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The purpose of this study was to investigate, with lateral cephalometric measurements, the changes occurring in the hard tissues 1 to 10 years after the surgical odontectomy of mandibular prognathism by the horizontal osteotomy of the rami on 51 adult patients. The cases in this study were divided into two groups on the basis of the condition of the anterior occlusion, i.e., overbite and overjet. Sixteen cases belonged to the group with prognathism alone and 35 to the group with prognathism and open-bite.

On the cephalogram 26 items of the angle and linear measurement were checked. The primary changes, observed just after the operation, and secondary changes, recorded through the follow-up cephalograms until the final results, were compared with each other. Especially the relation between the secondary change of the occlusion in the region of the front teeth and the angle, which was measured between the cut surface of the rami and FH-plane and named "cut angle" by the author, was examined and the mode of the secondary changes was investigated physically.

The conclusions reached after this study are as follows:

1. The primary changes showed that the antero-posterior relation in the region of the front teeth improved. The grade of the protrusion of the mental region, FA, the length of the mandible angle decreased and the facial esthetics improved.

2. In the secondary changes, each measuring point in the mental region was finely repositioned posteriorly and stabilized, and no recurrences were observed in any case.

3. Correlation between the extent of the secondary changes of the anterior occlusal position and the cut angle was investigated. The cut angle increase did not show any influence on the extent of the secondary change in the group with prognathism alone, while in the group with prognathism and open-bite the extent of the secondary change increased when the cut angle became smaller and the changes decreased when the cut angle became larger.

4. In five cases, which showed a remarkable secondary change in the overbite, the movement of the lower jaw body after the operation was investigated, which showed that the nature of the change was a rigid body rotation.

5. A period of about 6 months needed for the stabilization of the secondary change was affirmed through the follow-up cephalograms.


2. Electrokinetic Changes Associated with Cell Proliferation
—Different Reaction of Different Aged HeLa Cells Induced by Concanavalin A—
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The purpose of this paper is to study the effect of the cell growth and concanavalin A upon the cell electrophoretic mobility, using HeLa S1 cells. The cell growth, estimated by the cell population after incubation, was almost parallel to the changes in electrophoretic mobility; both showing the maximum value on the 3rd or 4th day.

Cell electrophoresis was measured after treatment with concanavalin A of 5, 10, 20, 50 μg ml⁻¹. The low concentration (5, 10 μg ml⁻¹) increased the mobility and the high concentration (20, 50 μg ml⁻¹) decreased it. This biphasic change in the electrophoretic mobility is characteristic. The susceptibility to concanavalin A is the highest during the exponential stage of growth. The biphasic
response would relate to the conformational changes in the distribution of electrical charges in the cell surface.


3. A Study on the Root Canal Enlargement Using the Reamers Polished Electrolytically

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(Director: Prof. Imao Sunada)

To avoid ledge formation and perforation into the root canal wall during the root canal preparation, reamers, about 3 mm in length from the tip, were polished electrolytically and experimented on the enlargement of the narrow root canal of the extracted upper molar.

The results obtained were as follows:
1) Reamers were polished electrolytically at the voltage of 24 volts without any bluntness of the edge.
2) The size of each reamer of 3 sizes, Prince No. 1, No. 2 and No. 3, was reduced by 125 µ to 145 µ by electrolytic polishing for 15 seconds, and the reduction of the size was generally proportional to the polishing time.
3) The use of the Prince No. 1 reamer polished electrolytically was able to minimize the possibility of ledge formation in the root canal wall as compared with the original unpolished reamer.

A significant difference in the frequency of ledge formation, at the 1% level by the X² test, was observed between the two kinds of reamers.


4. Effect of Ultrasonic Application of SnF₂ on the Acid-Resistance of Enamel

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(Director: Prof. Tokao Fushimi)

For the purpose of developing a new technic for the prevention of caries, ultrasonic application (19 kHz of SnF₂, 8%) solution was tried for acid-resistance on the enamel surface of the extracted human tooth and the surface was compared with that of the topical application of the same solution and non-treated surface.

The enamel surfaces of the three groups were subjected to acetate buffer (0.1 M, pH 4.5) after cleaning with brush and rinsing with water. The hardness (VHN) of the resultant surface, calcium solubility (ESR) in the buffer and morphological alteration of the surface were compared. The amount of fluoride uptake into the enamel was also compared between the topical and ultrasonic application of SnF₂.

