

International Collaborative Symposium on Development of Human Resources in Practical Oral Health and Treatment

Dates

10th - 12th February, 2019

Venue

Novotel Phuket Resort, Phuket, Thailand



Network for International Education and Research in Advanced Dental Sciences

Organized by
Faculty of Dentistry, Khon Kaen University
Niigata University Faculty of Dentistry

International Collaborative Symposium on Development of Human Resources in Practical Oral Health and Treatment



The International Collaborative Symposium on Development of Human Resources in Practical Oral Health and Treatment

Organized by

Niigata University
Graduate School of Medical and Dental Sciences
JAPAN
&
Khon Kaen University
Faculty of Dentistry
THAILAND

February 10th-12th, 2019
at Novotel Phuket Resort, Thailand

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WELCOME MESSAGES



Welcome to International Symposium at Phuket 2019

On behalf of the Faculty of Dentistry, Khon Kaen University (KKU), it is my honor and great pleasure to extend the warmest welcome to all speakers and participants of the International Collaborative Symposium on Development of Human Resources in Practical Oral Health and Treatment in Phuket, Thailand, during February 10–12, 2019. This symposium will provide a magnificent forum of dentistry to refresh your knowledge base and to explore the innovations in oral health and dental research.

This symposium will focus on several topics in oral health improvement, innovation in dentistry, dental technology and development of human resources in practical oral health and treatment. In addition to keynote/invited lectures, oral and poster presentations, the symposium will give participants a valuable platform to exchange and share new ideas on various perspectives of dental education and dental research among speakers and researchers. This is truly an opportunity to meet and interact with the leading researchers, friends and colleagues, as well as to discuss potential collaborations among participants.

2019 is a very important year for the KKU Faculty of Dentistry, as it marks the 40th Anniversary of the Faculty. This symposium, which is the 2nd collaborative symposium between Niigata University and KKU, celebrates 7 years of the two institutions' official collaborations and friendship. We hope that you will enjoy the symposium and bring back fond memories of your journey to Thailand. Your attendance and participation will assure a successful meeting!

Assoc Prof. Dr. Waranuch PITIPHAT

Dean

Faculty of Dentistry

Khon Kaen University, THAILAND



Welcome to International Symposium at Phuket 2019

We are honored to have the International Collaborative Symposium on Development of Human Resources in Practical Oral Health and Treatment at Phuket, Thailand on February 10th and 12th, 2019, supported by grants from the Ministry of Education, Culture, Sports, Science and Technology, Japan. In a past decade, Niigata University Faculty of Dentistry have had the International Collaborative Symposium every year, co-organized with Dental Schools in Thailand or Indonesia, with discussion of recent advances in dental research. Niigata University has been actively working on international exchange and has been eagerly seeking to establish campus globalization through every effort. Niigata University focuses on three issues: First, reorganization of educational system to cultivate young people with global mind; second internationalization including collaboration with foreign universities at student and faculty levels; and third, higher research activity under our ideals of autonomy and creation. Niigata University sets its international relation strategy that aims to be the academic gateway for Eastern Asia Rim region.

One of the purposes of this symposium is to encourage outstanding PhD students and young staff to become future cutting-edge researchers through exposure to a competitive environment, which extends its research activities to the international community of dental sciences. In addition, Japan is facing a super-aging society, and I hear aging in Asian countries are also progressing. The advent of aging society requests an improvement of dental education system including curriculum and assessments, since dental school graduates require new knowledge and skills, to treat such people. Thus, we have to share the clinical and social problems in a super-aging society in order to develop new dental treatments and services, and to create new research fields. Working together to strengthen our professional ties, we can accelerate advances in dentistry at all levels from faculty to students.

We look forward to fruitful, concrete academic interaction in the field of dental sciences at all levels, from faculty to PhD candidates. This symposium would be enable us to strengthen international relation between Japan and South-East Asian countries.

