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Comparative Surface Analysis of Four Osseointegrated Titanium Screw Implant Systems. P.J. HENRY, University of Western Australia.

Previous investigations have shown that the surface characteristics of currently available implant systems have not been adequately defined. The purpose of this study was to evaluate these implant surfaces. One implant of each system was tested, (i) Branemark System (Nobelpharma AB), (ii) Screw-Vent System (Core-Vent Corp), (iii) Osseodent System (OTC Corp), (iv) Steri-OSS System (Denar Corp). The specimens were evaluated with SEM and EDAX. Results indicated that the implants fall into two groups. The Branemark and Osseodent implants were virtually identical. The findings were consistent with the surface of defined geometry and finish as published by Branemark. A system of tooling groovings was evident running parallel to the surface of the screw thread. Occasional surface scrapings and smearings were evident parallel to the line of machining. At the ultra-structural level the surfaces were still well defined and symmetrically oriented. Macroscopically the Screw Vent resembled the Branemark in terms of thread configuration and parallel tooling groove pattern. At high levels of magnification the microstructure was quite different and resembled a finely textured surface similar to what is achieved by controlled sand-blasting and acid etching.

The Denar Implant presented a distinct macroscopic thread design with sharp edge configuration and little evidence of parallel groove machinery. The microstructure presented as a coarsely regular well defined surface. The surface finish, although not unlike the Screw Vent, was totally different to the Branemark. EDAX spectral analysis confirmed all implants to be essentially pure titanium.

The surface characteristics of Branemark and Osseodent implants was virtually identical. Screw Vent and Denar implants had a distinctive different surface finish. All surfaces were consistently well defined and tested as pure titanium. This study was supported by a grant from I.M.I. of W. Australia.

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The Dental Needs of Intellectually Handicapped Hostel Residents J.C. WINTERS Perth Dental Hospital

A survey of the dental status and treatment needs of 479 intellectually handicapped Hostel residents, revealed a steady decline in the mean number of teeth retained over the age of 30. The mean DIMF for the population was 11.7, and as expected, DIMF increased with age, but there was a reversal in the ratio of M to F after the age of 30. This could not be explained by the mean D component of 0.1, which was not significantly different for any age group. The mean dif for the residents under 10 was 0.6, with a d component of 0.04.

The periodontal evaluation was based on the worst tooth in each sextant. 52% of all sextants, had P1 = 2 or 3, 42.4% had calculus, and 42.9% had G1 = 2 or 3. The most important finding was that 17% of the residents had on average 2.3 sextants in which probing depths in excess of 6mm were recorded and could be considered at risk of tooth loss from periodontal disease. Neither Hostel staff assistance of resident's plaque removal, nor the use of chlorhexidine appeared to benefit the resident's periodontal status. 272 residents required scaling and root planing, 78 required restorations, and 226 were considered to require a GA to complete treatment. Education to improve the effectiveness of the Hostel staff assisted plaque control is needed.

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Behaviour of Dental Amalgams Subjected to Sub-Fracture Stresses at 37°C. T. GERZINA* and G. KING. Department of Operative Dentistry, The University of Sydney, Sydney Australia.

Studies by Giblin and Wing have shown that amalgam beams subjected to loads ranging from 40% to 95% of the modulus of rupture at temperatures of 22°C show varying bend and fracture characteristics related to the type of amalgam and the creep of the amalgam. Fracture occurs over extended periods of testing with low copper amalgams but is resisted by high copper amalgams except at loads approaching the modulus of rupture. The aim of this study was to determine the behaviour of amalgams in a similar test at a temperature of 37°C. Specimens 12mm X 4mm X 2mm were prepared using hand condensation and "single shot" mechanical condensation from Ag3Sn, Dispersion Modified and Single Melt High Copper alloys. The modulus of rupture was determined and specimens were loaded at 22°C and 37°C with a transverse load of 68.5 MPa. Single Melt High Copper amalgams did not exhibit fracture or significant bending, even with extremely long loading times (5 weeks) at either 22°C or 37°C. The Dispersion Modified type of amalgams resisted fracture at 22°C but fractured at 37°C in times ranging from 18 to 130 hours. These intermediate creep amalgams did undergo severe bending in the test at 37°C although this was not a feature in ambient temperature testing. Both Ag3Sn types of amalgam fractured in relatively shorter times than other amalgams at both temperatures, always with significant bending. The time of fracture was significantly reduced in the 37°C test compared with the 22°C test. At 22°C fracture times ranged from 17 to 25 hours and at 37°C from 3 to 14 hours. Sub-fracture loading of amalgams at 37°C offers many advantages over ambient temperature sub-fracture loading. Times to fracture are reduced to approximately one third of those at 22°C and results may represent a more valid correlation with static creep values tested at 37°C.

