

- 225 | Wetting of agar hydrocolloid duplicating materials by silica-bonded investments. E. PANAGIOTOUNI*, D. KAPARI and A. KALOYANNIDES (Dept. of Orthodontics, Aristotle University of Thessaloniki, Greece)

Convenient wetting of agar duplicating material by silica-bonded investment during the duplication procedure is essential, if air entrapment on the cast surface is to be minimized. In practice, several surfactants are proposed to be used as surface tension reducing agents in order to minimize air bubble entrapment. In this study both untreated as well as coated by surfactants agar surfaces were tested in order to investigate the latter's role on the spreading of investment on agar. Two commercial agar and three surface treatment materials were tested. Three commercial investments were used and prepared with varying L/P ratios. All agar samples possessed absolutely, flat, smooth and clean surfaces onto which 2 ml of investment were dispensed with a teflon volumetric dispenser. These samples were, then, encased, with a thin mix of white plaster, sectioned along their diameter and photographed perpendicular to the plane of the section. The contact angles were measured directly from the photographs. Contact angles of the investment materials observed on untreated and treated agar surfaces were determined as a measure of the degree of agar wettability. The contact angles observed on treated agar surfaces were high exceeding 75° while the ones observed on untreated surfaces ranged from 42° to 57°. However, an increase in the L/P ratio of the investment results in a decrease in the contact angles up to 35°. The observed differences were tested by ANOVA and proved to be significant ($p < 0.005$). Conclusions are that the surfactants used were not found to be effective in increasing the wetting of agar. On the contrary, an increase in the L/P ratio of investment can improve the wetting behavior of it on the agar duplicating material.

- 226 | Superelastic springs used in the orthodontics. B. MELSEN, L. TOPP and H.M. MELSEN. The Royal Dental College, University of Aarhus, Denmark.

Alloys characterized as superelastic has been introduced into orthodontics both as wires and later as springs. The supply of these springs has increased markedly within the last years. The purpose was to develop experimental data for description of activation and deactivation curves of all available closed coil springs. 19 different products were included in the study and to establish the intra brand variation 10 springs of each type were tested in a specially produced test machine the activation and the deactivation forces were produced between zero and 100% elongation. It was obvious that only one product-"GAC" springs fulfilled the requirement to a superelastic spring i.e. a long range of constant force related to the transition from austenite to martensite and reverse. All other springs exhibited load/deflection curves not compatible with superelasticity. On the basis of an ANOVA the springs were grouped. Several different products of the same manufacturer were found to be identical, as was products from various companies.

- 227 | Machine for experimental force system identification. H.N. MELSEN*, M.A.A. FREDERIKSEN, L.F. TOPP, B. MELSEN. The Royal Dental College, University of Aarhus, Denmark.

Success of an orthodontic treatment depends on how much a treatment result deviates from the scope of the treatment. For a given tooth movement only one force system is correct. A specific system can, however be obtained in various ways. Force systems developed in relation to a fixed appliance are, however, far from well known. With the purpose of analyzing intramaxillary force systems a machine capable of visualizing forces and moments in 3-dimensions was developed. The appliances to be tested can be inserted between two holders, the mutual position of which could be altered with reference to distance and angulation, or demands from the user by means of 6 steppingmotors. Two force/moment-sensors capable of measuring force and moments in 3 dimensions with a high degree of precision, were used to register the force systems developed at the two brackets. Data were transferred to a personal computer and converted into tables and graphics, readable by the user as well as standard commercial software. The machine possesses two basically different functions:

*Force systems could be measured during activation and deactivation at an interval given by the user. Forces developed during activation of coil springs will illustrate this.
The equipment also allows the user to identify position that correspond to a given force system. Demonstration of force systems developed by "V" bends will illustrate this usage.

- 228 | Methods to comprehend experimental data K.-A. HILLER*, K.-H. FRIEDL, and G. SCHMALZ. Department of Restorative Dentistry and Periodontology, University of Regensburg, Germany.

An essential part in the design of any experimental or epidemiological study is the general arrangement of mathematical/statistical models for the adequate valuation of the data. In many cases, several individual values are obtained from a single subject being investigated, e.g. from a single tooth, an upper jaw, or a single patient. In each case, the investigator needs to decide on the dependency of the individual values. If individual values are not independent, it is often necessary to decide, which criteria to use for comprehension of the individual data, in order to obtain independent values for each single subject. These values provide the basis for further statistical analysis of the independent values per subject. A study investigating the marginal quality of ceramic inlays was used as an example to describe principles of comprehension. These principles are: (1) calculating means, (2) calculating medians on the basis of different definitions, and (3) calculating maxima. We demonstrate, how these different adequate and routinely used methods of comprehending not-independent individual data lead to different results and conclusions. Therefore, when results of the statistical analysis of data are interpreted from the medical point of view, one has to be aware of the impact of the statistical method in general and the method of comprehending individual data especially.

- 229 | Dental health behavioural decisions studied using the Theory of Planned Behaviour. A. N. ÅSTRÖM* and J. RIBE. (Department of Community Dentistry, Research Center for Health Promotion, University of Bergen, Norway).

