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No. 1 Mar. 1974

   Hiroshi Yoshida
   First Department of Oral Surgery

   Hiroshi Yoshida
   First Department of Oral Surgery

3. The relationship between the circular-arc of deciduous teeth and the streptococci in the dental plaque.
   Asako Yuge, Kyue Baba, Keiko Kato and Eiko Miyawaki
   Department of Oral Microbiology, Kanagawa Dental College

4. Experimental production of the Sjögren’s syndrome-like changes on rabbits.
   Kazuo Hamada
   Second Department of Oral Surgery

5. Quantitative estimation of secretory IgA in serum on the oral diseases.
   Yuzo Takahashi
   Second Department of Oral Surgery

6. Studies of abrasion resistance of various materials used for artificial teeth and crowns. Part II. On abrasion resistance of various materials by impact and sliding abrasing testing machine.
   Hideshiko Jibiki
   Department of Prosthetic Dentistry, School of Dentistry, Tokyo Medical and Dental University;

Department of Dental Engineering, School of Dentistry, Tsurumi University;
Division of Organic Materials, Institute for Medical and Dental Engineering, Tokyo Medical and Dental University.

No. 2 June 1974

9. Studies on S-formed organisms isolated from oral cavity and their flagella.
   Osamu Fujita
   Department of Oral Bacteriology

    Takahiko Matsuo, et al.
    First Department of Oral Surgery

11. A case report on the double horizontal impaction on the mandibular second and third molars.
    Tsao Hikima and Youke Sekiguchi
    Department of Dentistry, The Jikei University School of Medicine

12. The change of dental enamel to ruby laser radiations: Observation with the scanning electron microscopy.
    Nobukazu Sugawara
    Department of Oral Pathology, School of Dental Medicine, Tsurumi University

    Yuichi Azumi
    First Department of Oral Surgery

14. Histopathological study of tooth hypoplasia in humans: Observations on deciduous teeth germs of 60 autopsy cases.
    Seiichiro Kuroda
    Department of Oral Pathology, School of Dentistry, Niigata University
15. Removal of infected dentin using fuchsin staining as a guide. 2. Experiment with vital carious teeth.
   Yuichiro Sato
   Department of Operative Dentistry

   No. 3 Sept. 1974

16. A study on cleansing of fissures.
   Koichi Aoki
   Department of Operative Dentistry

   Hiroichi Ikeda and Isamu Nakazawa
   Department of Prosthetic Dentistry
   Koichi Matsuda and Hitoshi Hamanaka
   Division of Metallurgy, Institute for Medical and Dental Engineering

18. Orthodontic findings in two cases of hypothyroidism associated with incomplete achondroplasia.
   Kiku Noguchi, Takayuki Kuroda and Masaki Kamata
   Department of Orthodontics

   Etsuhide Yamamoto
   First Department of Oral Surgery

   No. 4 Dec. 1974

   Hisashi Hisamitsu
   Department of Operative Dentistry

21. Anatomical studies of mandible of the recent German in Franken-District.
   Yosuke Sekiguchi
   Department of Dentistry, The Jikei University School of Medicine

22. Clinical features of mucoepidermoid tumors of the minor salivary gland origin and cell kinetics of their cultured cells: Repet of 2 cases.
   Gen-iku Kohama, et al.
   Department of Oral Surgery

23. Quantitative estimation of immunoglobulins (IgG, IgM and IgA) in human gingival tissue with periodontal disease.
   Tsutomu Ishizu
   Department of Periodontology
Abstracts of Original Articles

1. A Roentgenographic Study on Configuration and Function of Velopharynx

Part 1. Visualization of the soft palate, posterior pharyngeal wall and hard palate by cephalometric radiography with contrast media

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(Prof. Tadashi Ueno)

The purpose of this study was to obtain a foothold for elucidating the configuration and the function of the velopharynx in the cases of velopharyngeal incompetence.

In this study, the author has attempted to use materials of 3 groups, that is, 36 normals, 46 postoperative cleft palate subjects and 34 congenital velopharyngeal incompetences which had hypernasality in the absence of the overt cleft palate.

For many years, it has been considered that the configurations of the soft palate and the uvula of the velopharyngeal incompetence except cleft palate were very difficult to visualize in clear roentgenographic pictures.

This report observed the configurations of the soft palate, posterior pharyngeal wall, as the velopharyngeal soft-tissue structures and hard palate as the hard-tissue structures by using the lateral cephalometric roentgenography, the lateral cephalometric roentgenography with magnet, the cephalometric roentgenography with contrast media which was invented by the author, the cephalometric tomography of the mid-sagittal plane and lateral cinefluorography. The author has also attempted to compare and examine, through these above-mentioned methods, which is the most adequate roentgenographic method of visualizing the configuration of the velopharyngeal structures. The following conclusion was obtained that the cephalometric roentgenography with contrast media was a much more advanced method in all cases in order to visualize the configurations of the soft palate and posterior pharyngeal wall together with the hard palate under the following two conditions:

1) Contrast media:
   "Dionosil oily" was superior to "Conray,"
   76%, Urografin, BaSO₄, and "Dionosil aqueous" in having an excellent radiographic contrast, good viscosity, good retention and hardly stimulated the structures.

