that could occur during the second surgical phase (subsequent placement of the healing abutment).

However, the placement of an implant without first carefully examining the periodontium, the condition of the teeth and the intensity of occlusal contacts may have

unfortunate mechanical and esthetic consequences.⁴ This article summarizes the preoperative evaluation criteria for single-tooth implant restorations and lists clinical pitfalls to avoid.

Practical Tips: Planning and Treatment

When planning a restorative implant, surgical and restorative considerations must be looked at in tandem. These considerations apply to both external hex implants and internally connected implants. **Table 1** lists the primary contraindications.

Here are a few practical tips that help in clinically evaluating single-tooth implant restorations and facilitating treatment:



Figure 1a: Congenitally missing teeth 12 and 22.



Figure 1b: Orthodontic treatment to correct the position of the teeth and open edentulous spaces.

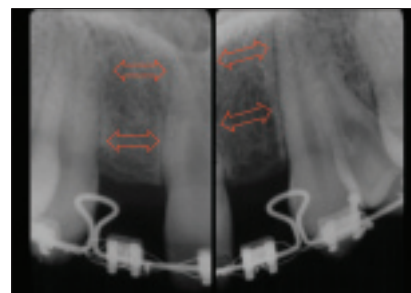


Figure 1c: Evaluation of the position of the roots for implant placement. Orthodontic correction would move the teeth to create a usable edentulous space.



Figure 1d: Lingual orifice filled with a resin composite.



Figure 1e: Verification of occlusal contacts using shimstock.



Figure 1f: Clinical appearance of dentogingival complex 11 years after insertion of the crowns on teeth 12 and 22.

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- The replacement of a congenitally absent tooth (missing lateral incisors) by an implant-supported crown is a long-lasting treatment that is less invasive for the adjacent teeth, but one that often requires orthodontic correction (Figs. 1a to 1g). To ease the placement of the implant, the teeth must be moved to create an upper mesiodistal edentulous space of 6 mm without producing root convergence of the adjacent teeth (Fig. 2). The orthodontic treatment must be finalized before placement of the implant. When the edentulous space is larger than the contour of the future restoration, a crown with diastema(s) may be the appropriate choice of restorative treatment (Fig. 3). In this clinical situation, a surgical guide is made from a diagnostic wax-up in order to insert the implant at the exact position defined on the diagnostic cast.⁵
- The placement of an implant must be postponed until after growth.⁶ During this time, several changes occur in

the dental arch, resulting in 3-dimensional changes in the position of the teeth. These changes may lead to occlusal interference and poor positioning of the teeth in relation to that of the implant. Therefore, an implant, especially in the esthetic zone, should not be considered until a girl reaches 15 years of age and a boy reaches 17 years of age (Fig. 4).

- The absence of gingival papilla is an esthetic handicap. A periodontal probe should be used to measure the height between the summit of the osseous crest and the interproximal contact (Fig. 5). A distance equal to or less than 5 mm would ensure optimal healing and re-establishment of the gingival papilla after placement of the implant.⁷ This rule applies specifically to triangular central incisors having interproximal contacts on the incisal third of the tooth (Fig. 6). Rectangular or square teeth are however easier to deal with esthetically.

Table 1 Surgical and Restorative Contraindications

Surgical contraindications	Restorative contraindications
Low bone volume (quality and contour)	Mesiodistal width of edentulous space < 6 mm
Proximity of anatomical structures	Insufficient interocclusal space
Insufficient gingival morphology	Overly high occlusal intensity (pronounced vertical overjet)
Root convergence	Extensive or defective restorations of adjacent teeth (poor prognosis)
Poor general and periodontal prognosis of adjacent teeth	Poor oral hygiene



Figure 1g: Radiologic evaluation of implant-supported restorations 11 years after insertion of the crowns (zinc phosphate cement).

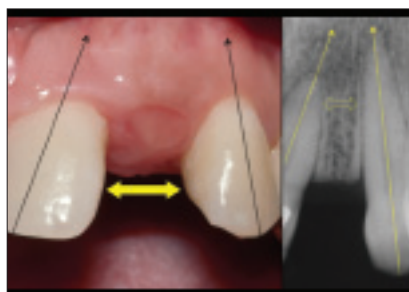


Figure 2: Sufficient intercoronal space and insufficient interradicular space.



Figure 3: Preserved diastema. Cemented implant-supported restoration on tooth 11.