Prof. Takeyasu MAEDA

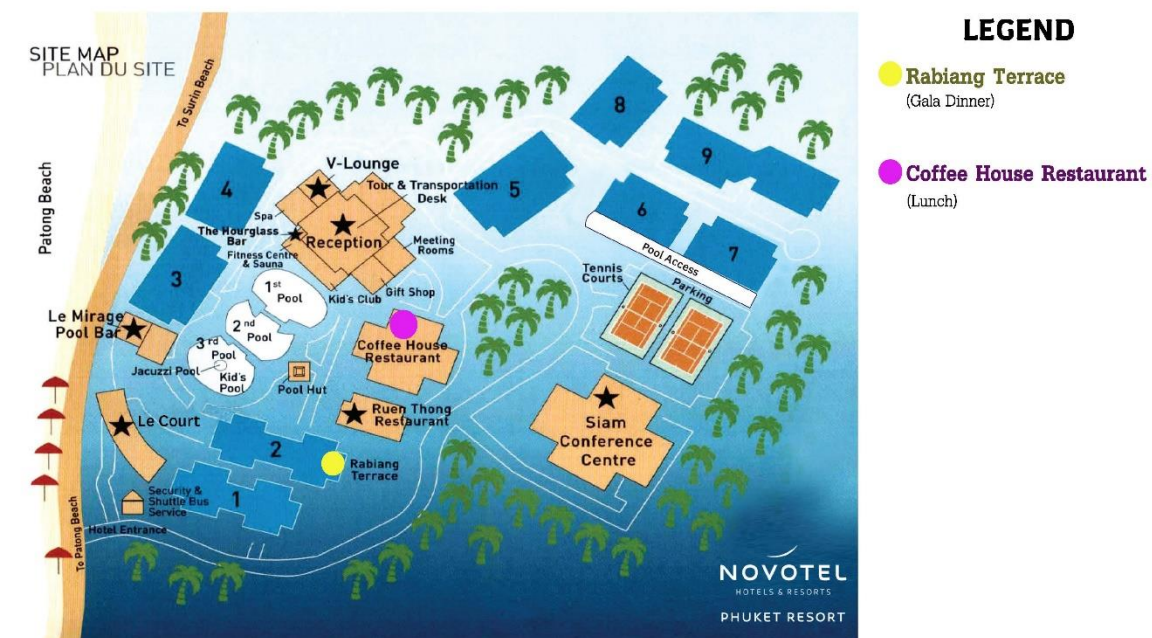
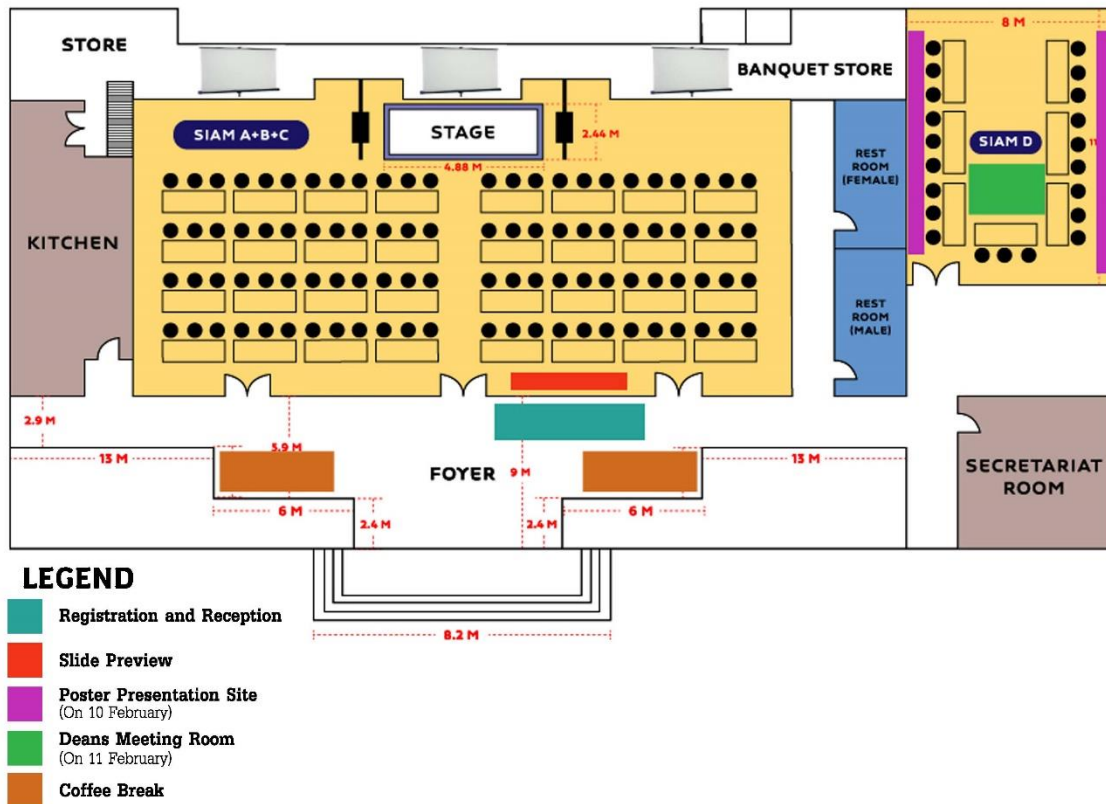
Dean