The difference in the hardness and solubility was not statistically significant between the non-treated group (NT) and the topical application group (TA), but the ultrasonic application (UA) group showed a hardness of more than two times and less than half solubility as compared to TA. The morphological change of the enamel surface after etching was quite marked with NT, sometimes showing a honeycomb structure, moderate with TA showing some exposed rods and pits, but negligible with UA, leaving clearly trace lines produced by finishing. The amount of fluoride uptake in the surface layer of UA was four times that of TA.

It was thus revealed that the ultrasonic application significantly improves the effect of SnF₂ on acid-resistance of enamel.


5. Study on the Dental Arch Form by Means of Curve Fitting

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The purpose of this study is to examine the following:
1. Which curve best fits each dental arch and is represented in a simple style?
2. What differences exist between the dental arch form in normal occlusion and that of patients after active treatment?
3. What changes are found in the dental arch form of the patients?

Plaster casts of 31 adult females with normal occlusion and 20 non-extraction cases were selected. Each of the treated cases consisted of three stages, pre-treatment, post-treatment and post-retention.

Fourteen measuring points were taken as the measuring points on the plaster models according to the method of Hayashi and the input was made by the three dimensional data-input device. These data were fitted to the four curves, catenary curve, elliptic curve, 4th degree polynomial equation and conic section curve. The residual sum of the
squares derived from the method of the least squares was used to compare the fits among the four curves.

The results were:

1) In each dental arch, the order of good fit was the same. The best fitted curve was the 4th degree polynomial equation followed by the conic section curve and elliptic curve. The catenary curve showed the worst fit.

2) A significant difference was found between the dental arch form in normal occlusion and that of patients after active treatment.

3) From the stage of pre-treatment to that of post-treatment significant difference was found when the lower dental arch form had a tendency to change.

4) In viewing the form of the dental arch in normal occlusion fitted by the 4th degree polynomial equation, the upper arch had a parabolic tendency and the lower arch had a square tendency.


6. Tumors of the Salivary Glands in Children

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(Director: Prof. Goro Ishikawa)

This paper describes about ten cases of the tumors of the salivary glands in children with regard to the clinical and histological features from the files of Department of Oral Pathology, Tokyo Medical and Dental University, between 1938 and 1975. The location of the tumors was as follows: palate, 6 cases; submandibular gland, 2 cases; parotis, one case; lower lip, one case. There were 6 females and 4 males. Histologically there were 9 cases of pleomorphic adenoma and 1 case of mucoepidermoid tumor. There was no recurrent case. Histologic features of the tumor in children showed no pronounced difference from the lesion in the adults. The frequency of the tumor of the salivary glands in children was 2.1% in 469 cases of all tumors of the salivary glands during this period.


7. Treatment of Cavity Walls with Cyanoacrylates

1. The Effect on Adhesion of Composite Resins

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(Director: Prof. Tokao Fusatoya)

After treating dentin or enamel walls of human extracted teeth with methyl or ethyl cyanoacrylate, two commercial composite resins were placed on them and stored in a room of 23°C, in a humidor box of 37°C or in water of 37°C. Their tensile adhesion was determined, the finding being as follows:

1. The adhesive bonding of cyanoacrylate to the dentin was stronger than to the enamel.

2. The bonding strength to the cyanoacrylate treated tooth surface varied slightly depending on the brand of the composite resin tested.

3. The adhesion to the dentin was stronger with ethyl cyanoacrylate than with methyl cyanoacrylate.

4. The bonding strength decreased with the increased humidity. Even when stored in water, some bonding to the dentin was maintained but little to the enamel.