Figure 4: An implant placed in a patient who is too young will lead to an unattractive crestal defect and inadequate positioning of the implant following growth.

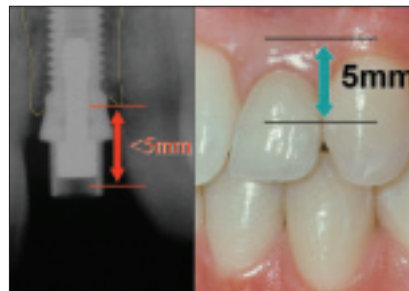


Figure 5: A 5-mm space between the interproximal contact and the osseous crest is ideal in order to preserve the gingival papilla.



Figure 6: Gingival embrasures from triangular incisors with interproximal contact at the incisal third are difficult to fill in (cemented implant-supported restoration on tooth 21).

A new implant (Perfect, Nobel Biocare) with interproximal scallops appears promising for preserving the height of interproximal osseous crests during an immediate placement procedure with this type of implant (Fig. 7).⁸

- The esthetic quality of the implant restoration depends on the morphology of the edentulous crest. Having an osseous crest with adequate volume (height and thickness) is critical for placing an implant along an appropriate longitudinal axis. Keratinized gingiva with good morphology contributes to the natural, esthetic appearance of the restoration. Labial concavity may be caused by low bone volume or gingival thickness. In this case, a bone and/or gingival graft is indicated.⁹⁻¹¹ There are 3 methods of evaluating bone volume: visual analysis and palpation, sagittal computed tomography using a radiopaque medium (scanner)¹² and bone survey with ridge mapping.¹³ The bone survey with ridge mapping allows reproduction of the sagittal bone profile on a diagnostic cast (Figs. 8a and 8b). If any doubt remains, a scanner will accurately confirm the contour of the osseous crest (Fig. 9).
- An edentulous crest with sufficient bone volume will enable the clinician to place the implant with an acceptable longitudinal axis. In a sagittal plane, this

longitudinal axis must pass through the restoration somewhere between the incisal edge area and the middle third of the lingual surface¹⁴ (Fig. 10). An overly labial or lingual longitudinal axis would definitely lead to restorative problems. A rule of thumb for a maxillary incisor involves ensuring that the prosthetic parts appear on the lingual side of an imaginary straight line that joins the labial surfaces of the adjacent teeth to the edentulous space.

- The implant must be sunk 4 mm apically into the labiogingival margin in order to hide the metal collar (subgingival 2-mm collar) and to establish a cosmetically pleasing gingival profile around the crown (Fig. 11a). Here, the gingival morphology is very similar to that of an ogival pontic and is ideally created using a temporary restoration (Figs. 11b, 11c and 11d).
- Choosing the diameter of the implant is based on the area in the mouth where the implant will be used and the occlusal stress placed on the restoration, and not on bone mass. Implants that are 3.75 mm and 4 mm in diameter are generally appropriate for an anterior restoration. However, an implant with a small diameter (3.25 mm) may be used for maxillary lateral incisors and mandibular incisors, due to the lower intensity of



Figure 7: Tooth 12 was extracted and a scalloped implant inserted immediately. The interproximal scalloped sides with titanium oxide should help to maintain the height of the interproximal osseous crests (placement of the implant: Dr. Éric Morin).



Figure 8a: The bone survey was performed at 3 points on the labial side and the palatal side, as well as 1 or 2 points at the summit of the edentulous crest using a measuring guide (acrylic stent).

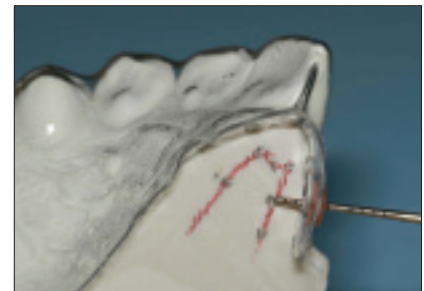


Figure 8b: The values obtained using the measuring guide are reproduced on a sagittal section of the diagnostic cast in order to draw the bone profile.

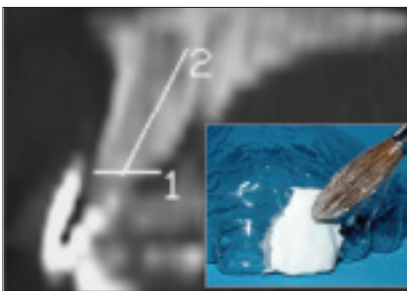


Figure 9: Bone volume can be evaluated using a scanner with radiopaque media (barium sulfate, gutta-percha point).