2) Roentgenographic techniques:
   The clear roentgenographic pictures of the velopharyngeal structures was obtained under the physical conditions of exposures in 80 KVp, 20 mAs and 165 F.F.D.

The author examined, in about 7 normals, the influence of the configuration of the soft palate by ("Dionosil oily.") The result was, in the case of the soft palate, the difference of measuring value 0.4 ± 0.6 mm length and 0.3 ± 0.4 mm thickness, and there was little difference in tests using contrast media and those not using it. Therefore, the influence of the configuration of the soft palate by "Dionosil oily" was not recognized.

(Kokubyo Z., 41: 1-20, 1974)

2. A Roentgenographic Study on Configuration and Function of Velopharynx

Part 2. Quantitative evaluation of configuration and function of velopharynx in normal palates and in velopharyngeal incompetence

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The purpose of this paper was to study the configuration and the function of the velopharynx in the case of velopharyngeal incompetence. Those who were examined for this study were divided into 4 groups, namely 34 subjects were normal (N group), 16 subjects with improved speech on postoperative cleft palate (CP-g group), 33 subjects with poor speech on postoperative cleft palate (CP-p group) and 32 subjects with congenital velopharyngeal incompetence which had hypernasality except overt cleft palate (VI group).

The author carried out the cephalometric roentgenography with contrast media to measure and compare the following points on these subjects.

1. At rest:
   The following findings indicated that compared to the N group, the other three groups had drastically shorter distance between the posterior nasal spine and the anterior nasal spine, that is the length of the hard palate, and those three groups were constantly shorter than the N group in the distance between the posterior nasal spine and the uvula tip, that is the length of the soft palate. Furthermore, the distance between the pterygomaxillary fissure and the uvula tip and the thickness of the soft palate was also shorter.

   The correlation was observed between the length and the thickness of the soft palate in the N group. But there was great deviation in the results of each case in the CP-p group and the VI group due to each individual degree of disease, and the correlation was not recognized between the length and thickness of the soft palate.

   The CP-g group was shorter than the other three groups in the depth of the velopharynx. On the other hand, no noticeable difference was observed among the three remaining groups. The ratio of the length of the soft palate to the depth of the velopharynx was identical between the N group and the CP-g group, but it was found to be more indistinct in the CP-p group and the VI group than in the N group.

2. On the function:
   The stretching and the thickening and the elevating of the velum were remarkable in the N group, and the difference was observed between the sounds Ah and Ee. The stretching and the elevating of the velum on the CP-g group were the next remarkable after the N group. But the thickening of the velum was the least in the CP-g group.

   On the other hand, these were small and no difference was observed during each function of the CP-g group and the VI group.

   The correlations between the stretching and elevating of the velum, and the thickening and elevating of the velum during phonation of the Ee sound and Blowig in the N group only were observed. Regarding the Pas-savant's ridge, the occurrence was the most frequent and remarkable in the CP-p group.

   In observing the lateral findings, the velopharyngeal contact was observed during phonation of the Ee sound and the Blowig, but it was not found during phonation of the Ah sound in the N group.

   However, a wide distance between the velum and the posterior pharyngeal wall was observed, and no difference was found during phonation of the Ee, Ah sounds and the Blowig in the CP-p group and the VI group.

   The position of the velopharyngeal closure was lower in all three groups compared to the N group.

(Kokubyo Z., 41: 21–58, 1974)

3. The Relationship between the Circular-Caries of Deciduous Teeth and the Streptococci in the Dental Plaque

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Both in 3-year-old children having no caries teeth (29 persons) and circular-caries teeth (58 persons) the prevalence of Streptococci, the acid-productivity of the dental plaque samples and their relationship were studied.

The detection rate and the ratio to total Streptococci of Str. mutans were statistically
higher in the plaques of circular-caries children than no-caries. On the other hand, as to Str. sanguis, it was the opposite above result.

The acid-productivity of the plaque samples was also higher in circular-caries children than in no-caries.

There is a clear-cut correlation between the caries degree and the detection rate, the caries degree and the ratio to total Streptococci, the acid-productivity and the detection rate, and the acid-productivity and the ratio to total Streptococci in the plaque samples respectively.

According to the increase of Str. mutans it was observed to drop the pH in the medium of the dental plaque samples.