*Faculty of Dentistry, Graduate School of Medical and Dental Sciences
Niigata University, JAPAN*

FLOOR PLAN & SCHEDULE OF EVENTS

FLOOR PLAN

SIAM CONFERENCE CENTER



SCHEDULE OF EVENTS

Sunday February 10th

| | | |
|-------------|--|-----------------------------------|
| 07.30- | Registration | @Foyer, in front of Siam A-C |
| 08.00-08.30 | Poster mounting | @Siam D, Siam Conference Center |
| 08.30-09.00 | Opening Ceremony | @Siam A-C, Siam Conference Center |
| 09.00-10.00 | Keynote Lecture | |
| 10.00-10.15 | Coffee Break | @Foyer |
| 10.15-11.45 | Symposium I Advanced Research in Oral Science | @Siam A-C, Siam Conference Center |
| 11.45-13.00 | Lunch Break | @Coffee House Restaurant |
| 12.15-13.15 | Poster Presentation | @Siam D, Siam Conference Center |
| 13.15-14.45 | Symposium II How Do We Understand and Treat Chewing and Swallowing Problems in the Elderly? | @Siam A-C, Siam Conference Center |
| 14.45-15.00 | Coffee Break | @Foyer |
| 15.00-16.00 | Oral Presentation I-1 | @Siam A-C, Siam Conference Center |
| 16.00-16.50 | Oral Presentation I-2 | |
| 16.50-17.40 | Oral Presentation I-3 | |
| 18.30-20.30 | Gala Dinner | @Rabiang Terrace |

Monday February 11th

| | | |
|-------------|---|-----------------------------------|
| 07.30- | Registration | @Foyer, in front of Siam A-C |
| 08.30-10.00 | Special Lecture | @Siam A-C, Siam Conference Center |
| 10.00-10.15 | Coffee Break | @Foyer |
| 10.15-11.45 | Symposium III Action for Oral Health in Global Initiatives | @Siam A-C, Siam Conference Center |
| 11.45-13.15 | Lunch Break | @Coffee House Restaurant |

| | | |
|-------------|---|-----------------------------------|
| 12.00-13.00 | Deans Meeting | @Siam D, Siam Conference Center |
| 13.15-14.45 | Symposium IV Dentistry in the 5G Era | @Siam A-C, Siam Conference Center |
| 14.45-15.00 | Coffee Break | @Foyer |
| 15.00-16.10 | Oral Presentation II-1 | @Siam A-C, Siam Conference Center |
| 16.10-17.00 | Oral Presentation II -2 | |
| 17.00-17.15 | Closing Ceremony | |

Tuesday February 12th (Optional Tour)

| | | |
|---------------|--|------------------------------|
| 07.30 – 07.50 | Registration | @Foyer, in front of Siam A-C |
| 07.50 – 08.00 | Departure from Novotel Phuket Resort | |
| 08:30 – 12.00 | The Community Tour at Coral Island, Phuket, Thailand | |
| 12:00 – 13.00 | Lunch Break | |
| 13:00 – 14.00 | Return to the Novotel Phuket Resort | |

SCIENTIFIC PROGRAM

Sunday February 10th

- 07.30- Registration @Foyer, in front of Siam A-C**
- 08.00-08.30 Poster mounting @Siam D, Siam Conference Center**
- 08.30-09.00 Opening Ceremony @Siam A-C, Siam Conference Center**
- 09.00-10.00 Keynote Lecture @Siam A-C, Siam Conference Center**
 Current Research Topics on Tissue Engineering of Oral Mucosa and Our Future Directions
Prof Kenji IZUMI
Niigata University, Japan
Chair:
Prof Waranun BUAJEEB, Dean, Mahidol University, Thailand
- 10.00-10.15 Coffee Break @Foyer**
- 10.15-11.45 Symposium I @Siam A-C, Siam Conference Center**
Advanced Research in Oral Science
Chairs:
Prof Atsushi OHAZAMA, Niigata University, Japan
Prof Miho TERUNUMA, Niigata University, Japan
- 10.15-10.40 S1-1: Lifestyle and Dementia: Why Lifestyle Change Can Reduce the Risk of Dementia
Prof Miho TERUNUMA
Niigata University, Japan
- 10.40-10.50 S1-2: Metformin, an Anti-Diabetic Agent Inhibits Oral Cancer Cell Proliferation and Migration
Dr Genki ITO
Niigata University, Japan
- 10.50-11.10 S1-3: Hedgehog Signaling Via Gli3 Is Essential for Peripheral Nerve Regeneration
Asst Prof Yurie YAMADA
Niigata University, Japan
- 11.10-11.20 S1-4: The Role of NF-κB in Tooth Development
Dr Akane YAMADA
Niigata University, Japan
- 11.20-11.45 S1-5: New Findings in Organogenesis
Prof Atsushi OHAZAMA
Niigata University, Japan
- 11.45-13.00 Lunch Break @Coffee House Restaurant**
- 12.15-13.15 Poster Presentation @Siam D, Siam Conference Center**
Chair:
Asst Prof Paiboon JITPRASERTWONG, Suranaree University of Technology, Thailand
P1 Shear Bond Strength Differences Between Dry, Wet, and Rewetting