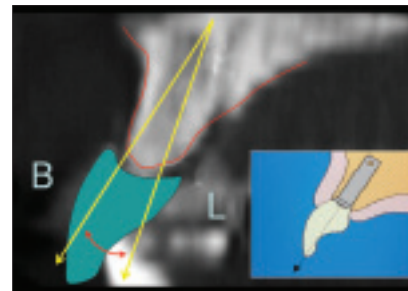


Figure 10: Sagittal scanner section and tracing indicating the acceptable limits of the longitudinal axis of the implant. The longitudinal axis must pass between the incisal edge and the middle third of the lingual surface.

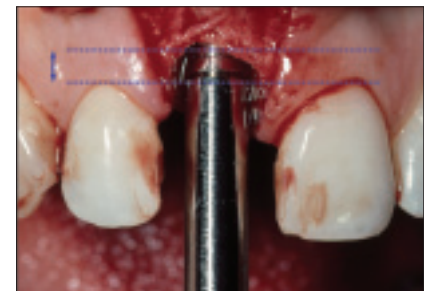


Figure 11a: The implant must be sunk to more than 4 mm apically to the gingival-labial margin (placement of the implant: Dr. Élise Shoghikian).

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the occlusal forces and lower risk of fracture.¹⁵ Lastly, the small diameter of these implants complicates an esthetic and harmonious emergence, especially in the case of maxillary central incisors.

- An impression can be made directly on the implant, and a master cast can be poured with an implant replica and flexible gingiva. Thus, choosing the abutment is far easier without the constraints of the oral environment (e.g., gingiva, saliva).

The longitudinal axis in the anterior zone often passes through the incisal edge of the crown because of the rectilinear shape of the implant (versus the convex shape of a tooth) and bone morphology. A crown cemented on an abutment is thus indicated since the insertion cavity for the prosthetic screw would leave an opening in the incisal edge (Figs. 12a and 12b). For a cemented crown, an opening is created in the lingual third of the framework of the ceramo-metal crown (Fig. 1d). This orifice is used as an evacuation channel to minimize the hydraulic pressure when cementing the crown (the zinc phosphate cement makes it easier to remove any excess cement lodged under the gingiva) and as an anchor if the crown should have to be removed later.¹⁶ This orifice is filled with a resin composite after the crown has been cemented.

A screw-retained crown (premachined UCLA cast onto abutment) can be made provided the longitudinal axis of the implant passes through the middle third of the lingual surface of the future crown without weakening the porcelain incisal third (Fig. 13). This restoration has the advantage of being completely reversible. The prosthetic screw is covered with a thin layer of friable material (white gutta-percha) and the access cavity on the lingual side is filled with a resin composite.

- The abutment screw is tightened using a torque wrench in accordance with the manufacturer's recommendations. The proximal contacts of a crown cemented on an abutment or of a screw-retained crown are adjusted to provide proper seating of both types of crowns. The occlusal contacts are then adjusted to maximum intercuspation laterally and protusively, during which the patient tightly clenches his or her teeth. It should be possible to pull a thin shimstock while feeling only slight friction at the occlusal points of contact (Fig. 1e). This serves to compensate for the missing periodontal membrane around the implant.

In conclusion, esthetic and functional success of a single-tooth implant restoration in the anterior zone requires meticulous clinical examination. The planning and treatment must involve the restorative dentist and surgeon, and quality technical work. ♦



Figure 11b: Gingival morphology can be modified using a temporary implant-supported restoration.



Figure 11c: Temporary screw-retained implant restoration on tooth 11.



Figure 11d: Cemented ceramic implant-supported restoration on tooth 11.



Figure 12a: The Procera abutment (Nobel Biocare) enables the placement of the abutment/crown junction at the desired subgingival depth while following the shape of the interproximal gingival scallop.



Figure 12b: The longitudinal axis of the implant passes through the incisal edge. The restoration is cemented on a Procera titanium abutment.

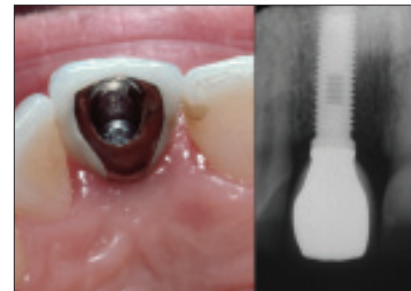


Figure 13: The longitudinal axis of the implant passes through the middle third of the lingual surface of a screw-retained restoration (premachined UCLA cast onto abutment).