(Kokubyo Z., 41: 59-68, 1974)

6. Experimental Production of the Sjögren’s Syndrome-like Changes on Rabbits

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Prolonged sensitization were achieved in rabbits by the use of “oil in water adjuvant” emulsified with bovine serum albumin solution. From 100th day, the sensitization of the cell-membranous lipoproteins prepared from homologous rabbit salivary and lacrimal glands and Freund’s complete adjuvant moreover were added.

Serological and pathological changes were studied. The results obtained are summarized as follows.

1) Serological changes:
Antisalivary lipoprotein antibodies, rheumatoid factors, direct antiglobulin factor and hypergammaglobulinemia were obtained.

2) Pathological changes:
Cell infiltration, atrophy and disappearance of glandular tissue, ductal dilatation and replacement of fibrous tissue were observed from the rabbit salivary and lacrimal glands.

But no massive lymphoid infiltration, epithelial cell proliferation and epi-myoepithe-

ial island were observed.

(Kokubyo Z., 41: 77-90, 1974)

7. Quantitative Estimation of Secretory IgA in Serum on the Oral Diseases

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Secretory IgA (SIgA) in the sera of healthy individuals and patients with an oral disease was estimated.

Quantitation of SIgA was carried out by haemagglutination inhibition test (H.I. test) using a specific anti-free Secretory Component antiserum and colostrum IgA coated cells.

A standard of SIgA was expressed as a concentration of purified colostrum IgA that was measured with Parrigen IgA plate.

The distribution of levels in the sixty-five healthy individuals was logarithmic. The mean level was 1.50 µg/ml, when it was expressed as the antilog of the mean log value, the result was 1.72 µg/ml.

The mean level of five lactating women in the sera was 7.56 µg/ml, that is about five times normal.

The sera of patients with eighteen recurrent aphthous stomatitis and twenty-two oral carcinoma showed normal levels and each mean level was 1.53 µg/ml and 1.80 µg/ml.

Slightly elevated level was found in the sera of patients with twenty-six Behçet disease, the mean level was 2.22 µg/ml, but found no correlation with total IgA and SIgA in the sera.

Elevated levels were found in the sera of patient with thirteen Sjögren syndrome and twenty rheumatoid arthritis. The mean levels of these cases were 2.91 µg/ml and 2.58 µg/ml.

The highest elevated level was found in the sera of patient with oral carcinoma with liver metastasis as well as stomach carcinoma with liver metastasis, acute hepatitis and hepatoma.

These cases were more than 12.01 µg/ml. From these results, it is suggested that
quantitation of SIgA in the serum would provide a useful parameter of activity of these diseases.

(Kokubyo Z., 41: 91–108, 1974)

8. Studies of Abrasion Resistance of Various Materials Used for Artificial Teeth and Crowns

Part II. On abrasion resistance of various materials by impact and sliding abrasing testing machine

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(Prof. Isamu Nakatani)
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(Prof. Tadashi Hirasawa)
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(Prof. Eiichi Masubara)

The following is a summary of the studies on the abrasion loss of five kinds of artificial crown materials antagonized one another, acrylic resin, porcelain, gold alloy, tested through the medium of glycyrin suspensions of calcium monohydrate, gold alloy, and by Professor Masubara's and Professor Hirasawa's MH impact and sliding testing machine.

1) As to the abrasion loss in case of the same kind of materials antagonized under the same condition, porcelain indicates the smallest value, then, gold alloy, gold-silver palladium alloy, and silver alloy indicate the larger ones in order, and acrylic resin does the largest one. The abrasion loss of the materials is in inverse proportion to their hardness. Though different conditions produce more or less different values, the abrasion loss of acrylic resin indicates over twenty times as much value as that of porcelain does.

2) The abrasion loss of acrylic resin is smaller in case of the different kind of materials antagonized. Porcelain, however, tends to indicate the smaller loss in the same kind of materials antagonized, in comparison with that in the different kind of materials antagonized, though the difference is slight.

3) In general, the abrasion loss of metallic materials antagonized one another lies between the loss of acrylic resin and that of porcelain, but the loss of gold alloy as well as that gold-silver palladium which are small are similar to that of porcelain, and on the other hand, the loss of silver alloy tends to be similar to that of acrylic resin.

4) With one or two exceptions, every medium gives the same tendency of abrasion to all the materials; that is, the abrasion loss increases according to the suspensions of calcium monohydrate, iron sesquioxi oxide, aluminium oxide and diphosphonium trioxide in order, and it is in proportion to the hardness of abrasive.

(Kokubyo Z., 41: 109–128, 1974)

9. Studies on S-shaped Organisms Isolated from Oral Cavity and Their Flagella

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(Prof. Takahiro Horikawa)

Using the Shimizu-Morita's medium containing 10% horse blood, slightly curved fusiform bacilli were isolated from adult's dental plaque. They were Gram-negative, anaerobic and motile.

