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THE SYMPOSIUM ON DENTAL CARIES
sponsored by
THE INTERNATIONAL SUGAR RESEARCH FOUNDATION

The Symposium on Dental Caries was held in the Edward Hotel, Durban on Thursday, 12th September, 1974. The Chair was taken by **Professor D.H. Retief,** Director of the Dental Research Unit of the University of the Witwatersrand and the South African Medical Research Council.

In his introduction, the Chairman stated that dental caries had assumed epidemic proportions, particularly in White school children in South Africa. As a result of the growing demand for conservative treatment coupled with a shortage of dental manpower, the dental profession in South Africa is faced with a monumental task. For too long dentistry has concerned itself primarily with the prosthetic restoration of tissues destroyed by caries. With the general acceptance that caries is an infectious disease resulting from the mutual interaction of three major criteria of which diet, dental plaque and microflora and host factors are fundamental, a preventive programme can be formulated.

Prof. Retief expressed the view that conditions in South Africa provide exciting avenues for caries research. There are four ethnic groups readily available for study and within all these groups an additional division into different socio-economic levels adds an additional parameter for investigation. In addition, there are well-defined geographical areas in South Africa with high and low caries incidence which provide a further fertile, and as yet practically unexplored, field for investigation.

Five papers were presented at the Symposium.

1. **"Some Factors in the Resistance of Teeth to Dental Caries".** *Dr. P.E. Cleaton-Jones.*
Dental Research Unit of the University of the Witwatersrand and the South African Medical Research Council, Johannesburg.

Dr. Cleaton-Jones outlined the development of the carious lesion and discussed some methods to protect the enamel and to influence the resistance of enamel to organic acids. The use of pit and fissure sealants to protect those parts of the teeth most susceptible to dental caries, has proved to be an effective prophylactic measure.

The most safe, practical and economic means of reducing the incidence of dental caries is by the ingestion of fluoridated drinking water containing an optimal level of 1,0 ppm F depending on climatic conditions. In the absence of water fluoridation in South Africa, topical fluoride therapy, whether professionally applied or self-administered, plays an important part in rendering the surface enamel more resistant to carious attack.

Dr. Cleaton-Jones described a modified acid etch enamel biopsy technique developed in the Dental Research Unit for determining the fluoride concentration in enamel and the application of this technique in evaluating the efficacy of some topical fluoride techniques of increasing the fluoride concentration in the superficial enamel.

Fluoride does not appear to be the only trace element involved in dental caries. It is believed that some trace elements such as molybdenum and vanadium have a mild cariostatic effect while others, such as selenium, may promote dental caries. The Dental Research Unit is engaged in a research project supported by the South African Atomic Energy Board to determine the trace element composition of human enamel by means of neutron activation analysis. To date the concentrations of 17 elements have been determined quantitatively. It is intended to extend this study to analyse the teeth of subjects from the four ethnic groups and from geographical areas with known high and low caries incidence in South Africa.

2. **"Sugar Intake and Dental Caries in Senior Pupils in Four Ethnic Groups in South Africa".** *Dr. A.R.P. Walker*
Human Biochemistry Research Unit of the South African Medical Research Council, Johannesburg.

Dr. Walker discussed the bearing of sugar intake on the caries incidence of pupils of 17-18 years in four South African ethnic groups — Black, Coloured, Indian and White. The DMFT scores were determined by staff of the Dental Research Unit using mirror and probe. The total sugar intake, which included sugar from component sources, was recorded using the questionnaire designed by Yudkin.

The survey revealed that the caries situation in Whites was poor and excellent in rural Blacks; data on Coloured and Indians were intermediate. The most outstanding feature was that urban Blacks still have very good teeth. The mean DMFT scores recorded for the different ethnic groups were; rural Black, 1,1; urban Black, 1,8; Coloured, 5,3; Indian, 7,8; White, 10,0.

In each ethnic group, it was found that the DMFT of the higher consuming upper third in respect of sugar intake was slightly, but not consistently greater when compared with the lower third. Of particular interest, it transpired that females in the lower third of intake in the different urban ethnic groups consumed similar amounts of total sugar, yet DMFT scores in these groups varied from 1,6 in the case of Black to 11,6 in the case of White pupils.