Dentin Bonding Technique Using Chitosan 2% Solution

Angela EVELYNA, Rudy DJUANDA, Sanchia Jovita BUDIONO
Maranatha Christian University, Indonesia*

P2 Assessment of Temporomandibular Disorders Treatment with Celebrex Drugs Coordinated with the Mandibular Exercises

Dinh Dieu HONG, Dang Trieu HUNG
Hanoi Medical University, Vietnam*

P3 Dental Caries Risk Factors in 12-Year-Old Pupils: One Year Cohort Study

Bich Van TRAN Thi, Hung Tu HOANG
University of Medicine and Pharmacy, Vietnam*

P4 Abnormal Mineralization in Bone and Aorta Induced by the Disrupted Function of FGF23/klotho

Tomoka HASEGAWA, Yukina MIYAMOTO, Zixuan QIU, Tomomaya YAMAMOTO, Norio AMIZUKA
Hokkaido University, Japan*

P5 Histological Assessment of Bone Formation Induced by the New Bone Prosthetic Material Contained Phosphorylated-Pullulan

Tomoka HASEGAWA, Hiromi HONGO, Zixuan QIU, Yukina MIYAMOTO, Norio AMIZUKA
Hokkaido University, Japan*

P6 Multiple and Unspecific Oral Lesions Becoming a Medical Dilemma and Complicating Management in Patient with Acute Lymphoblastic Leukemia

Masita MANDASARI, Nurfianti, Endah Ayu Tri WULANDARI, Gus Permana SUBITA
University of Indonesia, Indonesia*

P7 Influence of Polishing System on Color Changes for Microhybride Resin Composites after Immersion in a Turmeric Solution

Ellyza HERDA, Siska Yurvina ANGGITA, Bambang IRAWAN
University of Indonesia, Indonesia*

P8 Teaching and Learning About Dysphagia During a Short-Course Training in Gerodontology at Thammasat University

Matana KETTRATAD
Thammasat University, Thailand*

P9 The Influence of Culture on Older Adults' Perceived Needs for Dental Prosthesis: A Systematic Literature Search and Narrative Review

Natthapol THINSATHID, Matana KETTRATAD
Thammasat University, Thailand*

P10 FTIR Investigation of Chitosan-Based Mucoadhesive Films Containing Mangosteen Pericarp and Guava Leaf Extracts

Piyawat TANGSUKSAN, Wipawee NITTAYANANTA
Thammasat University, Thailand*

P11 Effects of Erythrosine With/without Nano-TiO₂ Mediated Photodynamic Therapy on HGF-1 and HOK Cells

Jirayu ANANTAWAN, Teerasak DAMRONGRUNGRUANG, Aroon TEERAKAPONG
Khon Kaen University, Thailand*