Isolated 30 strain showed sigmoidal, crescent or spiral shape in the broth culture. And their ordinary shape is regarded as sigmoid because they were almost displayed with sigmoidal form during isolation and cultural passage. They seemed to be identical with Spirillum sp. sputum named by Rosebury et al. because of their morphological and biochemical characteristics. Electron microscopic study revealed that their flagella arose from concave side and both terminal of the cell lacked flagella even when it formed long spiral shape. Therefore, these organisms
should not to be belonged to Genus Spirillum.

Moreover, the organisms morphologically seemed to be Selenomonas sputigena were isolated. Although they also appeared sometimes as long spiral form in the broth culture, sigmoidal organisms always were larger than them under all circumstances. And so sigmoidal organisms should not to be belonged to Genus Selenomonas, as Toda et al. indicated. For these reasons, new Genus should be put for them.

Immunological result was not clear.

Difference of flagella between these isolated organisms and other bacteria was revealed by electron microscopy. Clear sine curve was not observed and their flagella were apt to form circles and tufts. Because they were mechanically instable and fragile, short and circular filaments were observed after detachment from the cells. In the course of purification of them, they were made shorter filaments. Besides smaller circles were re-formed and tufts were not broken separately.

Such properties should be studied from now on.

(Kokubyo Z., 41: 155–156, 1974)

16. A Method of Intermaxillary Fixation for Repair of Mandibular Prognathism with Resin Postcrows

Takahiko Matsuo, Fukiko Ojima, Syunichi Takakura, Katsuhiro Yuki and Katsutoshi Motegi
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(Prof. Tadashi Ueno)

The intermaxillary fixation is considered to be important technique in the surgical treatment of mandibular prognathism. When patient has normal teeth, we usually do continuous dental wiring and ligate intermaxillarily with adequate steel wires.

But if the patient has abnormal teeth, we must plan a suitable method to treat them.

This time, we treated a patient with resin postcrows. In expectation of stable fixation, we put autopolymerizing resin on the wire-ligated surface of the postcrows, and we got satisfactory result.

(Kokubyo Z., 41: 151–157, 1974)

11. A Case Report on the Double Horizontal Impaction on the Mandibular Second and Third Molars

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(Assoc. Prof. Clayton H. Sato)

This case was of a 22-year-old female at the oral examination introducing the absence of right mandibular on second and third molars, which showed no sign of having been extracted in the past. This was revealed in an X-ray film, that the second and the third molars, one over the other, were in horizontal impaction.

In the evolution of man, the skeletal reduction is marked while reduction in the size of tooth materials are very small. At present, the third molars are gradually disappearing man. These factors happen to give this double horizontal impaction by reduction in space between the first molar and retro-molar fossa and the existence of third molar. In addition to this at the developing stage of the second and third molar, the location of the second molar germ is quite an invagination in the mandible, depressed by the third molar. It is visible in the resorption of distal root of the first molar.

(Kokubyo Z., 41: 158–169, 1974)
12. The Change of Dental Enamel to Ruby Laser Radiations
—Observation with scanning electron microscopy—

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(Prof. Goro Ishikawa, Dept. of Oral Pathology, School of Dentistry, Tokyo Medical and Dental University)

Ruby laser radiations used in the normal and early carious enamel of extracted human teeth were investigated macroscopically and histologically with the scanning electron microscopy. The small hole demarcated sharply was observed macroscopically in the lasered normal enamel and concurrently glass-like swelling was observed on the area around the hole. The holes were observed some differences in size and depth with the same laser energies. On the observations with the scanning electron microscopy, the area around the hole showed bubble-like structure, and cracker-like structure was revealed on the wall and bottom of hole. The findings lead to result that the enamel was fused instantaneously by the laser radiations and re-solidified on the surroundings, wall and bottom of hole. Lasered normal enamel was apparently increased the resistance to demineralization. After immersed in lactic acid solution for a long time, it tend to demineralized along the crack part of wall. Laser radiations were able to produce easily hole in early carious enamel rather than in normal enamel. The findings in both normal and early carious enamel are different on the surroundings, but not on the wall and bottom of hole. From those results, this technique may provide the possibility of the caries prevention and treatment.

(Kokubyo Z., 41: 161-171, 1974)

13. Cleavage Lines in the Facial Skin of Japanese Cadavers
Part I: Macroscopic findings

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(Prof. Tadashi Ueno)

Since 1861 Langer published his work on the cleavage lines of the skin, many Japanese and foreign authors have referred to Langer's lines as the most appropriate guides for skin incisions remaining minimum scarring after healing.

But it has been recently suggested that the cleavage lines of Langer do not constitute a suitable guide for incision.

Furthermore, in comparison with orientations of the cleavage lines which have been described in the published textbooks, the author found some variations in details among those descriptions, especially in the face.