Dr. Pierre Boudrias is a professor in the department of restorative dentistry and head of fixed prosthodontics at the University of Montreal. He teaches fixed partial prosthodontics and implantology and maintains a private practice at the university. Dr. Boudrias has no declared financial interest in any company manufacturing the types of products mentioned in this article.

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Dr. Boudrias' seminar "Implant Restoration for the Partially Edentulous Patient: Practical Concepts and Case Presentations" will be presented on Thursday, March 4. For more information on the PDC/CDA conference, visit www.pacificdentalonline.com.

References

1. Laney WR, Jemt T, Harris D, Henry PJ, Krogh PH, Polizzi G, and others. Osseointegrated implants for single-tooth replacement: progress report from a multicenter prospective study after 3 years. *Int J Oral Maxillofac Implants* 1994; 9(1):49-54.
2. Glauser R, Gottlow J, Lundgren AK, Sennerby L, Portmann M, Ruhstaller P, and other. Immediate occlusal loading of Branemark system implant with TiUnite surface: histological evaluation after 6 months. *Applied Osseointegration Res* 2002; 3(1):25-8.
3. Becker W, Becker BE, Israelson H, Lucchini JB, Handelsman M, Ammons W, and others. One-step surgical placement of Branemark implants: a prospective multicenter clinical study. *Int J Oral Maxillofac Implants* 1997; 12(4):454-62.
4. Mazurat RD, Love WB, Pesun IJ. The role of the restorative dentist in the diagnosis and maintenance phases of implant therapy — Part II: Prosthetic planning. *J Can Dent Assoc* 1994; 60(9):814-8.

5. Koyanagi K. Development and clinical application of a surgical guide for optimal implant placement. *J Prosthet Dent* 2002; 88(5):548-52.
6. Oesterle LJ, Cronin RJ. Adult growth, aging, and the single-tooth implant. *Intern J Oral Maxillofac Implants* 2000; 15(2):252-60.
7. Tarnow DP, Magner AW, Fletcher P. The effect of the distance from the contact point to the crest of bone on the presence or absence of the interproximal dental papilla. *J Periodontol* 1992; 63(12):995-6.
8. Wohrle PS. Nobel Perfect esthetic scalloped implant: rationale for a new design. *Clin Implant Dent Relat Res* 2003; 5 Suppl 1:64-73.
9. Langer B. Soft tissue complications — the esthetic dilemma. *Int J Oral Maxillofac Implants* 2003; 18(5):767-8.
10. Simion M, Jovanovic SA, Tinti C, Benfenati SP. Long-term evaluation of osseointegrated implants inserted at the time or after vertical ridge augmentation. A retrospective study on 123 implants with 1-5 year follow-up. *Clin Oral Implants Res* 2001; 12(1):35-45.
11. Torrea AS, Fonseca DM, Jovanovic SA. Single-unit implant-supported restoration in the vertically deficient anterior maxilla. *Pract Periodontics Aesthet Dent* 1999; 11(5):571-5.
12. Weinberg LA. CT scan as a radiologic data base for optimum implant orientation. *J Prosthet Dent* 1993; 69(4):381-5.
13. Boudrias P. Evaluation of the osseous edentulous ridge (i.e. ridge mapping): probing technique using a measuring guide. *J Dent Québec* 2003; 40:301-2.
14. Engelman MJ. Clinical decision making and treatment planning in osseointegration. Chicago: Quintessence Publishing Co, Inc.; 1996. Chapter 6:81-100.
15. Rangert B, Sennerby L, Meredith N, Brunski J. Design, maintenance and biomechanical considerations in implant placement. *Dent Update* 1997; 24(10):416-20.
16. Okamoto M, Minagi S. Technique for removing a cemented superstructure from an implant abutment. *J Prosthet Dent* 2002; 87(2):241-2.