- 13.15-14.45 Symposium II @Siam A-C, Siam Conference Center**
How Do We Understand and Treat Chewing and Swallowing Problems in the Elderly?
Chairs:
Prof Makoto INOUE, Niigata University, Japan
Prof Takahiro ONO, Niigata University, Japan
- 13.15-13.27 S2-1: Overview of Dysphagia- What Can We Do for Elderly Dysphagic Patients?
Prof Makoto INOUE
Niigata University, Japan
- 13.27-13.39 S2-2: Long-Lasting TRPV1 Activation Causes Impairment of Swallowing Initiation in Anesthetized Rats
Dr Midori YOSHIHARA
Niigata University, Japan
- 13.39-13.51 S2-3: Ingestive Function and Food Items of Elderly at Nursing Homes
Dr Sirima KULVANICH
Niigata University, Japan
- 13.51-14.03 S2-4: The Effect of Oropharyngeal Sensory Stimulation on Swallowing Motor System
Dr Jin MAGARA
Niigata University, Japan
- 14.03-14.15 S2-5: Relationship Between Oral Environment and Frailty Among Older Adults Dwelling in a Rural Japanese Community
Dr Yoko HASEGAWA
Niigata University, Japan
- 14.15-14.27 S2-6: Prosthodontic Approach for Dysphagic Elderly Patients
Prof Takahiro ONO
Niigata University, Japan
- 14.27-14.45 Discussion
- 14.45-15.00 Coffee Break @Foyer**
- 15.00-16.00 Oral Presentation I-1 @Siam A-C, Siam Conference Center**
Chairs:
Dr Naoki TAKAHASHI, Niigata University, Japan
Asst Prof Poramaporn KLANRIT, Khon Kaen University, Thailand
- 15.00-15.10 **O1:** Development of a Micropatterned Fish Scale Collagen Scaffold to Manufacture a Tissue-Engineered Oral Mucosa
Ayako SUZUKI, Hiroko KATO, Takahiro KAWAKAMI, Yoshihiro KODAMA, Mayuko SHIOZAWA, Emi HOSHIKAWA, Kenta HAGA, Aki SHIOMI, Atsushi UENOYAMA, Issei SAITOH, Haruaki HAYASAKI, Hiroyuki KUWAE, Keito MIWA, Jun MIZUNO, Kenji IZUMI*
Niigata University, Japan
- 15.10-15.20 **O2:** Quantitative Measurement of Cell Colony Mobility Using Image Analysis Methods for Quality Control of Oral Keratinocytes
Emi HOSHIKAWA, Yoshitaka KIMORI, Taisuke SATO, Hiroko KATO, Ayako SUZUKI, Kenta HAGA, Daisuke NANBA, Kenji IZUMI*
Niigata University, Japan

- 15.20-15.30 **O3:** Induction of Cyclin-Dependent Kinase Inhibitor p27kip-1 and Suppression of Complex Cyclin E-CDK-2 as a Target Therapy of Papua's Myrmecodia Pendans in Human Oral Tongue Cancer Cell
*Supriatno**
Gadjah Mada University, Indonesia
- 15.30-15.40 **O4:** The Novel Bone Regeneration Strategy Using Secretomes from Mesenchymal Stem Cells
Ryoko TAKEUCHI, Wataru KATAGIRI, Tadaharu KOBAYASHI*
Niigata University, Japan
- 15.40-15.50 **O5:** Effect of Local Hyaluronic Acid Administration to Trigeminal Nerve Lesion on Nociceptive Behavior in Rats
Yuzo IMAI, Yoshikawa HIROYUKI, Yuhei KOYAMA, Kenji SEO*
Niigata University, Japan
- 15.50-16.00 **O6:** Silver Nitrate Effects on Oral Mucosa: To Burn or Not to Burn
Felicia PARAMITA, Anandina IRMAGITA, Endah Ayu Tri WULANDARI*
University of Indonesia
- 16.00-16.50 Oral Presentation I-2 @Siam A-C, Siam Conference Center**
Chairs:
Assoc Prof Issei SAITOH, Niigata University, Japan
Dr Supawich MORKMUED, Khon Kaen University, Thailand
- 16.00-16.10 **O7:** Three-Dimensional Motion Analysis of Spoon Feeding - Effect of Food Properties and Mouthful Amounts
Tsutomu NAKAJIMA, Yuki NAKAMURA, Yuki SASAKAWA, Saeko TSUKUNO, Haruaki HAYASAKI*
Niigata University, Japan
- 16.10-16.20 **O8:** Naïve-Like Conversion from Human Deciduous Teeth Dental Pulp Cells-Derived iPS Cells and the Differentiation
Issei SAITOH, Emi INADA, Masahiro SATO*
Niigata University, Japan
- 16.20-16.30 **O9:** Streptococcus Pyogenes CAMP Factor Promotes Bacterial Adhesion and Invasion in Pharyngeal Epithelial Cells Without Serum
Mie KUROSAWA, Masataka ODA, Hisanori DOMON, Issei SAITOH, Haruaki HAYASAKI, Yutaka TERAOKA*
Niigata University, Japan
- 16.30-16.40 **O10:** Suitability with Vietnamese Harmonious Faces in Class III Malocclusion Orthognathic Patients – 3D
Nguyen Hoang MINH, Pham Hoang TUAN, Nguyen Hong HA, Le Van SON, Nguyen Thi Thu PHUONG*
Hanoi Medical University, Vietnam
- 16.40-16.50 **O11:** A Study on Dental Student's Self- Assessment Ability in Japan and a Comparison with The United States
Masako NAGASAWA, hiroe OYAMA, Nami AKIBA, Yosuke AKIBA, Yujin AOYAGI, Katsumi UOSHIMA*
Niigata University, Japan
- 16.50-17.40 Oral Presentation I-3 @Siam A-C, Siam Conference Center**

