Dalhousie University, Faculty of Dentistry

Dental Research News

APRIL 1993

Research Development Office, (902) 494-1675

Stimulus & Challenge

The voice of Dal Dental research

VOLUME VII, NUMBER 4.

Sixth Anniversary of RDO

This month the Research Development Office celebrates it's sixth year. We have come a long way during the past six years. A larger number of individuals are now engaged in research than ever before in the history of our Faculty of Dentistry. We have presented more research papers at International Research meetings than any other Faculty of Dentistry in Canada during the past three years. Our faculty has presented 182 abstracts at the IADR/AADR meetings during the past six years, this represents 75% of all of such abstracts presented in the history of our Faculty. During this period we have obtained our first MRC Development Grant, our first MRC Programme Grant, our first MRC University/Industry Grant, and our first University Industry Chair. The total research funding brought in during this six year period is is over $2.7 million, which is over 80% of the total funding obtaind in the history of our Faculty.

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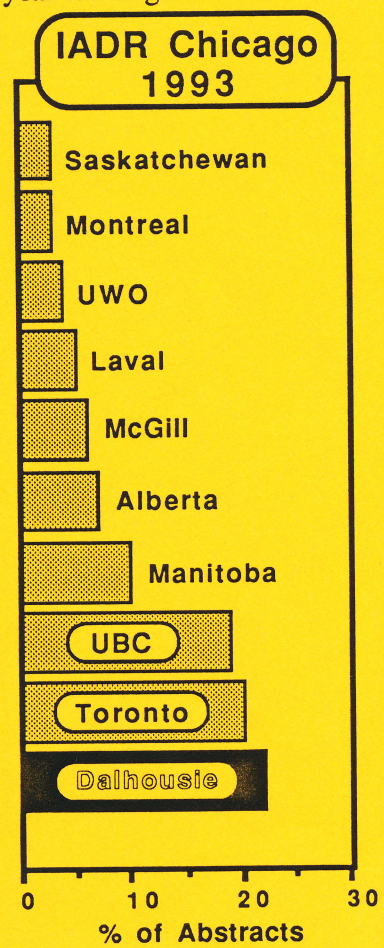
Dal Top of Canadian International Dental Research

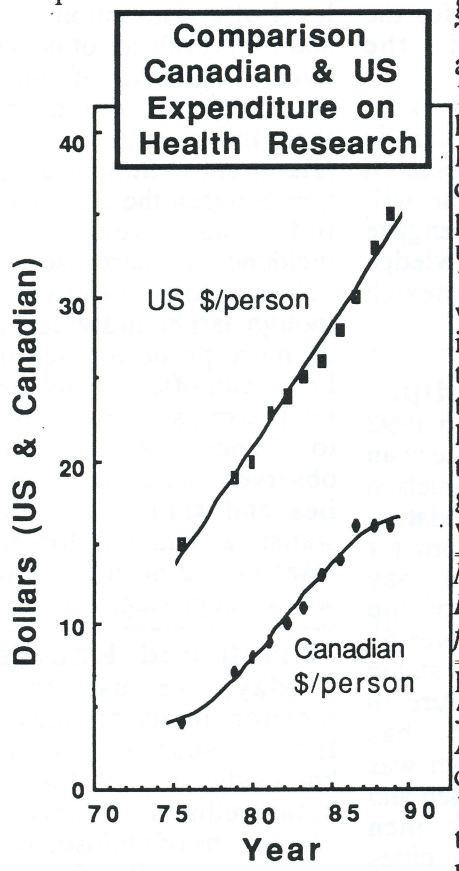
The performance of Dalhousie in terms of research productivity has been absolutely outstanding during the past two years. At the AADR meeting in Boston in March 1992 a total of 58 papers from Canada were presented, 17 of these (29.3%) were from Dalhousie. At the June 1992 IADR meeting in Glasgow a total of 110 papers were from Canada, 25 (22.7%) of these carried the name of Dalhousie. At the IADR meeting in Chicago in March 1993 a total of 166 papers were from Canadian Faculties of Dentistry, 36 (22%) of these carried the name of Dalhousie. The combined total of Canadian papers for the three meetings was 334 out of which 78 (23%) carried the name of Dalhousie. Our Faculty had just 2 more papers at the Chicago meeting than the nearest rival U of T who had 34 papers and UBC came a close third with 31. At the Chicago meeting 2,539 papers were presented 6.5% were Canadian and 1.4% were from Dalhousie. Few would have predicted ten years ago that Dalhousie would one day be the top Faculty in terms of abstracts presented two years running at international research meetings. For so many years Toronto, UBC Manitoba and Alberta have dominated the scene. It is true that the abstracts presented at these meetings do not tell the complete story about the level of research, any more than the number of research dollars brought in. However, the number of abstracts presented each year does provide us with a crude measure of the health of the research in our institutions. Clearly the health of research at Dalhousie has never been better. How does it feel to be a member of the leading research Dental Faculty in Canada for the second year running?