8. A Study of Influence of the Thickness of Patient and Bone with Lesion on the Photographic Contrast in the Skull Roentgenography

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In roentgenography, the tube voltage, tube current, exposure time and the geometrical relations among the focus, patient and film are important factors relating to the quality of the roentgenographic image. In addition to these factors, the thickness of the patient and bone with a lesion usually plays a very important role on the image quality. In this report, an experimental study was made on the influence of the thickness of patient and the relevant bone upon the photographic contrast. A plastic plate of 20 cm square and 2 cm thick was chosen as a unit of the plastic phantom of a patient which was made possible to increase
in the total thickness of the phantom by adding the plate. Aluminium columns with a 3 mm diameter ranging from 1 mm to 7 mm in height were embedded separately into the unit phantom and this was used as the bone phantom with various thicknesses. The roentgenograms of the phantom at the bottom of which the bone phantom was placed were taken under various conditions of exposure in reference to the tube voltage, the thickness of the plastic phantom and exposure (mAs) and the photographic contrast between the image of the aluminium with 1 mm and 2 mm height and between 6 mm and 7 mm were estimated. The photographic contrast obtained was plotted against the exposure (mAs) under a given tube voltage and thickness of the phantom. The results were as follows:

1) The relation between the photographic contrast and exposure was expressed as a convexed curve for any combination of tube voltage and thickness of the phantom.

2) The peak of the curve shifted to the right and decreased as the thickness of the phantom increased from 12 to 18 cm under a fixed tube voltage.

3) Curves for relatively thin phantoms were highly convexed and this showed that the latitude in the exposure for optimum contrast was small in the case of the thickness of patient of a lower value.

4) The photographic contrast estimated for the equal difference in the height of the aluminium columns, i.e., for 1 mm and 2 mm and for 6 mm and 7 mm, did not show the equal values in the both cases of relatively thin and thick phantoms.


9. Histochemical and Electron Microscopic Studies on Primary Culture Cells Derived from Human Salivary Gland Tumors

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(Chief and Director: Prof. Shigetoshi Shioda)

Histochemical and electron microscopic studies were made on the primary culture cells in order to reveal the biological characteristics of the salivary gland tumors. The materials were obtained from the biopsy specimens and surgically resected tissues from 19 patients with salivary gland tumors, comprised of 14 with pleomorphic adenoma, 5 with mucoepidermoid tumor and 2 with adenoid cystic carcinoma. Cultures were performed by direct coverglass method employing Eagle MEM supplemented by 20% calf serum as the culture medium in the CO₂ incubator at 37°C. Culture cells from pleomorphic adenoma migrated relatively slowly. They were positive for LDH, MDH, SDH, and Ac-p, and Al-p positive cells were occasionally present. Periodic acid Shiff-reactive substances were occasionally present in the cytoplasm and the intercellular spaces. Tonofilaments were found in the majority of the migrated cells and some cells contained secretory granules. Culture cells from the mucoepidermoid tumor consisted mainly of epidermoid cells. However, mucous cells and so-called intermediate cells were also present. Culture cells from adenoid cystic carcinoma proliferated slowly, but were arranged irregularly. They were undifferentiated epitheloid cells and some of them were Al-p positive. Primary culture cells from salivary gland tumors were vastly diversified both histochemically and ultrastructurally, while retaining relatively well the properties in vivo.


10. Clinical Studies on 40 Cases of So-called Denture Fibroma

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The so-called denture fibroma is also called epulis fissuratum, denture hyperplasia and so on. The purpose of the present studies is to observe the clinical features of the 40 cases of the so-called denture fibroma.

Result: The age where the incidence of this lesion was the highest was between 50 and 60 years, with 37 cases being women. The dentures had been worn for 2 to 30 years with an average of 7 years. The sites of lesions were labial and/or buccal sulcus in 30 cases, lingual sulcus in 7, crest of the edentulous alveolar ridge in 2 and a case of palatal region. We classified these lesions into three types according to their clinical appearance as follows: 1) flap-shaped type to be found in the sulcus in 30 cases, 2) multi-lobulated type to be found in the sulcus in 7 cases and 3) epulis-like type to be found at the alveolar ridge in 3 cases. The lesions of all cases were excised surgically and the post-operative courses were not eventful.

11. A Study on High Temperature Cast Restoration

II. Distortion of Castings of Clinical Forms

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(Director: Prof. Takao Fusayama)

In order to investigate the distortion of the castings made of Ni-Cr alloy, the change of the properties of a phosphate bonded investment, Ceramigold, by diluting the mixing liquid was determined and the cement thickness of clinical form castings made with this investment and cemented on the original cavity was measured at various parts. The casting shrinkage of the rods of the alloy was also determined for reference. The findings were as follows:

1) Dilution of the mixing liquid with 10 or 20% water decreased the setting expansion, the thermal expansion and the compressive strength after heating but did not change the temperature rise on the setting.