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PERIODONTAL STATUS OF ADULT DIABETIC PATIENTS IN HONG KONG. K.C. CHIU, E.F. CORBET*, J. Ma and J. Theilade. Faculties of Dentistry and Medicine, University of Hong Kong.

Not all previous studies have shown adult Diabetes Mellitus patients to be a high-risk group for periodontal disease. The purpose of this present study was to assess the periodontal status and treatment needs of a group of adult patients and to compare these findings with those of an earlier survey of the general population of Hong Kong. 61 Diabetic patients aged 35-44 years were subjected to both a questionnaire investigation and a clinical examination, which included a count of teeth present and a recording of the Community Periodontal Index of Treatment Needs. The criteria applied were identical to those used in the earlier survey, in which 668 individuals aged 35-44 years were examined. The two examiners of this study were trained by, and calibrated against, examiners from the previous study.

No Diabetic patient was assessed as having a healthy periodontal condition. A mean of 0.6 sextants per patient were found to have deep pockets with a mean of 0.5 sextants per patient being excluded due to insufficient numbers of teeth. The previous survey had shown a mean of 0.3 sextants with deep pockets and 0.1 sextants excluded for the general population. 98% of the Diabetic patients had an indicated need for scaling, with 35% requiring further complex therapy. The questionnaire revealed that these Diabetic patients had not achieved the same educational attainment reached by the subjects of the earlier survey. An analysis of the data, correcting for the differences in education of the two populations, confirmed the prevalence of missing teeth and of deep periodontal pockets to be greater in these patients. It was concluded that these adult Diabetic patients constituted a high-risk group for more advanced periodontal disease and had a greater indicated treatment need than the general adult population.

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CPITN Index: Partial versus Full Mouth Recording. Shanti SIVANSHARAN, PD BARNARD*. Department of Preventive Dentistry Westmead Hospital Dental Clinical School.

The Community Periodontal Index of Treatment Needs (CPITN) was determined for 100 persons over 15 years of age. Four interproximal sites (MB, ML, DB & DL) were examined for each tooth present using the 621 probe. This full mouth recording was compared to partial mouth recordings using:

- (1) the 10 index teeth recommended by FDI/WHO; and (2) Ramfjord's selection of 6 index teeth.

Partial mouth recording using the 10 index teeth gave a good assessment of the full mouth appraisal of periodontal conditions of patients. The use of Ramfjord's 6 index teeth gave significantly lower CPITN scores when compared to full mouth recording.

The effectiveness of using combinations of only 2 probing sites was compared to that of using 4 probing sites per index tooth in 157 persons over 20 years of age.

Combinations of two probing sites did not adequately detect the prevalence and severity of periodontal disease.

Four interproximal probeings (MB, ML, DB & DL) of the 10 recommended index teeth should be used for partial CPITN examination.

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Survey of Magnetically retained denture 1986 Design Type. E.W. ROBERTS Westmead Hospital Dental Clinical School, Westmead, N.S.W.

Since 1986 a different style of magnet and keeper has been used to that of the previous study reported at I.A.D.R. in Adelaide, 1986. This study examined the clinical success of partial and complete dentures retained by magnets of the new design and their effects on the oral tissues. The sample consisted of 82 patients, who were mostly treated by Year V Dental Students under staff supervision. Sixty of the 72 subjects attended for oral examination and questionnaire and the remaining 12 subjects received the questionnaire over the telephone. Ten subjects could not be located. Of the 60 subjects, 25 wore the denture constantly, 22 day not night wear, 7 occasionally, and 6 had discarded their denture. This success rate of 80% was greater than the 61% reported before with the old style magnets. The Russell Periodontal Index of Teeth associated with magnets was not significantly increased, but showed some influence. Eighty per cent of patients returned with problems associated with the denture, most commonly fractures of the base, magnets falling out, loss of root element, pain on gums due to rocking around tooth elements or just getting used to a denture.

The success rate of this mode of treatment with the new type magnets is producing a more successful and respectable wearing rate. It is still plagued by maintenance problems in the hands of Year V Dental Students under staff supervision. A problem still to be addressed.

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Oral Health Care Needs of Pregnant Adolescents. J.N. Doust*, A.T. Fada1, L.J. Pearson and D.C. Hewitt. Perth Dental Hospital and Curtin University of Technology, Western Australia.

Previous studies identify a need for dental care among pregnant women attending public antenatal clinics. There are no published data about the oral health of pregnant teenagers. The purpose of the study was to determine the need to include a dental service as part of antenatal care for unmarried girls attending a special pregnancy clinic in King Edward Memorial Hospital in Perth, WA. The sample (N=100) included 77% of girls who attended the clinic in a 12 month period. At the second antenatal visit, each participant completed a questionnaire and a clinical examination to score DMF, Plaque, Calculus and Gingival status.