So in this study, the Japanese cleavage lines were examined and established in the facial region of seven male and four female cadavers, and the following results were obtained.

1. Forehead: The long axes of the cleavage lines tended to run transversely as a whole.
2. Eyelids: The lines ran, drawing a concentric circle, around the eye-fissure.
3. Nose: In the radix nasi and in the upper part of the dorsum nasi the lines ran like figuring “八” of the Japanese letter. In the lower part of the dorsum nasi the lines were parallel to the sagittal plane, and in the apex nasi they ran laterally towards the cheek.
4. Nasolabial fold: The lines were almost parallel to the nasolabial fold.
5. Upper lip: The main directions of the lines in the upper lip were radial upwardly.
6. Lower lip: The lines ran radially like the upper lip, but downward.
7. Corner of the mouth: The lines from the nasolabial fold and the cheek ran like flowing into the corner of the mouth, drawing
the slight curve.

8. Chin: The cleavage lines were in a whirl irregularly.

9. Check: The lines turning the inside corner of the eye-lid and drawing a large curve in the cheek, flew like the transformed "S", in the corner of the mouth and the lower lip.

(Kokubyo Z., 41: 172-179, 1974)

14. Histopathological Study of Tooth Hypoplasia in Humans—Observations on deciduous teeth germs of 60 autopsy cases

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On the basis of availability of maternal and pediatric histories and an autopsy examination, a total of 60 babies varying in age from premature stillborns to seven months, has been systematically studied, by ordinary and fluorescence microscope, microradiograph, electron and scanning electron microscope, and electron probe microanalyser etc., in order to understand better the pathogenesis of tooth hypoplasia and evaluate more adequately the influence of the pre- and postnatal periods and the incidence of these. Although it would not be possible to make dogmatic assertions from a study such as this, the following points are of particular significance.

1. Apparent tooth hypoplasia were present in 7 cases (11%), of babies studied, among which all but one were postnantly occurring hypoplasia.

The incidence of apparent tooth hypoplasia is high in the babies (5/19) with various congenital anomaly (endocrine organ, heart, and digestive tract etc.), in male (6/36) than female (1/24), but no occurrence in the groups of premature and cerebral damaged babies.

2. From information provided by maternal, obstetrical, pediatric and autopsy histories and examinations, it seems to indicate rather clearly that there is a more or less definite correlation between the occurrence of a tooth hypoplasia and contemporaneous systemic ailments.

3. Earliest histopathological changes in enamel hypoplasia are characterized by the appearance of globular, enamel-like material, subjacent to and within the cytoplasm of ameloblasts, in keeping with the finding of Kreshover (1958). As this lesion progresses, such globular material accumulated in large number and fused together in a solid mass constitute enamoloid tissue and, finally, they appeared as a conglomerate of highly mineralized globules within or outside the enamel.

4. In case of the most severe dentin hypoplasia, interesting findings of the obstruction of dentinal tubules were seen.

Inclusions of dentin forming cells or capillaries in localized areas of dentin were occasionally seen and appeared in 12 cases excepting the case of apparent tooth hypoplasia.

5. Judging from the knowledge gained from previous experimental and clinical studies, and from present study, it seems reasonable to recognize that apparent tooth hypoplasia may be considered nonspecific in nature and related to a variety of causative factors.

(Kokubyo Z., 41: 180-201, 1974)

15. Removal of Infected Dentin Using Fuchsine Staining as a Guide

2. Experiment with vital carious teeth

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(Prof. Takao Fusayama)

The 0.5% basic fuchsine-propylene glycol solution was applied to the carious cavities of vital teeth in mouth. The fuchsine stainable dentin was half-removed from one side of the cavity and left in the other side. The tooth was extracted and the depth of stained dentin removal and that of bacterial invasion were compared on its Gram stained vertical sections. It was thus revealed that the complete removal of fuchsine stainable carious dentin and distinct natural discoloration in
vivo assured the complete removal of infected dentin.

The radiographs of carious teeth in mouth before excavation and after removal of the fuchsir stainable carious depth or further stopping with a cement were compared. It was revealed that the radiolucent figures of carious lesions indicated much narrower area than the extent of fuchsir stainable carious dentin to be removed.

(Kokubyo Z., 41: 202–211, 1974)

16. A Study on Cleansing of Fissures

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(Prof. Takao Fusayama)

In order to develop an effective technique for cleansing occlusal fissures before application of sealants, solutions of 1N-HCl, 50% H$_2$PO$_4$, 1N-HaOH and 10%-NaOCl were tried on occlusal surfaces of freshly extracted human teeth and the cleansing effect was compared. They were applied with and without giving the vibration of an ultrasonic scaler to fissures of various forms. Findings were as follows:

1. The cleansing effects of the chemicals without ultrasonic vibration were generally limited on the occlusal surfaces and did not reach in fissures, but the NaOCl solution was the most effective among them.