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by John Webster

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International Equity fund (KBSH)	up to 1.45%	1.3%	-15.6%	-1.8%	n/a
Pacific Basin fund (KBSH)	up to 1.45%	2.7%	-23.1%	-3.9%	n/a
US Equity fund (KBSH) ^{†3}	up to 1.20%	-7.0%	-15.3%	-0.8%	9.4%
Global fund (Trimark) ^{†4}	up to 1.65%	-0.6%	3.2%	7.7%	11.0%
Global Stock fund (Templeton)	up to 1.77%	1.2%	-6.0%	-1.0%	n/a
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Cholinergic agent

ACTION AND CLINICAL PHARMACOLOGY

SALAGEN (Pilocarpine HCl) tablets are made from the naturally-occurring alkaloid pilocarpine which is obtained from the leaves of the South American shrub *Pilocarpus jacobinellii*. Pilocarpine HCl is a cholinergic (cholinergic parasympathomimetic) agent capable of exerting a broad spectrum of pharmacologic effects with predominant muscarinic action. Depending upon the dosage and the individual, oral pilocarpine HCl will increase secretion by the exocrine glands (e.g. sweat, salivary, lacrimal, gastric, pancreatic, intestinal and respiratory mucous cells) and stimulate smooth muscle (e.g. gastrointestinal tract, bronchi, uterus, urinary bladder, gall bladder, and biliary tract). Pilocarpine HCl may also produce antihypertensive or paradoxical effects on the cardiovascular system manifested by hypotension after a brief episode of hypertension.

The bioavailability of oral multiple-dose SALAGEN tablets has been determined in 19 healthy male volunteers. SALAGEN tablets 5 mg and 10 mg were administered orally for 2 days, at 8 a.m., noon, and 6 p.m. for a total of 6 doses. The results are presented in Table 1.

TABLE 1

Bioavailability parameters following multiple-dose oral pilocarpine HCl tablets*

Dose	Tmax (hr)	Cmax (ng/mL)	AUC ₀₋₁₂ (ng·h/mL)	C _t (hr)
5 mg (n=10)	1.25	14.61	33.04	0.76
10 mg (n=9)	0.85	43.25	107.96	1.35

* Pilocarpine HCl tablets given orally, three times daily, for 2 days; the results determined after the final dose. † Tripartite values.

Pharmacokinetics in elderly male volunteers (n=17) were comparable to those in younger men. In five healthy elderly female volunteers, the mean Cmax and AUC were approximately twice that of elderly males and young/normal male volunteers.

When taken with a high-fat meal by 12 healthy male volunteers, there was a decrease in the rate of absorption of pilocarpine from SALAGEN tablets. Mean Tmax was 1.47 and 0.87 hours, and mean Cmax's were 51.5 and 39.2 ng/mL for fed and fasted, respectively.

The results of an *in vitro* protein binding study indicate that pilocarpine HCl is not bound to plasma proteins as determined in either rat or human plasma.

Limited information is available about the metabolism and elimination of pilocarpine in humans. Inactivation of pilocarpine is thought to occur at neuronal synapses and the urine in plasma. Pilocarpine and its minimally-active or inactive degradation products, which include pilocarpic acid, are excreted in the urine.

INDICATIONS AND CLINICAL USE

SALAGEN (pilocarpine HCl) is indicated for:

- 1) the treatment of the symptoms of xerostomia (dry mouth) due to salivary gland hypofunction caused by radiotherapy for cancer of the head and neck;
- 2) the treatment of the symptoms of xerostomia (dry mouth) and keratoconjunctivitis (dry eyes) in patients with Sjögren's syndrome.

CONTRAINDICATIONS

SALAGEN (pilocarpine HCl) tablets are contraindicated:

1. in patients with uncontrolled asthma;
2. when miosis is undesirable (e.g. acute iritis and in narrow-angle (angle-closure) glaucoma);
3. in patients with known sensitivity to pilocarpine or to any of the tablet's excipients.

WARNING

Cardiovascular Disease: Patients with significant cardiovascular disease may be unable to compensate for transient changes in hemodynamics or rhythm induced by pilocarpine. Pulmonary edema has been reported as a complication of pilocarpine toxicity. SALAGEN (pilocarpine HCl) tablets should be administered with caution and under close medical supervision to patients with significant cardiovascular disease.

Pulmonary Disease: Pilocarpine has been reported to increase airway resistance, bronchial smooth muscle tone, and bronchial secretions. SALAGEN tablets should be administered with caution and under close medical supervision to patients with significant pulmonary disease (e.g. uncontrolled asthma, chronic bronchitis, or chronic obstructive pulmonary disease).

Should any adverse changes in the patient's cardiopulmonary condition occur, or be suspected, therapy with SALAGEN tablets should be discontinued immediately.