2) The cement thickness on the side wall of the crowns and MOD inlays was greater at the lower part than at the upper part, indicating an opening distortion. The degree of the distortion was greater with the 10% diluted solution than with the original solution.

3) Class I inlays also showed greater cement thickness at the lower part than at the upper part of the side wall but the difference did not change by diluting the liquid.

4) The casting shrinkage of the alloy in rod form was 2.4% (±0.16%).


12. A Fundamental Study of the Method of Applying the Electric Current to the Tooth

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(Former Director: Professor Kensaku Suzuki, Professor Emeritus of Tokyo Medical and Dental University, Professor of Endodontics, Showa University Dental School. Current Director: Professor Inao Shunada)

In this report methodological investigations were made on the electrode and the measuring apparatus, to be used in determining the electrical characteristics of the tooth and its surrounding tissue.

The essential point of this report are as follows:

1) The merit of the wide range frequency characteristics of the measuring electrode was discussed and proposed as an example. Using this electrode, it was possible to detect the true potential of the tissue surface during the application of the electric current.

2) A biological constant voltage power source and also an ideal earthing circuit were made, using this electrode and the semiconductor apparatus.

3) To cope with the error caused by the current leakage along the surface of the tissue, a study was made by the electro-static method using the multi-pole electrode. By combining this electrode with the semiconductor apparatus, a voltage-follow-up electrode was obtained. The electro-static method was useful not only in taking measures against the leakage but also in having an effect on the distribution of the electric current and potential in the tissue.

4) When a direct current was applied to the tooth, the neuronal response seemed to depend on the amount of the electric potential that was measured between the pulp containing the nerve and the surface of the dentine.

A suggestion was made to relate this potential and the electro-analgesia to obtain a fruitful relationship.


13. Fibro-osseous Lesions of the Jaws

Part I: Solitary Lesions

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One hundred fifty-six cases of solitary fibro-osseous lesions of the jaw were studied. Case materials included cementoblastoma 6, osteoblastoma 5, cementifying fibroma 17, ossifying fibroma 11, periapical cemental dysplasia 14, fibrous dysplasia of bone 50, so-called cementoma 47 and miscellaneous cases 6. The differential diagnosis of these lesions was discussed in detail based on the microscopic features. Polarized microscopy was useful for differentiation, but not conclusive. Periapical cemental dysplasia in Japan occurs usually in the maxillary region of the middle-aged women. The so-called cementomas, which are the most common of the cemental lesions, are composed of masses of cementum. It is not settled whether the so-called
cementoma is the end-stage of the periapical cemental dysplasia or a separate entity.


14. A Study on the Quantative Observation of the Roentgenogram of the Periapical Lesions

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Dept. of Dental Radiology, School of Dentistry, Tokyo Medical and Dental University
(Director: Prof. Tadashi Nakanura)

An experiment relating to the basic matters of standardized intraoral dental roentgenography was performed to make it possible to make a follow-up on the healing process of the periapical lesions of the teeth and to interpret the changes of these pathological conditions, using intraoral dental roentgenography. The X-ray apparatus used was Honds D-69-S and the physical and geometrical conditions of the exposure were as follows: tube voltage 60 KVp, H.V.I., 1.8 mm Al, tube current 10 mA, focus-film distance 34.5 cm and field size 20 cm in diameter on the film. The film used was the Fuji KX X-ray film and was developed and fixed by Hi-rendol and Hi-renfix, respectively.

In this experiment, the steps wedge of plaster was used as the phantom. The film density of each step (alveolar bone) and hole (periapical lesion) drilled to the step was varied by the exposure time and the thickness of the steps. The photographic contrast between each step and the drilled hole was also varied by these two factors.

In intraoral roentgenography, the physical conditions (tube voltage and tube current) are usually fixed and the geometrical conditions are more replicable than those of extraoral roentgenography.

Accordingly, the film density of the periapical lesion is influenced by the exposure time and the pathological conditions of the affected part.

From the above mentioned results, the roentgenograms of the periapical lesion of a patient were taken under different exposure time. The film density and the diameter of the periapical lesions were measured.