2. The ultrasonic vibration could remarkably increase the effect of the agents and the combination of it with the NaOCl solution could cleanse even inside pits and fissures.

3. This combination could completely remove the fissure content in 100%, 94.0% and 71.1% of cases with respectively funnel-shaped fissures, bottle-shaped fissures and deep fissures almost reaching dentin, that is, in 91.1% of all cases.

(Kokubyo Z., 41: 225–232, 1974)

17. Studies on Mechanical Properties of Dental Materials for Clasp

Part 1: On elastic properties of marketing alloys for cast clasp

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(Prof. Isamu Nakazawa)

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(Prof. Isji Miura)

Elastic properties of dental alloys are important to design clasp, saddles and so on. but scarcely known in general. This is thought to be caused by the difficulties for determining stress-strain curve accurately. For example differential transformer system is common to determine stress-strain curve for tensile test, but this is apt to make error in strain by slip and is unsuitable for small test pieces as dental materials. So, in this study, we used strain-gages adhered test pieces to measure strain, and examined to determine accurate stress-strain curves for five types of marketing casting alloys for clasp. From these stress-strain curves, elastic properties, such as Young's moduli, proportional limits, resilience were studied. Tensile strength, hardness and microstructures were also studied. Main results in this study are as follows:

Regarding to the Young's modulus, Co-Cr alloy is the highest 21.4×10$^5$ kg/mm$^2$, and then 14k 12.6×10$^5$ kg/mm$^2$, Ag-Pd-Au alloy 12.4×10$^5$ kg/mm$^2$, and Pt-Au alloy 11.5×10$^5$ kg/mm$^2$ in order. Stress-strain curve of Co-Cr alloy shows sharp straight line at a start, but after the proportional limit, the rate of increase in the curve slows down suddenly. The curve of 14k is similar to that of Co-Cr alloy. On the other hand, the curve of Pt-Au alloy shows gentler slope and higher proportional limit as compared with above two alloys, and the slope of the curve decreases gradually after the proportional limit.
The curve of Ag-Pd-Au alloy looks like that of Pt-Au alloy, but its proportional limit is lower than that of Pt-Au alloy.

From these results, Co-Cr alloy is thought to be excellent in regard to the Young's modulus, stiffness and hardness, but has a fault that it is apt to remain large permanent deformation at large deformation. While the Young's modulus of Pt-Au alloy is about half that of Co-Cr alloy, Pt-Au alloy is excellent in high proportional limit and resilience, that is, high flexibility and toughness.

Though these results show well such a matter as have been known clinically from experiences, it can be concluded that we should mention more elastic properties of dental alloys, besides the ultimate tensile strength, hardness and elongation, to make higher level design.

(Kokubyo Z., 41: 233-246, 1974)

18. Orthodontic Findings in Two Cases of Hypothyroidism Associated with Incomplete Achnondroplasia

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Two cases of hypothyroidism associated with incomplete acrochondroplasia are studied from orthodontic point of view. Patients are 15 and 12 years old girls in siblings, whose chief complaint are severe mandibular protrusion.

It is assumed that the developmental process in the instractory system of hypothyroidism does not follow a typical pattern progressively. Rather, the intensity of the effect of hypothyroidism on a particular factor related to the craniofacial growth and development seems to have an important role to control the representative feature.

It is interesting fact that the mandibular condylar cartilage is unaffected during growth. This fact might be due to the presence of proliferative cells derived from perichondrium at the mandibular condyle.

(Kokubyo Z., 41: 247-259, 1974)

19. Cell Kinetic Study on the Effects of Cancer Chemotherapeutic Agents to Primary Culture Cells from Human Oral Mucosa

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The effects of cancer chemotherapeutic agents on cell kinetics of primary culture cells from human oral mucosa were investigated autoradiographically in vitro. The agents used in this study were Bleomycin (BLM), Mioyycin C (MMC) and 5-Fluorouracil (5-FU). The results were as follows:

1) Tissue specimens of human oral mucosa, which were obtained from cleft palate patients at plastic operation, were cut into 1 mm square and cultured on coverslips employing explant culture method. Culture medium was Eagle MEM supplemented 20% calf serum.

2) Epithelial cells and fibroblastic cells had grown each from epithelial and submucous explants, respectively. By using cumulative labeling method and labeled mitosis chase method of ^H-thymidine autoradiography, generation time, growth fraction (GF) and the duration of the phase of cell cycle of these cells were calculated. Epithelial cells showed labeling index (LI)=16%, mitotic index (MI)=1.03%, T₀=60 hrs, G₁=45 hrs, S=12 hrs, G₂=2 hrs, M=0.8 hrs and GF=80%. Fibroblastic cells showed LI=24%, MI=1.71%, T₀=35 hrs, G₁=22 hrs, S=8.5 hrs, G₂=4 hrs, M=0.6 hrs and GF=100%.