PRECAUTIONS

General

1. Pilocarpine toxicity is characterized by an exaggeration of its parasympathomimetic effects.
 2. The dose-related cardiovascular pharmacologic effects of pilocarpine include hypotension, hypertension, bradycardia, and tachycardia. (See also **WARNINGS** Section.)
 3. SALAGEN tablets should be administered with caution to patients with known or suspected cholelithiasis or biliary tract disease. Contractions of the gallbladder and biliary smooth muscle could precipitate complications including cholecystitis, cholangitis, and biliary obstruction.
 4. Pilocarpine may increase uterine smooth muscle tone and could theoretically precipitate renal colic or "uterine reflux" in patients with renal dysfunction (e.g. nephrolithiasis).
 5. The pharmacokinetics of orally administered pilocarpine in patients with renal and hepatic disease is not known.
 6. Cholinergic agonists, like pilocarpine, may cause increased acid secretion. This possibility should be considered when treating patients with active peptic ulcer disease.
 7. Cholinergic agonists, like pilocarpine HCl, may have dose-related central nervous system effects. This should be considered when treating patients with underlying cognitive or psychiatric disturbances.
 8. Ocular administration of pilocarpine has been reported to cause visual blurring and impairment of depth perception which may result in decreased visual acuity, especially at night and in patients with central lens changes. Patients should be cautioned about driving at night or performing hazardous activities in reduced lighting while receiving therapy with SALAGEN tablets.
- Drug Interaction:** SALAGEN tablets should be administered with caution to patients taking beta adrenergic antagonists because of the possibility of conduction disturbances. Drugs with parasympathomimetic effects administered concurrently with SALAGEN tablets would be expected to result in additive pharmacologic effects. SALAGEN tablets might antagonize the anticholinergic effects of drugs used concurrently. These effects should be considered when anticholinergic properties may be contributing to the therapeutic effect of concomitant medication (e.g. atropine, inhaled anticholinergics).

While no formal drug interaction studies have been performed, the following concomitant drugs were used in at least 10% of patients in either or both Sjögren's protocol studies: acetylsalicylic acid, artificial tears, calcium, conjugated estrogens, hydroxychloroquine sulfate, ibuprofen, levothyroxine sodium, methoxypropargyl acetate, methotrexate, multivitamins, naproxen, omeprazole, paracetamol, and prochlorperazine. There were no reports of drug toxicities during either trial. Use in **Children:** Safety and effectiveness of SALAGEN tablets have not been studied in children under 18 years of age.

Impairment of fertility: The data obtained from a study in rats suggest that pilocarpine may impair the fertility of male and female humans (See also **TOXICOLOGY** Section). Therefore, SALAGEN tablets should be administered to individuals who are attempting to conceive a child only if the potential benefits justify potential impairment of fertility. Use in **Pregnancy:** The safety of SALAGEN tablets has not been established in human pregnancy. Therefore, SALAGEN tablets should only be used during pregnancy if the potential benefits to the mother justify the potential risk to the fetus. **Nursing Mothers:** It is not presently known whether this drug is excreted in human milk. Because many drugs are excreted in human milk and because of the potential for serious adverse reactions in nursing infants from SALAGEN tablets, a decision should be made whether to discontinue nursing or to discontinue the drug. **Dependence Liability:** Pilocarpine HCl does not have the potential for addiction; consequently, there have been no reports of addiction with the use of pilocarpine HCl. There are no known withdrawal effects associated with pilocarpine either in animals or in humans. The pharmacologic effects, other than salivation, are not pleasurable; thus, there is no reason to suspect it will be abused.

ADVERSE REACTIONS

Head and Neck Cancer Patients: In the controlled clinical studies, 217 patients of whom 147 (68%) were male and 70 (32%) were female were administered SALAGEN (pilocarpine HCl) tablets. The mean age of the patients was approximately 58 years; the majority of patients were between 50 and 64 years (51%), 33% were 65 years and older, and 16% were younger than 50 years.

No serious drug-related adverse events were reported with use of SALAGEN tablets in these controlled clinical trials. Table 2 presents the adverse events observed during treatment with SALAGEN tablets which were considered to be a consequence of the expected pharmacologic effects of pilocarpine. These adverse events were dose-dependent and generally of mild or moderate intensity. Such adverse events usually subside within 6 hours of discontinuation of therapy.