Then, it could be observed that the exposure time did not have any influence on the diameter of the roentgenographic image of the periapical lesions but had an influence on the film density.

Therefore, it could be concluded that the observation of the diameter of the periapical lesions was more reliable than the observation of their roentgenographic density.


15. Nickel-Chromium Alloy Casting by Using an Argon-Arc Casting Machine

I. Surface Roughness

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This study was made to investigate the effect on the cast surface of four dental nickel-chromium alloys by the type of casting machine and the condition of investing or casting technique. A wax pattern was invested with a phosphate-bonded investment directly or after coating with colloidal silica. The alloy was cast by an argon-arc casting machine or a high frequency casting machine after being fused by heating for an optimal time according to the instructions of the maker or overheating for an excess time. After cleaning, the cast surface was subjected to macroscopic observation and surface analysis. The findings were as below:

1) The colloidal silica coating of the wax pattern before investing improved significantly the cast surface smoothness in all the alloys tested.

2) The coating was more effective in the alloys adhering to the mold wall, such as Ticon, Summalloy Nickel and Summalloy Titan than Sancolium which readily separates from the mold wall.

3) The argon-arc casting machine produced a smoother cast surface than the high-frequency casting machine when properly used.

4) Overheating beyond the optimum heating time roughened the cast surface. This effect was more remarkable with the argon-arc casting machine.

5) The surface roughness was the smallest with Ticon which contains additionally more ingredients when cast under an optimal condition but it was the greatest when overheated. The influence of overheating was the smallest with Sancolium which contains almost pure Ni and Cr. The result with Summalloy Nickel and Summalloy Titan was between that of Ticon and Sancolium.

16. Studies on Immunized Rabbits with *Candida albicans*

—By Lymphocyte Blastoid Transformation Test, Agglutination Test and Skin Test—

**Mikio Kusama**

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(Director: Prof. Hideo Itoh)

To analyze the immune defense mechanism associated with candidiasis, cell-mediated and humoral immune response to *Candida albicans* in rabbits immunized with *C. albicans* was investigated continually. Lymphocyte blastoid transformation (LT) and agglutination titers (AT) to Candida antigens were measured in vitro and the skin reaction (SR) to the Candida antigen was tested in vivo.

The results were as follows:

1. The level of LT reached the optimal value in two weeks after immunization and disappeared rapidly.

2. The level of AT appeared later than LT and reached the optimal in three weeks after immunization, and then remained high for a fairly long time. In both LT and AT the rabbits immunized with dead *C. albicans* showed higher levels than with live *C. albicans*.

3. SR was clearly positive at two weeks after immunization but feeble at eight weeks. This SR was considered to be the delayed type skin reaction.

4. The positive SR of rabbits immunized with dead *C. albicans* corresponded with the high level of LT. On the other hand, rabbits immunized with live *C. albicans* also showed a positive reaction in spite of the feeble reaction of LT.

5. The level of SR did not correspond with the level of AT.


17. A Study on Relationship between Oral Lichen Planus and Metallic Dental Materials

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(Director: Prof. Hideo Itoh)

Patch tests were carried out with 16 kinds of metal salts to study the relationship between lichen planus of the oral mucosa and the metallic dental materials. The whole blood levels of Cu, Co and Ni were measured by atomic absorption spectrophotometry. Furthermore, a macrophage migration inhibition test was carried out to study if the etiology of this disease involves cell-mediated immunity. The oral macula antigen (OMA) was used alone or in combination with Cu, Co, Ni, Sn and Cr<sup>6+</sup>. The following findings were found:

1. Patch test:

   Cu, Sn and Co gave a high positive rate in the normal subjects, and Sn, Cu, Pt, Zn and Co in the patients. There was a significant difference in the positive rate with Zn or with Sn between the two groups.

2. Determination of heavy metals in whole blood:

   Blood levels of Cu, Co and Ni were slightly low in the patients; however, there was no significant difference between the two groups.

3. Macrophage migration inhibition test:

   There was no difference in the test result with OMA, Cu+OMA or Sn+OMA between the two groups. The macrophage inhibition rates with Co+OMA, Ni+OMA and Cr<sup>6+</sup>+OMA were high in the patients.