Dalhousie was the top Dental Faculty in terms of the number of papers presented at the International IADR meeting held in Chicago in March 1993.

Poor Cousins to Uncle Sam

We hear a lot about how the US need to spend more on their health care programmes. However, it is interesting to look at the comparison in the amout of funding devoted to US health related research compared to Canada.



Research funding in Canada for health related research is very difficult to obtain. If we look at the comparison of expenditures between Canada and the US in the above graph we can see how much we lag behind our colleagues in the US in terms of relative funding devoted to this important aspect of health care.

The MRC and NHRDP research funding is clearly not going to increase drammatically during the next few years. One of the possible answers to the problem is for us to collaborate in mulitdisciplinary research projects to increase our chances of success.

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Increase in Research Recommended

The accreditation report of Dalhousie University Faculty of Dentistry recommended that more research should be undertaken. It stated that "Every dental school has some responsibility in the pursuit of research and in the provision of graduate, post-graduate and refresher courses." This was the report of the accreditation team 42 years ago in 1951. In 1994 we shall again have an accreditation visit to our Faculty. The excellence and quality of our current research programme are at a level undreamed of 42 years ago in 1951. In terms of our research we have clearly come a long way in 42 years, amazingly most of this progress has been made in the past 5 years. Interestingly our level of research is not the only thing which has changed, the fees generated from the clinic 42 years were a mere $7,800.

Not all research is presented at IADR meetings. As can be seen from the following.

David Precious will address the 50th Anniversary Meeting of the American Cleft-Palate-Craniofacial Association, Pittsburgh, April 1993. The title being "A Functional Approach to Cheilorhinoplast and Genioplasty." He will also present two research papers; "The Surgical Relevance of Labioseptal Premaxillary Anatomy in Normal and Cleft Lip/Palate Human Fetuses." and "Modified Posterior-Superior Step LeFort 1 Osteotomy."

Barry Pass presented the following paper at the American Academy of Forensic Sciences, in Boston in February 1993.

Postmortem Radiation Doses from Chernobyl Using Dental Enamel.

In the event of a radiation accident Electron Spin Resonance in dental enamel can be used for triage, whereby determination of exposure facilitates the correct choice of treatment. In the event of death from a radiation accident this technique can be used for postmortem dose determination in order to confirm radiation as the cause of death.

Many properties of human tissue have been investigated as possible means to determine absorbed radiation doses. Dental enamel is the only tissue in the human body that retains indefinitely the history of its radiation exposure. The absorbed dose is stored in the form of long-lived free radicals (i.e. freed electrons trapped in lattice defects of hydroxyapatite). These free-radicals can be detected using Electron Spin Resonance, the electron equivalent of Nuclear Magnetic Resonance.

In the present study tooth enamel from two victims of the Chernobyl nuclear disaster, and from one victim of an accidental exposure to a radiation sterilization source, were studied for radiation dose determination using Electron Spin Resonance.

The two victims of the Chernobyl disaster were determined to have been exposed to 7.0±0.7 Gy and 9.0±1.0 Gy, respectively. These results agreed well with dose estimates by Soviet investigators.

The third individual reported on here entered a sterilization chamber for medical supplies where the Co^{60} source had not retracted properly. Dose estimates by Russian physicists, and dose determinations using cytological techniques, indicated an exposure range of 8 to 16 Gy. Electron Spin Resonance studies of dental enamel by this group determined the exposure to be 13.7±1.4 Gy. This is in good agreement with the Russian estimates.