The mean age was 16.1 years; racial origin was Caucasian 75% and Aboriginal 22%; 75% of the sample were receiving social service benefits; 64% had not visited a dentist in the past 12 months; 59% required fillings in one or more teeth and 42% required one or more extractions; 62% needed scaling and oral hygiene instructions; in 42% ; fissure sealants were indicated; and 56% stated a need for advice about mouth care for baby. Comparison of DMFS (data X = 7.85), suggested higher dental caries experience among the study group than a low SES High School (WA) sample (X = 5.8). Smoking rates were also higher than rates of 16-19 year old girls in a National Survey (53% vs 43%). When racial groups were compared, no significant differences were detected on clinical or behavioural variables.

The findings of this study suggest there is a need to provide a dental service as an integral part of antenatal care for adolescents. The service should focus on preventive procedures but also include emergency care. The dental staff should encourage the use of community health services and link girls to dental services which they can use post-natally.

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Anterior Dental Trauma presenting after-hours in Newcastle and Western Sydney. I. MARTIN*, V. LIEW and C. DALY. Dental Clinical School, Westmead and Dept. of Dentistry, Royal Newcastle Hospital.

Compilation of data concerning dental trauma occurring after-hours is important in planning emergency dental services. This investigation studied the types of anterior dental trauma presenting at Royal Newcastle Hospital (RNH) in Newcastle and at Westmead Hospital (W'mead) in Western Sydney from 1983-84.

Patients were assessed as described previously by Andreasen (Scand J Dent Res 78:329:1972). Patients with facial or jaw fractures were not included. A total of 744 patients were studied - 382 at RNH and 362 at W'mead. The male:female ratio was 2.6:1 and 2.5:1, respectively. The most frequently injured teeth in both centres were upper central incisors. Frequencies of injury types were similar for RNH and W'mead. At RNH, the rate of occurrence of trauma was the highest and relatively uniform in the 6-11, 12-17 & 18-23 age group. At W'mead it was highest in the 6-11 age group. "Falls" was the main presenting cause of injury at both RNH and W'mead. Team sports and swimming pool/surfing accidents accounted for twice as many injuries at RNH as compared with W'mead. On the other hand "Struck by object" injuries were encountered nearly twice as frequently at W'mead.

This study suggests that dental trauma presenting after-hours is more severe than that shown in a private practice survey in Australia (Davies & Knott, ADJ 1984; 29:217). Some differences were found in the predominant causes of trauma and age groups affected in Newcastle compared with Western Sydney. Overall the frequency of injury types was similar.

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A comparison of Samarium-Cobalt and Neodymium-Iron-Boron Permanent Magnet Alloys in Overdenture Attachments. A.R.D. GILLINGS and A. R. GILLINGS, University of Sydney and Westmead Dental School, Sydney, Australia

First described at the 1977 Perth I.A.D.R. Meeting, the University of Sydney Magnetic Overdenture Retention System has undergone continual development. Mini magnet retention has increased from 250 to 460mg, through changes in design and using the more powerful Sm-Co alloys developed in recent years. However, Sm-Co alloy has now almost reached its full potential.

Another rare earth magnet alloy based on Neodymium, Iron and Boron (Nd-Fe-B), first developed in 1984, is now available commercially. It costs about the same as Sm-Co, has low toxicity, and similar corrosion behaviour and physical properties, but a 50% higher field strength. Sample denture retention elements were made using this alloy and compared with the previously used Sm-Co elements to evaluate their possible clinical use. Some Nd-Fe-B alloys can lose magnetism when heated well below their 310°C Curie point, so elements were tested for retention loss after 4hrs. exposure to boiling water. A small denture element face is desirable clinically, so some side plates were chamerfered, and the affect of this on retention evaluated.

The Nd-Fe-B Mini magnets provided more than 500 mg of retention, and the Maxi magnets just on 1 kg. In comparison with the otherwise identical Sm-Co units, the Nd-Fe-B Mini magnets with 0.8 mm side plates were 10% stronger, and with 1.2 mm side plates, about 40% stronger. There was no retention loss after 4hrs. at 100°C. Chamfering the side plates reduced retention about 10% with both 0.8 and 1.2mm side plates.

It was concluded that Nd-Fe-B magnet alloys make stronger denture retention devices, but that to achieve optimum retention increases, the side plates should be thick enough to carry the higher magnetic flux. The future of Nd-Fe-B in dental applications is bright, as theory indicates that a 100% additional increase in strength is achievable.