Dalhousie University, Faculty of Dentistry

Dental Research News

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The voice of Dal Dental research

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This January 1995 issue of the Dental Research News is the 85 edition to be published since the first edition in September 1987.

Happy New Year

New Years Resolution

For over 7 years the Dental Research News has provided news relating to the research and scholarly activities of our faculty. The Dental Research News has been published continuously since September 1987. A total of 622 pages of research information have been documented between the first edition up to and including this January 1995, edition. What will be in the next 622 pages? it is up to you. Dental Faculty members are encouraged to provide details for publication in the DRN. Such information may be about a new research project which you have started, news of one of your publications in the dental scientific literature or it may involve a report of your summer research project. The Dental Research News provides you with the opportunity to inform your colleagues in the Dental Faculty and Dalhousie University about your research accomplishments. You should note that the DRN is disseminated to the broader Dalhousie community. Copies are displayed in the Health Sciences Library and back copies are available on the library shelves. The DRN thus provides a useful communication to the Dalhousie community about your research activities and accomplishments. This January 1995 publication of the Dental research News is our 85th issue. Make a new year's resolution to have your name recorded for posterity as a contributor to the rapidly develo-ping research history of our Faculty of Dentistry, and have it recorded in the pages of the Dental Research News. At the beginning of a new year some may say that we look forward to an uncertain future. Let us look forward with hope and enthusiasm for research and scholarship in the Faculty of Dentistry at Dalhousie University. We should perhaps remember the words of Hippocrates who stated that: "Life is Short, Art Long, Opportunity Fleeting, Experiment Slippery, Judgement Difficult."

This Was the Year, That Was

Looking back over the past twelve months we have accomplished much. In 1994 we saw the establishment of the Clinical Research Unit. In 1994 we had the presentation of our 250th research paper at an international dental research meeting of IADR/AADR/CADR. An NHRDP grant was obtained by Amid Ismail and a CIDA grant was obtained by Peter Pronych. Amid Ismail organized the first in a series of special international symposia "Clinically-Oriented Scientifically Based Issues Facing Dental Practice." 1994 saw the introduction of the new expanded mandate of the Medical Research Council, this is intended to address pertinent clinical aspects of health care, which gives greater opportunities for our clinical faculty members. In April 1994 we held our important research discussion group meeting to address and debate the focus and thrust of research within th Faculty of Dentistry. 1994 sa the election of the 8th Canadia President of the IADR, Dr. Barr Sessle, Dean of Toronto Denta Faculty. In July 1994 the Denta Research News reported on paper by Dr. Howard Friedma who claimed that his data indicate that scientists live longer than nor scientists. What better news coul we wish to have than this. Long live research. The year 1994 sa the strengthening of our researc capability with the arrival of thre new faculty members, Kath Russell, Helen Lyttle and Son Lee. In 1994 we held a ver successful summer researc seminar in which 12 summe research students participated i presenting their research to a grou of faculty members. 1994 sa increased collaboration betwee the Faculty of Dentistry and th Faculty of Medicine. The ye 1994 saw the successful defenc by Brian Smyth of his thes involving total hip acetabul implants, which was conducted our Biomaterials Division. Y 1994 was a good year. Let hope that 1995 will bring furth success for our research in th Faculty of Dentistry. Let us ho that 1995 brings increase collaboration with colleagues other faculties.

Happy New Year

More Abstracts

In addition to the nine abstracts of papers highlighted in the October edition of the Dental Research News the following two abstracts have also been acepted for presentation at the AADR/CADR meeting next March.

Longitudinal Radiographic Evaluation of Crestal Bone Levels Around Brånemark Single Implants and Adjacent Teeth.

L. Aviv-Arber*, D. Chaytor, M. Pharoah*, GA. Zarb*
(*University of Toronto)

A compelling concern in assessing single implant success is its impact on crestal bone levels at implant surfaces and adjacent teeth. This study was designed to measure crestal bone levels annually and relate them to potentially relevant factors e.g. patient age and sex, implant characteristics, cause of tooth loss, vertical and horizontal distances between implant and adjacent teeth, occlusal contacts, bone dehiscence.

Standardized periapical radiographs were available from 37 implants inserted at different jaw regions and monitored annually for 1 to 8 years (mean = 4 years) after loading. Consistent image geometry, film exposure and development were used. Radiographs were digitised by a 35 mm slide scanner (Microtek Sacnmaker 35T) at a resolution of 968 dpi. NIH-Image program was used for digital processing and measuring of the images on an Apple Macintosh Quadra ™ 800 computer. The 0.6 mm inter-thread distance was used to calibrate image measurements. Measurements included: bone levels at mesial and distal implant surfaces and at adjacent tooth surfaces, plus vertical and horizontal distances between implant and adjacent teeth.

For the group of 37 implants the mean annual bone loss after one year or implant loading was 0.03 mm at implants mesial and 0.11 mm at implants distal. At tooth surfaces facing implants a mean annual bone gain of 0.12 and 0.01 mm bone loss were observed at mesial and distal teeth respectively. While more bone appeared to be lost during the first year of loading, no significant differences ($p<0.05$) were observed between the first year of loading and each of the subsequent years. It appears that certain factors such as occlusion and horizontal and vertical distances between an implant and adjacent teeth, may implact on the observed bone level changes.

Despite the presumed fabourable bone level changes at single tooth implants and their adjacent teeth, considerable variations were evident among individual implants as well as from year to year with individual implants. Several factors may contribute to such variations. Consequently, the applicability of the published success cirterion for edentulous patients to single implants is questioned. These are expected to be confirmed in more extensive long-term studies.