3) When epithelial cells and fibroblastic cells were affected by the agents with higher concentration than each BLM 100 μg/ml, MMC 20 μg/ml and 5-FU 1 mg/ml for 60 hours, remarkable morphological changes increased gradually presenting vacuolar degeneration of cytoplasm, nuclear pycnosis, cell death and so on. These morphological findings were more prominent in epithelial cells than in fibroblastic cells.

4) When epithelial cells and fibroblastic
cells were affected by the agents with lower concentration than each BLM 50 μg/ml, MMC 10 μg/ml and 5-FU 500 μg/ml for 48 hours, morphological changes were observed slightly. In autoradiographical findings, however, cell kinetic changes were observed markedly.

5) The effects of 0.5-50 μg/ml and MMC 0.1-10 μg/ml on cell kinetics of epithelial cells and fibroblastic cells were analysed from the decreasing changes of LI, MI and grain number of labeled nuclei (GN). The rates of these decreasing changes were correlated with incubation time after adding the agents to medium and concentration of agents. Among these decreasing changes, the decreasing rate of MI was especially higher than that of LI and GN. From these results, block of cell flow G1 to S and from G0 to M phases and inhibition of DNA synthesis were estimated. These cell kinetic changes were more prominent in epithelial cells than in fibroblastic cells.

6) The effects of 5-FU 1-500 μg/ml on cell kinetics of epithelial cells and fibroblastic cells were different from those of BLM and MMC. For example, the higher 5-FU concentration was, the more GN increased. These results showed that action mechanism of 5-FU differed from that of BLM and MMC.

(Kokubyo Z., 41: 260-285, 1974)

20. Measurements of Cervical Undercuts of Human Tooth Crowns

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With the purpose of investigating the cervical anatomy of crowns, 320 intact extracted human permanent teeth were subjected to measurement selecting 10 teeth of each number of the right and left and upper and lower tooth lines. They were photographed from facial and mesial to produce magnified pictures, on which the profiles of the cervical undercuts on the facial, lingual, mesial and distal surfaces were observed.

The depth of the undercut depression and the vertical width of the undercut surface were measured in the relation to the crown axis. The inclinations of the undercut surfaces from the directions of the crown axis, the cervical root surface and the facial and lingual food stream surface were also measured. Findings were as follows:

1. On the facial and lingual surfaces, the depth of the undercut depression varied from 0.1 to 0.8 mm, generally smaller in anterior teeth than in posterior teeth, greater in upper teeth in the anterior area and greater in lower teeth in the posterior area.

2. On the facial and lingual surfaces, the vertical width of the undercut surface varied from 1.0 to 3.2 mm, 4 to 10 times the depth, and smaller in anterior teeth than in posterior teeth.

3. On the facial and lingual surfaces, the inclination of the undercut surface from the crown axis varied from 6 to 33 degrees and, generally, greater on lingual surfaces in anterior teeth while greater on facial surfaces in posterior teeth. The inclination from the cervical root surface were generally slightly smaller than that from the crown axis. The inclination from the food stream surface varied from 23 to 52 degrees and was remarkably greater than that from the crown axis in all kinds of teeth. They were particularly greater on lingual surfaces of upper anterior teeth and facial surfaces of lower molars.

4. On the proximal surfaces, the depth of the undercut depression was uniformly 1±2 mm.

5. On the proximal surfaces, the vertical width of the undercut surface was greatest in incisors (4 to 7 mm), smaller in canines (approximately 4 mm) and smallest in posterior teeth (approximately 3.5 mm in the third molar).

6. On the proximal surfaces, the inclination of the undercut surface from the crown axis varied from 11 to 27 degrees and generally smaller in tall anterior teeth and greater in short posterior teeth. That from the cervical root surface was generally slightly smaller than that from the crown axis also on the proximal surfaces.

7. The measurements of teeth of all num-

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Case 2 was mucoepidermoid tumor on the left side of the mouth floor. This tumor revealed swelling with a size of 20 mm × 10 mm. The tumor grew slowly without ulceration for three years. Palpation showed that it was elastic soft, circumscribed. Histological findings showed will differentiated type of mucoepidermoid tumor composed of mucous cells and squamous cells.

The treatment recommended by us was resection of the tumor with neighboring normal tissues. The result has been good for a year without recurrence.

The primary culture cells from Case 2 formed also good epithelial sheets. Electronmicroscopic findings in these cells showed epithelial structures, and some cells had products like secretory granules. In these cells, labeling index was reached 70% in continuous labeling. Therefore, we presumed that there were growth fraction of about 70%, and non-growth fraction of about 30% in these primary cultured cells. In the cells of growth fraction, generation time and duration of DNA synthesis were 48 hours, 7.2 hours, respectively. Mitotic index was 1.5%.