18. Fibro-osseous Lesions of the Jaws

Part 2. Multiple Lesions

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(Director: Prof. Goro Ishikawa)

Twenty-five cases with multiple fibro-osseous lesions of the jaws were studied clinicopathologically. Case materials studied were subtyped into five groups: non-familial cemental lesions in nine cases, familial cemental lesions in five cases, non-familial ossifying fibroma in three cases, familial ossifying fibroma in three cases and multiple fibrous dysplasia of bone in five cases. Non-familial cemental lesions with widespread involvement in the jaw bones would be compatible with the sclerotic cemental masses of the jaws (Waldron et al.) or florid osseous dysplasia (Melrose et al.). The pedigree of the family with multiple cemental lesions has been extensively examined by Dr. Aka- saka and colleagues (published in Japanese). In another family, the father and two sisters were affected with multiple ossifying fibroma of the maxilla and mandible. Both familial cases of the fibro-osseous lesions of the jaws are very interesting and the lesions similar to these cases have not been reported yet in the literature. The osteogenic sarcoma developed in the mandible of a 59-year-old
man with craniofacial fibrous dysplasia of bone since childhood. He had not experienced radiotherapy prior to the malignant transformation.


19. The Dissolution of the Calcium from Teeth in Acid-Containing Fruit Juices, Soft Drinks and Foods

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Acids in fruit juices, soft drinks and foods have been known to dissolve the teeth and cause various dental lesions. It has also been known that the degree of the hypersensitivity of the dentine has a close relationship with the amount of the intake of the acid-containing drinks and foods. The increase of the acidic intake enhances the symptom and the decrease suppresses it. The possible mechanism of the change of the sensitivity may be explained by the disturbance of the tooth and the oral fluid. Experiments were carried out to compare the tendency of the calcium dissolution among the acid-containing foods and drinks.

Results obtained were as follows:
1) Five fruit juices, 8 acid-containing soft drinks, 8 adjusted acid solutions were titrated with 0.1 N NaOH. The pH values were measured by a glass electrode pH meter during the titration.

All of the initial pH values of the test solutions were around 2.5. The amount of the 0.1 N NaOH required to neutralize the test solutions varied considerably.

In the group of the citrous fruit juices, the order of the subjective taste of the acidity seemed to equal the order of the 0.1 N NaOH required to neutralize them.

2) The coronal parts of the extracted maxillary permanent anterior teeth were dipped for up to 9 minutes in one of the following test solutions: cola drink, Japanese vinegar, lemon juice, 0.1 M citric acid and 10% lactic acid solution. A quantitative analysis of the dissolved calcium was performed by the atomic absorption analyzer.

Although the difference of the initial values was small, the lower the pH of the test solution was the more was the dissolution of the calcium observed. An exception to this tendency existed between the cola drink and the Japanese vinegar.

The buffer action, the cleaning action of the saliva, the duration of the stay of the foods and drinks in the mouth and the individual habit of ingestion must also be related to the decalcifying capacity of the solutions.

The amount of the base required to neutralize the test solutions seemed to be more desirable than the initial pH values to estimate the decalcifying capacity of the solutions.


20. A Study to Analyse Three-Dimensional Positions of Permanent Mandibular Buccal Tooth Germs

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(Directors: Emeritus Prof. Hiroshi Yamashita and Prof. Hiroshi Ono)

A system to analyse the roentgen cephalograms and dental cast in the same dimension was studied in order to locate the positions of the mandibular buccal tooth germs. Materials required for this system were the frontal, right and left 45° oblique cephalograms and mandibular dental cast which were taken on the same day. These materials were obtained from a child in the stage of Hellman's dental age from IIA to IIIA.

Based on our methods (1977) which are to obtain facial measurements with three-dimensional coordinates using two oriented cephalograms free from enlargement and distortion, landmarks of dental germs seen on both the frontal and oblique films were reproduced three-dimensionally. Three-dimensional reproduction of these landmarks led the dental cast to be treated in the same dimension. Consequently the positions of the mandibular buccal tooth germs can be measured from the reference plane representing the deciduous molar cusp regression plane which is computed from the dental cast.

The test of accuracy for this system was studied with the template-simulating mandibular buccal tooth germs. And a diagram in which the landmarks of the dental germs and the reference plane were projected on the XY, YZ, XZ planes was drawn to visualize the positions of the dental germs concretely. This system was applied to three cases in Hellman's dental age IIA, IIC and IIIA.