Dr. Walker discussed the results obtained in this investigation and extensively reviewed the literature related to similar studies. He concluded that sugar is not the sole nor principal cariogenic component of modern dietaries.

3. **"Virtual Absence of Dental Caries in one Context of High Sugar Intake".**
Dr. G.D. Campbell
Durban.

Dr. Campbell studied the incidence of dental caries and paradontal disease in Pondo and Zulu cane-cutters on the Natal Sugar Belt. He reported that in spite of a large intake of sucrose, these cane-cutters suffered from a very limited degree of dental caries and paradontal disease.

The main source of sugar intake of these labourers is from chewing cane and the sucrose extraction rate of the human mouth was found to be approximately 80%. The minimum daily sugar intake from this source was estimated at 180 g and the total daily sugar intake including sugars from rations and purchases amounted to 250 g.

Dr. Campbell reported that the relative absence of dental and paradontal disease in the cane-cutter contrasted strikingly with the epidemic of dental disease in the gold miner. He reasoned that this was possibly due to three factors.

(i) Many cane-cutters make a ritual of cleaning their teeth, generally twice daily.
(ii) A considerable amount of sucrose ingested comes from chewing cane with the resultant abrasive and cleaning effect on the teeth and gums.
(iii) On the whole, cane-cutters purchase a limited amount of sticky saccharine foods.

4. **"Studies of Cariogenic Streptococci in Local Populations".**
Prof. C.W. van Wyk, Prof. H.C. de Klerk and Dr. M.H. Finlayson.
Departments of Oral Pathology and Medical Microbiology, University of Stellenbosch.
This paper was read by Prof. J. Staz.

As the distribution of Streptococcus mutans, S. sanguis, S. mitis and S. salivarius is unknown in the South African population and because of the alleged association of these organisms with dental caries, Professor van Wyk and his co-workers decided to study this problem.

They investigated the distribution of the four cariogenic Streptococci in the oral cavities of Cape Coloureds resident in several well-defined geographical areas. The sugar intake of these subjects varied and the fluoride content of the drinking water was low in some areas and relatively high in others.

The highest number of positive growths of S. mutans were recorded on teeth of individuals in communities consuming water with a low fluoride content. The distribution growth pattern of the microorganisms was not dependent on sucrose intake. Fewer positive cultures were found on the teeth of subjects drinking water with a high fluoride content and dental decay was relatively low.

These findings are of importance because Streptococcus mutans is believed to be the most cariogenic of the four organisms investigated and is most likely to elaborate glucans during sucrose metabolism.

5. **"Studies of Dental Plaque in the Baboon".**
Dr. N.P. Louw.
Faculty of Dentistry, University of Stellenbosch.

The Cape Chacma baboon is being considered as an experimental model to determine the effects of diet and related microorganisms on dental decay.

Dr. Louw and his co-workers decided to investigate the oral and plaque flora of the baboon to determine whether its oral ecology was comparable to that of man.

Plaque was collected from the teeth of 17 baboons, innoculated on, amongst others, Mitis-Salivarius agar media and grown anaerobically. The culture medium was examined after five days and the various colonies of S. mutans, S. salivarius, S. mitis and S. sanguis estimated per plate. Plaque distribution on the teeth of the baboons was determined by disclosing solutions.

Plaque was present in all the baboons used in this study and the four strains of Streptococci could be grown from plaque obtained from 16 of the animals.

The author concluded that the four strains of Streptococci were present in sufficient numbers to make the Cape baboon a suitable experimental model for future studies.

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After a lively discussion and brief summary by the Chairman, the speakers were thanked by Dr. Paul Wahl the Belgian Chairman of the Board of Directors of the International Sugar Research Foundation. The presence of a number of Natal Dentists was much appreciated by the South African Sugar Association. Dr and Mrs Wahl were hosted by the Dental Association during a brief visit to Johannesburg, en route to Brussels.