We reported the clinical features of two cases with mucoepidermoid tumor of the minor salivary gland origin and cell kinetics of their cultured cells.

Case 1 was mucoepidermoid tumor on the right side of the palate. This tumor revealed swelling of about 25 mm × 20 mm with granulomatous proliferation. Histological findings showed predominance of squamous cells with slight cell atypia, and clear cells were also
observed. Mucoepidermoid tumor with low malignancy was diagnosed.

The treatment recommended by us was hemi-maxillary resection including the whole tumor. The result has been good for two years without recurrence.

The primary culture cells from the tumor formed good epithelial sheets. In these cells during primary exponential growth, autoradiographic analyses with \(^{3}H\)-thymidine by cumulative labeling method. Epithelia cells were almost labeled with \(^{3}H\)-thymidine, and growth fraction more than 90% was estimated. Cell cycle were analysed from logarithmic curve of cumulative labeling index. Generation time and duration of DNA synthesis were 44.7 hours, 7.2 hours, respectively. Mitotic index was 1.5%.

(Kokubyo Z., 41: 341–347, 1974)

23. Quantitative Estimation of Immunoglobulins (IgG, IgM and IgA) in Human Gingival Tissue with Periodontal Disease

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It has been suggested that immune reaction may act as one of the mechanisms of gingival inflammation. The existences of immunoglobulins in gingival tissue were reported, but their concentrations in it have not been known. Ten, this study was performed to evaluate the concentrations of immunoglobulins (IgG, IgM and IgA) in inflamed gingival tissue and to compare them with clinical findings.

From twenty patients with periodontitis, gingival biopsy was obtained by gingivectomy and serum was collected just before the operation. The clinical conditions of operation area were recorded as follows: (1) Depth of periodontal pocket, (2) Gingival Index of Löe and Silness, (3) Plaque Index of Löe and Silness.

The gingival biopsy which was sliced (6 µ), freezed and dried, was treated with freezing thawing and sonicated (100 W, 5 min.) in 0.01 M phosphate buffered saline pH 7.2 (1 ml/20 mg dry weight). Then the suspension was centrifuged at 8,000 rpm for 30 min. at 4°C. Concentrations of IgG, IgM, IgA and albumin in this supernatant (Fraction I) and in serum were evaluated by Single Radial Immunodiffusion method. While, the precipitate was suspended in 0.01 M phosphate buffered saline pH 7.2 and centrifuged at 8,000 rpm for 30 min. at 4°C until the optical density of the supernatant was gained under 0.050 at 280 mµ. The final supernatant was regarded as Fraction II. The precipitate which was washed with distilled water, freezed and dried, was treated with 0.2 N HCl-Glycine buffer pH 2.4 (1 ml/20 mg dry weight). Then, the suspension was centrifuged at 8,000 rpm for 30 min. at 4°C. This supernatant was neutralized with 1 M K2HPO4, dialized against 0.01 M phosphate buffered saline pH 7.2 and was adjusted the volume (Fraction III). Concentrations of IgG, IgM and IgA in Fraction II and Fraction III were measured by Enzyme linked Immunozymoassay system.

Mean values of the concentrations of IgG, IgM, IgA and albumin in serum were 1873 mg/dl, 119 mg/dl, 379 mg/dl and 4860 mg/dl respectively. Mean values of the concentrations of IgG, IgA and albumin in Fraction I were 15.5 mg/lg dry weight, 3.1 mg/lg dry weight and 26 mg/lg dry weight respectively. Concentration of IgM in Fraction I could not be evaluated by Single Radial Immunodiffusion method. Concentrations of IgG, IgM and IgA in Fraction II could not be measured by Enzyme linked Immunozymoassay system. Mean value of concentration of IgG in Fraction III was 0.26 mg/lg dry weight. Concentrations of IgM and IgA in Fraction III could not be evaluated by Enzyme linked Immunozymoassay system.

It was considered that IgG and IgA which were of serumal origin and/or synthesized locally in gingival tissue were existed in inflamed gingival tissue, because IgG/albumin ratios and IgA/albumin ratios in Fraction I were higher than them in serum significantly.
It was suggested that IgG in Fraction III might be the antibody which was separated from insoluble Ag-Ab complex and/or tissue-bound antigen, because IgG could not be found in Fraction II.

No correlation could be observed between clinical findings and both the concentrations of immunoglobulins in serum and in Fraction I. The same could be found between clinical findings and the concentration of IgG in Fraction III. Also, no correlation could be recognized between clinical findings and total concentration of IgG extracted from gingival tissue (concentration of IgG in Fraction I plus it in Fraction III.)

(Kokubyo Z., 41: 348-359, 1974)