Dalhousie University, Faculty of Dentistry

Dental Research News

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Stimulus & Challenge

The voice of Dal Dental research

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IADR to be held in Canada

The IADR/AADR/CADR meeting will be held in Canada in 1999. Derek Jones as President of CADR has lobbied strongly for a Canadian meeting. We were unsuccessful with our proposal that the 1996 IADR/AADR/CADR meeting be held in Toronto. The meeting will now be held in San Francisco. We also lost out to Minneapolis for the 1998 AADR/CADR meeting which we had proposed for Vancouver. However, we have finally obtained acceptance of our bid for 1999. You have six years to prepare your abstract. The meeting will be held either in Vancouver or Toronto. The final decision on the location will be made during the next year. For those who like to plan ahead the 2007 IADR meeting is tentatively planned for Melbourne, Australia. For this meeting in Australia you have 14 years in which to save up the money for the trip and to write your abstract.

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Biomaterials Appointment

The Division of Biomaterials is pleased to announce that Dr. Les Russell has joined their research team. Dr. Russell has been appointed by the Board of Governors as an honorary Professor in the Division of Biomaterials, Department of Applied Oral Sciences.

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IADR 1994

A record total of 3,074 abstracts were submitted for the IADR meeting to be held in Seattle, 9-13th March 1994. This total is over 500 more than the previous record number. There were 4,361 participants and 2,537 abstracts at the meeting in Chicago in March 1993. The Seattle meeting will have 25 Lunch and Learning sessions, 9 Jointly-sponsored symposia, 14 Group/Division-sponsored symposia and 5 hands-on workshops. It should be quite a meeting. Please note that the registration fee for the Seattle IADR meeting for non-members is $360 compared to only $185 for members. A saving of $175, quite impressive. If you wish to take advantage of the lower registration fee by joining the CADR, you must have paid your membership before January 1st 1994. You can also save a further $40 dollars off the registration fee by registering (by mail or FAX) for the meeting before the 4th February 1994.

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Research Grant Submitted

An NSERC grant has been submitted by Choong Foong. The title is "Phospholipid Vesicles in Biological Environments." The three year budget for the project is $29,517.

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Biomaterials

Biomaterials was highlighted in the Friday @ 4 lecture series on the 19th November 1993. This was described by Howard Dickson in his introduction as a curtain raiser to the Workshop on Biomaterials which will take place on the 1st December 1993.

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Commitment to Clinical Research

A preliminary meeting dealing with clinical research was held on Saturday October 16th. A very successful session was held which resulted in suggestions being put forward for a number of research projects dealing with various clinical procedures. A further workshop dealing with clinical research was also held on Saturday 27th November 1993. A proposal was put forward to establish a clinical research unit. Derek Jones made the point that it required commitment from participants not just support. He gave the analogy of a bacon and egg breakfast, in which the hen had been supportive, but the pig was totally committed. Like the pig, the RDO is totally committed to supporting clinical research.

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Missing Link

"I believe I've found the missing link between animal and civilized man. It is us."

Zoologist Konrad Lorenz.

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Dr. Derek W. Jones
Faculty of Dentistry
Dalhousie University
Halifax, Nova Scotia B3H 3J5
Canada

Craniosynostosis Breakthrough

Research supported by NIDR has produced a major discovery which links a 600 million-year-old gene called MSX2 to a skull deformity known as craniosynostosis. A defective version of the gene has been discovered in members of a New England family who were born with craniosynostosis. The results of the study appear in the November 5th edition of the journal Cell. Craniosynostosis refers to a spectrum of skull malformations that result from premature joining of separate bones that make up the human skull. In the US approximately 1 in 3,000 is born with premature closure of one or more of the sutures which results in an abnormally shaped skull. Drs Wen Luo and Malcolm Snead of the USC School of Dentistry Los Angeles are members of a team of 12 researchers from 6 institutions in the US and one in Germany who have mapped the human MSX2 gene to the same region of chromosome 5 that is associated with "Boston type" craniosynostosis. The mutation was found in part of the MSX2 gene known as the homeodomain. The researchers claim that this is the first report of a human craniofacial disorder that is due to a mutation in the critical region of a homeobox gene that is believed to regulate other genes during embryo development. The MSX2 mutation was observed at a site within the homeodomain that has remained unchanged for millions of years. The MSX2 gene was first discovered in the fruit fly, and similar genes have since been found in a variety of animals, including sea urchins, fish, amphibians, birds, and mammals. The sea urchin studies date the MSX2 gene lineage to animals that were present on earth 600 million years ago. The MSX2 gene in the mouse has been thoroughly studied in several laboratories, in terms of development of the skull, limbs, and heart. This study which has linked the MSX2 gene to the Boston type of craniosynostosis, has opened the door to tracking the genetic cause of other forms of craniosynostosis. The researchers believe that future studies may provide additional insights into improved therapeutic approaches to this serious craniofacial disorder.

Distinguished Scientist Award

A new IADR Distinguished Scientist Award is to be established in the subject area of "Experimental Pathology." The award will recognize contributions to the understanding of the mechanisms contributing to the health and disease of the oral cavity and associated structures.

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HPB Invite Dalhousie Biomaterials

Derek Jones has been invited to give a lecture on biomaterials to the health Protection branch in Ottawa on the 3rd of December.