TABLE 2

The most frequent adverse events, by dose, associated with SALAGEN Tablets

Adverse Event	(Percent of Patients Reporting)		
	Placebo (n=152)	5 mg (n=141)	10 mg (n=121)
Sweating	3%	29%	68%
Nausea	4	6	15
Blurred Vision	7	5	14
Chills	<1	3	14
Vasodilatation (Flushing)	3	8	13
Urinary Frequency	7	9	12
Dizziness	4	5	12
Asthma	3	6	12

Table 3 presents additional adverse events (incidence ≥ 3%) reported at dosages of 15 - 30 mg/d in the controlled clinical trials.

TABLE 3

Adverse events (incidence ≥ 3%) reported at dosages of 15 - 30 mg/d SALAGEN Tablets

Adverse Event	(Percent of Patients Reporting)	
	Placebo (n=152)	15-30 mg (n=217)
Headache	8%	13%
Dyspepsia	5	7
Lacrimation	8	6
Diarrhea	5	6
Edema	4	5
Abdominal Pain	4	4
Ambyopia	2	4
Vomiting	1	4
Pharyngitis	8	3
Hypertension	1	3

The following events were reported by head and neck cancer patients at incidences of 1 - 2% at dosages of 15 to 30 mg/d:

- Cardiovascular:** tachycardia.
 - Digestive:** dysphagia, taste perversion.
 - Musculoskeletal:** myalgia.
 - Nervous:** tremor.
 - Respiratory:** epistaxis, sinusitis, voice alteration.
 - Skin:** pruritis, rash.
 - Special Senses:** abnormal vision, conjunctivitis.
- In long-term treatment were two patients with underlying cardiovascular disease of whom one experienced a myocardial infarct and another an episode of angina. The association with drug is uncertain.

Sjögren's Syndrome Patients: In the controlled clinical studies, 106 patients of whom 19 (5%) were male and 87 (95%) were female were administered SALAGEN (pilocarpine HCl) tablets. The mean age of the patients was approximately 55 years; the majority of patients were between 40 and 69 years (78%), 16% were 70 years and older, and 14% were younger than 40 years of age.

No serious drug-related adverse events were reported with use of SALAGEN tablets in these controlled clinical trials. Table 4 presents the adverse events observed during treatment with SALAGEN tablets which were considered to be a consequence of the expected pharmacologic effects of pilocarpine. These adverse events were dose-dependent and generally of mild or moderate intensity.

TABLE 4

The most frequent adverse events, by dose, associated with SALAGEN Tablets

Adverse Event	(Percent of Patients Reporting)			
	Placebo (n=253)	2.5 mg (n=121)	5 mg (n=255)	5-7.5 mg (n=114)
Sweating	7%	11%	48%	47%
Urinary Frequency	4	11	10	6
Chills	3	1	4	6
Vasodilatation (Flushing)	2	2	9	3
Increased salivation	0	0	3	4

Table 5 presents additional adverse events (incidence ≥ 3%) reported at dosages of 10 - 30 mg/d in the controlled clinical trials.

TABLE 5

Adverse events (incidence ≥ 3%) reported at dosages of 10 - 30 mg/d SALAGEN Tablets

Adverse Event	(Percent of Patients Reporting)	
	Placebo (n=253)	2.5-7.5 mg (n=326)
Headache	10%	18%
Flu Syndrome	9	12
Nausea	9	12
Diarrhea	7	8
Dyspepsia	7	8
Rhinitis	8	8
Diarrhea	7	7
Dizziness	7	6
Pain	2	4
Abdominal Pain	4	5
Pharyngitis	5	4
Sinusitis	5	4
Asthma	2	3
Rash	3	3
Infection	6	3

The following events were reported by Sjögren's patients at incidences of 1 - 2% at dosages of 10 to 30 mg/d:

- Body as a whole:** accidental injury, allergic reaction, fever, abnormal lab test.
- Cardiovascular:** palpitation, tachycardia.
- Digestive:** constipation, flatulence, glossitis, stomatitis, vomiting.
- Metabolic and Nutritional:** edema, face edema.
- Musculoskeletal:** back pain, myalgia.
- Nervous:** somnolence.
- Respiratory:** cough increased, epistaxis.
- Skin:** pruritis.
- Special Senses:** blurred vision, tinnitus.
- Urogenital:** urinary incontinence, urinary tract infection, vaginitis.