Chairs:

Prof. Akihiro YOSHIHARA, Niigata University, Japan

Dr Rajda CHAICHIT, Khon Kaen University, Thailand

- 16.50-17.00 **O12:** Preventive Effect of Preschool and School-Based Fluoride Mouth Rinsing Program on Dental Caries in Early Adulthood
Daisuke YONEZAWA, Minoru YAGI, Akihiro YOSHIHARA*
Niigata University, Japan
- 17.00-17.10 **O13:** Drinking Habits and Periodontal Tissue Condition in Community-Dwelling Elderly Japanese
Kana SUWAMA, Akihiro YOSHIHARA*
Niigata University, Japan
- 17.10-17.20 **O14:** The Association Between Oral Health Condition, Serum C-Reactive Protein and Depressive Symptoms in Yogyakarta Community-Dwelling Elderly
Lisdrianto HANINDRIYO, Rini WIDYANINGRUM, Elastria WIDITA, Dewi AGUSTINA, Fimma NARITASARI, Iffah MARDIYAH, Bambang PRIYONO*
Gadjah Mada University, Indonesia
- 17.20-17.30 **O15:** The Relationship Between Serum Cholesterol Levels and Salivary Flow Rate in the Community Dwelling Elderly
Nana MIZOGUCHI, Kaname NOHNO, Noboru KANEKO, Akihiro YOSHIHARA, Hiroshi OGAWA*
Niigata University, Japan
- 17.30-17.40 **O16:** The Relationship Between the Number of Remaining Teeth and ADL in 90 Years Old Community-Dwelling Elderly
Raksanan KARAWEKPANYAWONG, Kaname NOHNO, Hiroshi OGAWA*
Niigata University, Japan
- 18.30-20.30 **Gala Dinner @Rabiang Terrace**

Monday February 11th

- 07.30- **Registration @Foyer, in front of Siam A-C**
- 08.30-10.00 **Special Lecture @Siam A-C, Siam Conference Center**
L1: Histological Assessment for Osteocyte Function
Prof Norio AMIZUKA
Hokkaido University, Japan
L2: Genetic and Intervention Studies Implicating Keystone Pathogens and Del-1 as Major Targets for the Treatment of Periodontitis
Assoc Prof Tomoki MAEKAWA
Niigata University, Japan
Chair:
Assoc Prof Oranart MATANGKASOMBUT, Chulalongkorn University, Thailand
- 10.00-10.15 **Coffee Break @Foyer**

- 10.15-11.45 Symposium III @Siam A-C, Siam Conference Center**
Action for Oral Health in Global Initiatives
Chairs:
Assoc Prof Waranuch PITIPHAT, Dean, Khon Kaen University, Thailand
Prof Hiroshi OGAWA, Niigata University, Japan
- 10.15-10.35 S3-1: WHO Integrated Care for Older People (ICOPE): Oral Function in the Care Pathways
Dr. Arunee LAITEERAPONG
Chulalongkorn University, Thailand
- 10.35-10.55 S3-2: Phasing Down of Dental Amalgam Use -Future Challenge-
Prof Hiroshi OGAWA
Niigata University, Japan
- 10.55-11.15 S3-3: A Mobile Teledentistry Model Evaluated in Australia
Prof Boyen HUANG
Charles Sturt University, Australia
- 11.15-11.45 General discussion
- 11.45-13.15 Lunch Break @Coffee House Restaurant**
- 12.00-13.00 Deans Meeting @Siam D, Siam Conference Center**
- 13.15-14.45 Symposium IV @Siam A-C, Siam Conference Center**
Dentistry in the 5G Era
Chairs:
Asst Prof Suchit POOLTHONG, Dean, Chulalongkorn University, Thailand
Prof Maria F. LINDAWATI, Dean, University of Indonesia, Indonesia
- 13.15-13.35 S4-1: Digital Technology in Esthetic Dentistry
Asst Prof Chaimongkon PEAMPRING
Prince of Songkla University, Thailand
- 13.35-13.55 S4-2: Photodynamic Therapy: A New Way to Treat Oral Lichen Planus
Assoc Prof Teerasak DAMRONGRUNGRUANG
Khon Kaen University, Thailand
- 13.55-14.15 S4-3: A Targeted Next-Generation Sequencing Assay for the Molecular Diagnosis of Rare Diseases with Tooth Involvement
Dr Supawich MORKMUED
Khon Kaen University, Thailand
- 14.15-14.45 General discussion
- 14.45-15.00 Coffee Break @Foyer**
- 15.00-16.10 Oral Presentation II- 1 @Siam A-C, Siam Conference Center**
Chairs:
Dr Yoko HASEGAWA, Niigata University, Japan
Asst Prof Ajiravudh SUBARNBHESAJ, Khon Kaen University, Thailand
- 15.00-15.10 O17: Relationship Between the Masticatory and Obesity with Using