Thus, radiation exposure resulting from nuclear accidents can be accurately determined using electron spin resonance in dental enamel and has application in the forensic sciences.

Times of Challenge

These times of challenge facing us in dental and biomedical research are much like those that Dickens wrote about in the Tale of Two Cities, the need to address important and exciting new research subjects, the need to operate within the federal and provincial and institutional budget crisis.

"It was the best of times: it was the worst of times;
It was the age of wisdom: it was the age of foolishness;
It was an epoch of disbelief: it was an epoch of incredulity;
It was the season of hope: it was the winter of despair.

We should not despair. In these times of soaring costs and a decline in real dollars for funding from federal research agencies we need to be innovative. The challenge is to use our creativity to address the many fertile areas of clinical research which do not require vast amounts of funding. Brain power, an enquiring mind, determination and enthusiasm are the main ingredients to fuel any research programme.

Someone once said "I do not know if these are the best of times or the worst of times. I do know that this is the only time we have." This is indeed without question the only time that we have, we must be vigilant in setting down the research programmes which will form the foundation of the future of our academic institution. We owe this to the Faculty, Dalhousie University, our profession and the general public, but most of all to ourselves to be as productive as we can be, by working at the cutting edge of the knowledge base. Knowledge is the lifeblood of any university.

We need to be vigilant to observe the difficulties and problems which face each of us as we go about our daily tasks. Experienced clinicians have a wealth of innate knowledge which can be exploited to solve many of the unexplained problems in clinical practice. Even with a well designed experiment the data does not always readily yield the truth to us. As Einstein once said "There is no logical way to the discovery of these elemental laws. There is only the way of intuition, which is helped by the feeling for the order lying behind the appearance."

Clinical knowledge and skills combined with intuition can be powerful tools in any research endeavor. However, these will all be wasted if we do not engage in the pursuit of new knowledge through the medium of research and scholarship.

Fluoridation not Hip.

A study in the August 12th 1992 issue of the Journal American Medical Association by Danielson *et. al.*, suggests that fluoridation in drinking water at 1 ppm for approximately 20 years may result in a higher rate of hip fractures for individuals over 65 years of age. The authors stated that the rate of hip fracture in Brigham City which has fluoridated water at 1 ppm was 1.27 times higher for women and 1.41 times higher for men compared to individuals in cities which were not fluoridated. This was said to be the first study to show this effect with fluoridated water at the 1 ppm level, four other studies have previously found increased hip fractures with levels above 1 ppm. However, an editorial by Michael Kleerekoper pointed out that a fifth study had found a decreased rate of hip fracture for individuals in a fluoridated region. A review paper by Gordon and Corbin in Osteoporosis International also deals with the relationship between hip fracture and water fluoridation. This review paper claims that the data reported by Danielson *et. al.*, fails to establish an adequate basis for making firm conclusions that relate fluoride levels in drinking water and the prevalence of hip fractures. It is clearly wise to remember that demonstrating a good statistical correlation between two phenomenon does not prove a direct cause-and-effect relationship. It may be possible to show statistically that there is a very good relationship between the level of consumption of Aspirin and the prevalence of dental caries over a period of 80 years, however, few would speculate that there may be a causal relationship. Similarly a correlation between the size of shoes an individual wears and the incidence of heart disease would not seem to be meaningful, even though larger individuals might be more prone to such disease. Logic can often tell us that some relationships are most likely due to chance. As Disraeli once observed there are "Lies, damn lies and statistics." In using statistical analysis for our own research we need to ensure that we do not propagate a lie.

Truth and Knowledge

"Today, we use the word research in its broadest sense. It's a search for general knowledge, to look for truth, the basic truths of the universe, the basic truths of philosophy."

Bob Fournier.

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Exploit What You Have

"It's not the level of intelligence you have, that alone affects prospects for success, but how you direct or utilize the intelligence— how you exploit what you have."

Robert J. Sternberg.

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Jones Appointed to MRC Committee.

Derek Jones has been appointed by the President of MRC to serve on a special Advisory Committee on Programmes.