SYMPTOMS AND TREATMENT OF OVERDOSSAGE

Symptoms: Toxicity from pilocarpine is characterized chiefly by exaggeration of parasympathomimetic effects and resembles "muscarinic poisoning" (e.g. consumption of mushrooms of the genus *Amanita*). Dose-dependent symptoms include salivation, sweating, vomiting, respiratory distress, hypotension, diarrhea, nausea and shock. Mental confusion and cardiac arrhythmias can also occur.

A fatal overdose with oral administration of ocular pilocarpine, resulting from poisoning, has been reported in the literature. The symptoms included salivation, pinpoint pupils, sweating, dyspnea, tachycardia, and pulmonary edema.

There are several reports of pilocarpine overdosage reported with the treatment of intractable glaucoma. Cardiovascular decompensation has been noted in patients with acute closed-angle glaucoma who have received intracocular instillation of pilocarpine in excess of 60 to 100 mg over short periods prior to eye surgery. Other reported symptoms occurring in this situation include nausea, vomiting, profuse sweating, tremor, hypotension, sinus bradycardia, arrhythmias, block, changes in mental state, and shock. **Treatment:** Overdosage with pilocarpine should be treated with atropine titration (0.5 mg to 1.0 mg given subcutaneously or intravenously) and supportive measures to maintain respiration and circulation. Epinephrine (0.3 mg to 1.0 mg, subcutaneously or intramuscularly) may also be of value in the presence of severe cardiovascular depression or bronchoconstriction. It is not known if pilocarpine is dialyzable.

DOSSAGE AND ADMINISTRATION

The usual dose for initiation of treatment is 5 mg SALAGEN (pilocarpine HCl) tablets three or four times daily. Titration up to 10 mg (2 tablets) per dose, not to exceed a total of 30 mg (6 tablets) per day, may be considered for patients who have not responded adequately and who can tolerate the lower doses. The lowest dose that is tolerated and effective should be used for maintenance.

Treatment with SALAGEN tablets should begin at the first signs of xerostomia. Clinical experience indicates that the relief of xerostomia and/or keratoconjunctivitis improves over time with the administration of SALAGEN tablets. Administration of SALAGEN tablets, at the above recommended dosage, for 12 or more weeks may be required before relief can be expected. Onset and degree of relief may vary among patients.

PHARMACEUTICAL INFORMATION

DRUG SUBSTANCE:

Proper Name: Pilocarpine Hydrochloride (HCl)
Chemical Name(s): (11Z)-1-(1-phenyl-3-ethylbutyl-4-[(1-methyl-1H-imidazol-5-yl)methyl]-1-morpholinoethyl)carbamate hydrochloride (2S-cis)-[2] Pilocarpine Monohydrochloride

Molecular Formula: C₂₁H₂₇N₃O₂HCl

Molecular Weight: 294.72

Description: Pilocarpine hydrochloride is a white crystalline powder. It is hygroscopic, melting between 200 and 285°C. Pilocarpine hydrochloride has a pKa of 10.71 (10°C) and forms a solution with a pH of 3.5 - 4.5 (3% solution in carbon dioxide-free water). The drug is highly soluble in water and alcohol, practically insoluble in chloroform, and insoluble in ether.

COMPOSITION: SALAGEN (pilocarpine HCl) tablets contain the following non-medical ingredients: microcrystalline cellulose, stearic acid, coating (hydroxypropyl methylcellulose, titanium dioxide, polyethylene glycol, polyacrylate 80, ink [titanic, ethanol, synthetic black iron oxide, N-butyl alcohol, propylene glycol, ethylene glycol monochloroacetate, acetone, methyl alcohol] polyvinylpyrrolidone).

STABILITY AND STORAGE RECOMMENDATIONS: Store at room temperature (15 - 30°C).

AVAILABILITY OF DOSAGE FORMS

SALAGEN (pilocarpine HCl) tablets are available as:

- 5 mg, white, round, bisect, film-coated uncoated tablets, printed with "SAL" on one side and "5" on the other side, in bottles of 100

Product Monograph Available Upon Request



New Products

JCDA's *New Products* section provides readers with brief descriptions of recent innovations in dentistry. Publication of this information does not imply endorsement by JCDA or the Canadian Dental Association. If you would like material to appear in JCDA's *New Products* listing, send all news releases and photographs to Rachel Galipeau, coordinator, publications, at rgalipeau@cda-adc.ca. Material received in English and French will be given priority.



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