A Reliability Study of Computer-assisted Implant Related Bone Levels.

E. Habsha*, D.V. Chaytor & G.A. Zarb*.
(*University of Toronto).

Stability of bone around implants is one of the criteria for determining implant success. In the past, annual bone levels were measured on standardized periapical radiographs aided by a microscope. With a view to improving the reliability of these measurements, this study compared 4 technqiues for computer-assisted image analysis and measurement. The annual recall radiographs of 4 patients each treated between 1984 - 1987 with two Brånemark implants used for over-denture support were digitized at 968 dpi using a slide scanner (Microtek Scan Maker 35T). The NIH IMAGE program was used on a MacIntosh Quadra™ 800 for digital processing and measuring of the images. Measurements were calibrated using the 0.6 mm pitch of the implant threads. The vertical distance from the implant collar to the mesial and distal implant bone interfaces on each of the 24 radiographs were measured. The 4 methods used were: (1) direct measurements of images as scanned; (2) histogram-derived density sliced, independently specific at mesial and distal sites; (3) entire image histogram-derived density sliced; (4) entire image histogram-derived density sliced, X 2 magnification. Intra-observer variation was determined from 2 independent sets of measurements of bone height which were read one week apart. Determination of significant differences in the intra-observer variance among the measurements from the 4 measurement techniques was done by using a 2-tail F-test at the 5% level of confidence. Statistical results demonstrated that the first method employed, that is direct measurements of image, yielded the most reproducibly consistent results.

This study was supported by Wrigley Canada Inc. and the Dentistry Canada Fund.

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Interplay

"Because events are the result of a multiplicity of causes, explanations usually identify a number of interacting causes that joined together to produce the event."
Ernest R. House, Educ.Res., Aug-Sept. 1991 p 2-9.

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Educational Research

The following abstract has been acepted for for presentation at the AADS meeting next March.

The predictive value of admissions tests for third year dentistry performance.

D. V. Chaytor, H. J. Murphy.

Only infrequently do studies of the predictive value of admissions tests follow a cohort of students into their clinical program years. This study examined the grade performance of 6 consecutive third year classes in relation to their scores on the Canadian Dental Association Dental Aptitude Test (DAT), the Group Embedded Figures Test (GEFT) and the Impression /Die Matching Test (IMP/DIE).

Purpose: to determine (1) predictive validity of the DAT for third year DDS performance (2) carving test contribution to that prediction, and (3) predictive validity of the GEFT and IMP/DIE.

Subjects: 192 third year students, six classes, one school.

Predictors: CDA-DAT sub-tests , GEFT and IMP/DIE scores. The latter two tests were given in first year.

Criteria: 22 course grades(13 didactic, 9 clinical) plus clinical, didactic and overall GPAs.

Results: Significant(p.=.05), positive Pearson r were found for 49/175 DAT subtest correlations, none with GEFT and 4 with IMP/DIE . Regression analysis revealed DAT sub-tests significantly (p=.05) predicted performance on 6 criterion scores, explaining at best 17% of the variance; removal of carving as a predictor had essentially no effect, nor did adding GEFT or IMP/DIE. *Conclusions*: While prediction of success remains a reasonable objective, using current admissions tests for the clinical years requires caution.

Linking Science to Society

Concern for man himself and his fate must always form the chief interest of all technical endeavours.....Never forget this in the midst of your diagrams and equations. —*Albert Einstein.*

The Public and Research

Should the lay public have a say as to which research areas are funded or which areas of research have priority? Should the public have a say in the way that public money is spent on science? Should the public have any input into the use of dental amalgam? In Denmark several consensus debates have been held in which a group of lay people question experts about controversial scientific and technological subjects. The panel of lay persons control the proceedings, decide which questions it wants to address, and which experts it wishes to consult. The panel then draws its conclusions. Subjects debated have included trans genic animals and food irradiation. Interestingly Danish legislation has been changed as a result of these public consensus debates. The idea has now spread to the UK where the first consensus conferences was held in November 1994 on "Plant Biotechnology." A panel of 16 lay persons were selected on the basis of age, gender and occupation. The cross-section of panelists included a retired teacher a road sweeper and an airline pilot. The panelists met for a three day public conference funded by the British Biological Sciences Research Council in front of a participating audience of over 300. The expert witnesses selected by the panelists were called upon to answer questions. The panel drew their own conclusions and produced a jargon free report concerning the benefits and risks of modern plant biotechnology. The response to the report by the British Research Council was said to be positive, and it will be used to define future priorities in the council's research programs which it funds. What concern is this to those of us who are conducting biomedical research in Canada. The answer is that trends of this type have a way of gaining in popularity especially in times of fiscal constraint. The recent Strategic Plan operation conducted by MRC made use of grass roots-consultation within the academic community. This may well herald an era of consensus conferences of the Danish type coming to Canada in the area of research funding for health care.

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A View of Educational Research

"Over the past few decades, the standard view of educational research has been strongly criticized. There is little doubt that the Human or regularity theory of causation on which the standard view is based is incorrect. However, no one has succeeded in defining a satisfactory alternative position. Scientific realism, derived in part from studying how scientists actually conduct their research, has resulted in a new conception of science and causation that has promise as a basis for educational research."

Ernest R. House, Educ.Res., Aug-Sept. 1991 p 2-9.

Nothing But The Facts

"We must trust to nothing but facts: these are presented to us by nature and cannot deceive. We ought, in every instance, to submit our reasoning to the test of experiment and never to research for the truth but by the natural road of experiment and observation."

--Lavoisier

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