- Wearable Device
*Shogo YOSHIMURA**, *Kazuhiro HORI*, *Fumiko UEHARA*, *Yoshio YAMAGA*, *Yoko HASEGAWA*, *Takahiro ONO*
Niigata University, Japan
- 15.10-15.20 **O18:** The Effect of Thickner on Tongue Motion and Pressure Production Against Hard Palate
*Shohei KODAMA**, *Shigehiro FUJIWARA*, *Satoko SHITARA*, *Jumpei OKAWA*, *Kazuhiro HORI*, *Takahiro ONO*
Niigata University, Japan
- 15.20-15.30 **O19:** Histological Evaluation of Peri-Implant Bone Response to Abutment Screw Preload
*Farah A. AL-OMARI**, *Masako NAGASAWA*, *Mubarak SULIMAN*, *Keisuke HAMAYA*, *Ameen KHRAISAT*, *Katsumi UOSHIMA*
Niigata University, Japan
- 15.30-15.40 **O20:** Effects of Sub-Minimum Inhibitory Concentration of Chlorhexidine Gluconate on Development of in Vitro Novel Multispecies Biofilm
*Yuki SUZUKI**, *Tatsuya OHSUMI*, *Ryoko NAGATA*, *Taisuke HASEGAWA*, *Shoji TAKENAKA*, *Yuichiro NOIRI*
Niigata University, Japan
- 15.40-15.50 **O21:** The Rice Peptides Restrained Periodontal Inflammation and Bone Loss
*Hikaru TAMURA**, *Tomoki MAEKAWA*, *Hisanori DOMON*, *Takumi HIYOSHI*, *Daisuke YONEZAWA*, *Kosuke NAGAI*, *Yutaka TERAOKA*, *Takeyasu MAEDA*, *Koichi TABETA*
Niigata University, Japan
- 15.50-16.00 **O22:** Differentiation of Eating Behaviors by the Aspect of Masseter and Supra-Hyoid Muscles
*Fumiko UEHARA**, *Kazuhiro HORI*, *Jumpei OKAWA*, *Shigehiro FUJIWARA*, *Takahiro ONO*
Niigata University, Japan
- 16.00-16.10 **O23:** Exploring the Possibility of Dental Metal Allergy Related to the Pathophysiology Mechanism of Psoriasis
*Yurina TAKAOKA**, *Yosuke AKIBA*, *Nami AKIBA*, *Masako NAGASAWA*, *Kaori EGUCHI*, *Haruka TAKEUCHI*, *Katsumi UOSHIMA*
Niigata University, Japan
- 16.10-17.00 **Oral Presentation II-2 @Siam A-C, Siam Conference Center**
Chairs:
Assoc Prof Tomoki MAEKAWA, Niigata University, Japan
Dr. Chantida PAWAPUTANON NA MAHASARAKHAM, Khon Kaen University, Thailand
- 16.10-16.20 **O24:** Interaction Between Neural and Non-Neuronal Cells in the Pathogenesis of Periodontitis
*Naoki TAKAHASHI**, *Yumi Matsuda-MATSUKAWA*, *Keisuke SATO*, *Takeyasu MAEDA*, *Kazuhisa YAMAZAKI*, *Koichi TABETA*
Niigata University, Japan
- 16.20-16.30 **O25:** The Anti-Oxidative Function of a Bioactive Microbial Metabolite

- in Gingival Epithelial Cells
Mai Yokoji-TAKEUCHI, Naoki TAKAHASHI, Yumi Matsuda-MATSUKAWA, Miki Yamada-HARA, Benso SULIJAYA, Koichi TABETA, Kazuhisa YAMAZAKI*
Niigata University, Japan
- 16.30-16.40 **O26:** Bioactive Metabolite Prevents Alveolar Bone Loss in Periodontitis Model Through Its Antimicrobial Effect
Benso SULIJAYA, Miki Yamada-HARA, Mai Yokoji-TAKEUCHI, Kyoko YAMAZAKI, Aoi MATSUGISHI, Takahiro TSUZUNO, Naoki TAKAHASHI, Koichi TABETA, Kazuhisa YAMAZAKI*
Niigata University, Japan
- 16.40-16.50 **O27:** A Bioactive Metabolite Prevents P. gingivalis-Induced Gingival Epithelial Barrier Disruption
Miki Yamada-HARA, Naoki TAKAHASHI, Yumi Matsuda-MATSUKAWA, Keisuke SATO, Mai Yokoji-TAKEUCHI, Benso SULIJAYA, Koichi TABETA, Kazuhisa YAMAZAKI*
Niigata University, Japan
- 16.50-17.00 **O28:** In Vivo Analysis of Cell Cycle Dynamics During the Course of Periodontal Ligament Development
Takako IDA, Masaru KAKU, Masaru MIZUKOSHI, Kohei KITAMI, Isao SAITO, Katsumi UOSHIMA*
Niigata University, Japan
- 17.00-17.15 **Closing Ceremony @Siam A-C, Siam Conference Center**