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Don't Put Your money Where Your Mouth is.

Archaeologists, anthropologists and forensic scientists have been studying about 1,000 corpses 387 of known age, sex and date of death which were removed from the vaults of Christ Church in London UK. One of the 18th century corpses was a suicide victim who shot himself. The individual could not face up to the fact that he had become bankrupt. What was interesting from the dental viewpoint was the fact that he had clearly desperately tried in vain to remove a fixed gold denture from his mouth, presumably to pay off some of his debts. The denture was said to have been worth 75 guineas.

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Cold Fusion Breakthrough

A new silver tin alloy has been developed as a dental restorative material. The material was developed by Drs. Lashmore and Dariel at the US, National Institute of Standards and Technology (NIST). Although silver and tin are the main ingredients in the prototype version the researchers are contemplating adding other metals such as copper and gold. The material was developed by using new patentable fusion technology invented by Lashmore and Dariel. The researchers claim that preliminary laboratory tests have shown that the material is stronger than mercury containing amalgam. They claim that dentists will find that the material is as easy to use as amalgam. The material is said to undergo cold welding using the normal condensation pressures used for amalgam. Specific details of the cold welding technique is the subject of a patent application by NIST. This invention could have a major impact on restorative dentistry by replacing dental amalgam which has been in use for the past 150 years. The new material can be polished as soon as it is placed, unlike amalgam which often requires a return visit. The new alloy is said to look like amalgam but is slightly shinier. This development opens up an wonderful opportunity for clinical research projects by our faculty members once the material is released onto the market. According to Dr. Lashmore the material could be available by 1996.

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575 and still going Strong

Did you know that this months edition of the Dental Research News brings the total number of pages published to 575 since our very first edition over six years ago in September 1987.

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Biomaterials Abstracts Submitted.

Two abstracts have been submitted from the Division of Biomaterials to the Society of Biomaterials Meeting to be held in Boston in April 1994. One of the papers deals with orthopedic bone cement. A modified bone cement formulation has recently been marketed which contains a methyl/butyl methacrylate copolymer powder, and a monomer containing n-decyl methacrylate and isobornyl methacrylate. The modulus of elasticity and modulus of rupture of bone cement materials are considered important in terms of the level of stress transfer and the resistance to fracture during function. The suggestion has been made that a lower modulus cement may offer an advantage. The objective of the project was to compare the physical properties of a conventional poly (methyl methacrylate) bone cement with the new bone cement formulation containing butyl methacrylate. These commercialbone cement materials were also compared with bulk synthesized methacrylate homopolymers and copolymers. The research study has shown that the new bone cement has a significantly lower (17%) modulus of elasticity and modulus of rupture (29%) than the more conventional bone cement material.

The second paper to be submitted to the Biomaterials Society meeting deals with a finite Element Analysis study of dental restorative materials. The study was conducted in order to characterize and contrast the stress distribution transmitted to the tooth cavity when using different base/lining materials in combination with commercial 'dental composite' and amalgam materials. It is important to characterize the mechanical properties of these materials, particularly the so-called 'posterior composites' designed as possible alternatives to dental amalgam for use in stress-bearing restorations in molar teeth. The functional stress transmitted by the restorative material may result in catastrophic fracture of surrounding brittle tooth enamel structure if high stress concentrations occur. Liners or bases placed underneath restorative materials have potential to significantly effect the stress distribution. Dynamic Young's modulus and Poisson's ratio were evaluated for four composite and three amalgam materials. Values of moduli corresponding to two different powder liquid ratio's for a commercial lining/base material placed underneath the restorations were also incorporated into the model. In the case of the amalgam restorations no connection was made between the cavity walls of the tooth and base/liner. In contrast the composite restorative materials were bonded to the cavity walls of the tooth. The moduli values of four commercial composite materials and three amalgam materials were incorporated into the model. A wide range of values were found amongst the maximum stress levels in the restored tooth cavity for the four different composite and three amalgam materials evaluated. It was found that the highest stress values occurred in the case of the higher modulus liner in combination with the amalgam restorative materials. However, the clinical implications of this are not known.

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The Relevance of Educational Research

"Research should improve the instructional relevance of testing, probe the social contexts of learning, and foster a rich view of thinking and creativity."

Thomas James, *et al.* Research and the Renewal of Education, 1991,

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A Distinction

"There is a distinction to be made that transcends the one between the quantitative and qualitative research paradigms. It is a distinction between that kind of research that suits best the study of causal relations among selected variables and the study of complex learning environments undergoing change."

Gavril Salomon,
Educat. Resr. Aug-Sept. 1991 10-18.

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Educational Research the Challenging Problem

"Research must be designed to understand how students can be intellectually engaged and encouraged to solve challenging problems as individuals and as a group - the kind of learning they will use in the real world. Research must focus on ways to help students take initiative, construct meaning for themselves, and develop thinking skills in new and unfamiliar settings." Research and the Renewal of Education, 1991, Thomas James, *et. al.*

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SMILE

Research Definition

A two sample 't' test is used to determine the difference between Red Rose and Earl Grey.

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NSERC Changes

The number of application forms is to be reduced for NSERC grants. Forms are to be redesigned to serve more than one programme. In addition whenever possible, electronic versions will also be developed. Serious consideration is being given to 4-year grants, as a means of significantly reducing the workload not only of the council but of the applicants as well.