The cognitions underlying the decision to use dental floss and to drink low-diet mineral water was studied using the Theory of Planned Behaviour. The empirical data stem from The Norwegian Longitudinal Health Behaviour Study and this questionnaire survey was performed in October 1992. The 1100 15 year old adolescents studied constitute a representative sample of this age group in the county of Hordaland in Norway. The theory posits that the decision to perform a particular behaviour is governed by three types of cognitions: attitudes in terms of behavioural beliefs; subjective norms in terms of normative beliefs; and perceived behavioural control in terms of control beliefs. Multiple regression analyses showed that the decision to use dental floss was primarily governed by subjective norms ($\beta = .41$) and perceived behavioural control ($\beta = .33$) while attitudes had lower impact ($\beta = .09$). The decision to drink low-diet mineral water was mainly predicted by perceived behavioural control ($\beta = .48$), while attitudes ($\beta = .27$) came second and subjective norms ($\beta = .21$) third. This implies that persuasive messages in dental health education should pay attention to social pressure and the difficulties adolescents face in performing these two behaviours. This study was supported by the Directorate of Health.

- 230 | Awareness of periodontal conditions in Finland. M. HIENONEN, H. MURTOOMA and J. AINAMO (Institute of Dentistry, University of Helsinki, Helsinki, Finland).

Oral self care plays a key role in the prevention and treatment of periodontal disease. In order to achieve a high level of oral hygiene it is necessary that the patients are able and willing to adopt and maintain an optimal level of motivation. A thorough awareness of the condition of one's own periodontal status is from a health policy planning point of view essential if people are expected to take good care of their oral health. In 1972 and 1990 surveys were conducted in order to analyse the conceptions among Finns regarding their own periodontal status. In 1972 the interviewed sample, drawn to cover the total Finnish population aged 15 years and over, comprised 985 persons as compared to 1006 persons in 1990. After exclusion of those with no natural teeth a total of 732 subjects in 1972 and 853 subjects in 1990 were accepted for the interview study. In 1972 a total of 10% of all the interviewees stated that they at the time of survey had gingivitis. In 1990 only 2% of the interviewees reported gingivitis, with the percentage being highest in the youngest age-group (8%). In 1972 the awareness of gingivitis among adult Finns was low; 67% of the interviewees reported never to have had gingivitis. In 1990 the respective proportion was 60%. The proportions of those who had never observed gingival bleeding were 54% and 50%. In 1990 there were no statistically significant differences between age cohorts with regard to awareness of gingivitis or bleeding. The optimistic impression of a low prevalence of gingivitis in Finland is in disagreement with national epidemiological data based on clinical examination. The results of the current survey suggests that in Finland the awareness of periodontal problems is still poor.

- 231 | Patientcentered Approaches to Periodontal Treatment. B. SÖDER*, J.-U. ANDERSSON, L. J. JIN & P.-Ö. SÖDER (Depts of Periodontology & Pedagogic, Karolinska Institute & University of Stockholm, Stockholm, Sweden).

The aim was to study the effect of caring, coping and non-surgical treatment on patients with severe periodontitis. Twenty patients with severe periodontitis, 10 women and 10 men 32.5 years (± 3.4 ys) participated. At baseline (BLI) the patients were initially treated with non-surgical treatment and retreated every six month during four years (K4). Plaque index, calculus index, bleeding on probing and pocket depths were recorded. The level of coping was determined at the beginning and at the end of the study and the effect of caring was measured. Plaque index decreased from 1.2 at baseline (BLI) to 0.8 after four years (K4) ($p < 0.001$). Calculus index decreased from 1.5 to 0.1 ($p < 0.001$). The number of bleeding sites were 27.7 percent at BLI and 4.2 percent at K4 ($p < 0.001$). The mean pocket depth was improved from 3.0 mm BLI to 1.7 mm at K4 ($p < 0.001$). The level of coping was at the beginning study low and increased for almost all patients. All patients found that the dental team always took good care of them and had a soft and careful manner during the treatment. 18 patients had changed their oral hygiene procedures and 17 their personal and interpersonal behavioral view of oral health.

Conclusion: The meeting with the therapist is the first step in a contact which will end up in a relation therapist-patient. This will give the patient a feeling of confidence and possibility to develop an inner strength and thus increase its own ability to fight and even overcome the disease.

- 232 | Prerequisites for Oral Health Promotion of Sierra Leonean Teachers and Health Workers. S. NÖRMARK (Division of Auxiliary Education and Training, School of Dentistry, University of Copenhagen, Denmark).

In a baseline survey of an oral health intervention project for school children in Sierra Leone oral health knowledge, attitudes, and promotion habits of primary and secondary school teachers and primary health workers were analysed in relation to their educational background. A total of 154 teachers from 10 schools (mean age 32 yrs) and 57 health workers from 22 health posts (mean age 34 yrs) completed a multiple-choice test (23 knowledge items), a Likert-scale with 25 attitude statements (max. 100 points), and closed questions concerning their background and promotion habits. The tests were based on 7 cognitive and 8 affective aspects, items being selected after evaluation of content validity, clarity, and discriminatory power. Test-retest reliability assessment showed an average difference of 1 point in each test. After participating in a 4-days oral health course, 40 persons re-attempted the tests. In the baseline survey the combined study population had an average of 7.6 correct m.-c. answers and a mean Likert score of 62.4. No differences were found between teachers and health workers, between personnel from rural and urban areas, and between primary and secondary school teachers. Younger health workers had slightly more knowledge than older ($p < 0.01$). Attitudes were somewhat less positive among younger primary school teachers without formal training, and among health workers of older age, or without a longer/community based training ($p < 0.05$). The course participants improved their m.-c. score with 4.3 correct answers ($p < 0.001$) and their Likert score with 5.8 points ($p = 0.001$). Knowledge of teachers and health workers was insufficient, their positive attitudes were limited, and their oral health activities at schools and health stations were sporadic. The courses improved knowledge and attitudes to a moderate extent. The study was supported by Danida's Council for Development Research, Grant No. 104.Dan.8/465.