21. Tarnish and Corrosion of Copper-rich and Conventional Amalgams

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In order to investigate the tarnish and corrosion of the dental amalgam, the surface changes of the amalgams made from various brands of alloys (four conventional and five copper-rich amalgam alloys) were examined by electron probe microanalyzer after one or three-month immersion in the physiological saline solution (pH 7.0) or after about three-month exposure to oral environment.

The findings obtained were as follows:
1) The surfaces of the conventional amalgams in vitro changed with the SnO₂ or SnO deposits. The surfaces in the oral cavities could not hold such deposits due to the mechanical wear, and produced small defects accompanying the dissolution of Sn in the area of the γ₃ phase. Thus, the conventional amalgam generally demonstrates a relatively lower corrosion resistance.
2) The copper-rich amalgams showed a high corrosion resistance without the dissolution of Sn. But these amalgam surfaces have lost the luster with the formation of the γ₃ deposits. These phenomena would come into the category of “tarnish”.
3) The surfaces of the copper-rich amalgams containing indium showed a deposit formation apparently of Sn or indium oxide on the matrices after immersion for a long period of time. Such a phenomenon would be “corrosion”. This fact suggests the contraindication of adding indium to the amalgam alloys.


22. Accuracy of MOD Type Stone Models Made from Elastomeric Impressions

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For investigating the accuracy of the stone models of intra- and extra-coronal type, the buccal-lingual and mesio-distal dimensional changes of the MOD and BOL stone dies made from various elastomeric impressions were examined at various portions by a ball feeler measurement.

The findings were as follows:
1) The single MOD dies from the tube tray impressions were generally smaller in the buccal-lingual direction and were greater in the mesio-distal direction than the original die.
2) The mesio-distal dimensions of the MOD models having adjacent teeth with undercuts were greater than those of the single dies. The effects of undercuts were not found with the various silicone rubber impressions, but the polysulfide rubber impression showed an extremely small size in the bucco-lingual direction due to the undercuts.
3) The MOD stone models having a unilateral undercut showed a remarkable reduction in the mesio-distal direction.
4) The stone models made by the laminated single and double impression techniques with silicone rubber showed approximately the same tendency, except for the case of unilateral undercut.
5) The most accurate MOD or BOL models were produced from the regular type silicone rubber impressions.

(J. Stomatol. Soc., Jpn., 44: 419-441, 1977)

23. Effects of Vitamin D, Serum Calcium and Phosphate Levels on Bone and Serum Alkaline Phosphatase Activities

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Male weanling rats were fed on either vitamin D deficient or supplemented (250 U/g diet) diet containing various calcium and phosphorus concentrations to investigate the effects of vitamin D, serum Ca and P levels on the bone and serum alkaline phosphatase activities.

The low phosphorous diet (0.09% P, 3% Ca) caused a decrease in the serum P level and increase in the bone phosphatase activity even in the vitamin D-supplemented group as well as in the vitamin D-deficient rats, but the serum phosphatase activity did not correlate with the enzyme activity in the bone.

The result of the other series of experiments designed to obtain animals having various serum Ca levels indicated that the serum phosphatase activity was reversely correlated to the serum Ca level (correlation coefficient: -0.87), regardless of the presence or deficiency of vitamin D, but was independent of either the serum P level or the Ca×P product.

The results of the present study suggest that vitamin D has an influence on the bone and serum alkaline phosphatase activity through the serum P or Ca level rather than directly.


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It is generally accepted that the genetic effect on the morphogenesis is varied at different growth sites and also at different growth stages. Therefore, the genetic explanation for the phenotype should be considered in the growth changes.

The purpose of this study is to make clear the genetic effect on the pattern changes of the craniofacial complex during growth.

Materials studied were 286 lateral cephalograms taken from 22 parent-offsprings, including the serial cephalograms of 22 offsprings.

The total and component pattern similarity of the craniofacial complex among the parent-offsprings is analysed by using the cephalometric data treated isometrically.

The conclusions are as follows:
1. The total pattern similarity tends to increase during growth except for a few cases.
2. The component pattern similarity is varied in the different morphogenic units.