Tuesday February 12th

Optional community tour for oral health planning and implementation

- 07.30-07.50 **Registration @Foyer, in front of Siam A-C**
- 07.50-08.00 **Departure from Novotel Phuket Resort**
- 08.30-08.50 **Take a speed boat at Chalong pier to the Coral Island**
 Relax and enjoy the sceneries on the speed boats
- 08.50-11.50 **Arrive at Coral Island**
 Enjoy sightseeing around the island (snorkel & mask included) and playing seaports activities (on your own expenses)
- 12.00-13.00 **Buffet Lunch (included in pax)**
- 13.00-14.00 **Returning to Novotel Phuket Resort**
 On the way back to the hotel, we will stop by a souvenir shop.

Price: 1,500 – 2,000 baht per person (depending on the total number of participants)

ABSTRACTS

Keynote Lecture

Current Research Topics on Tissue Engineering of Oral Mucosa and Our Future Directions

Professor Kenji IZUMI

Division of Biomimetics Department of Oral Health Science

Graduate School of Medical and Dental Sciences

Niigata University, JAPAN

KEYNOTE LECTURE

Current Research Topics on Tissue Engineering of Oral Mucosa and Our Future Directions



Kenji IZUMI

Division of Biomimetics, Niigata University, Japan
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Advances in tissue engineering have allowed the three-dimensional (3D) reconstruction of human oral mucosa for a variety of in vivo and in vitro applications. Recent technology of tissue engineering/regenerative medicine permits maxillofacial surgeons to utilize a tissue-engineered oral mucosa substitute for therapeutic purposes such as a suitable graft material for intraoral and extraoral repair and treatment of soft-tissue defects. On the other hand, 3D in vitro models of oral mucosa and oral diseases have been developed as alternatives to animal models for investigation of physiological and pathological phenomena, including evaluation of drug delivery systems. Thus, the introduction of 3D oral mucosa constructs, in the form of epithelial cell sheets or full-thickness oral mucosa equivalents, has had a significant impact on oral sciences.

Our research team successfully developed a tissue-engineered oral mucosa, referred to as an ex vivo produced oral mucosa equivalent (EVPOME). EVPOME, composed of autologous oral keratinocytes and a human cadaver dermis, AlloDerm®[®], has brought into clinical arena to reconstruct oral mucosa defects after tumor resection, congenital diseases and pre-prosthetic surgeries. We previously demonstrated that EVPOME grafting contributed a favorable intraoral wound healing. Furthermore, our platform technique of EVPOME manufacturing can be also used to fabricate a 3D oral mucosa in vitro model. A tissue-engineered oral mucosa (TEOM) mainly comprises normal oral keratinocytes cultured on top of a normal oral fibroblasts-containing matrix such as type I collagen gel. In the laboratory, it further serves as an alternative model to in vivo testing of oral care

products, and provides insight into the behavior of the oral mucosal cells in healthy and pathological tissues. Currently, Kenji Lab's translational research focus mainly involves topics on enhancement of EVPOME quality.

In the first part of this presentation, I'll demonstrate the roadmap of clinical application of EVPOME graft, bench to bedside, as well as the research application of the 3D oral mucosa in vitro model. In the second part, I'd like to introduce ongoing studies on which two PhD students in Kenji's Lab have been working. Because oral presentations of their research details will be scheduled this afternoon, I will talk about the general information here. One topic is development of biomimetic scaffold for EVPOME, and the other is non-invasive and quantitative measurement to evaluate cultured oral keratinocytes. I'd like to show an in vitro oral cancer model as well.

Keywords: Tissue Engineering, Regenerative Medicine, Oral Mucosa, Translational Research, Biomimetics

SPECIAL LECTURES

L1: Histological Assessment for Osteocyte Function

Prof Norio AMIZUKA

Hokkaido University, Japan

L2: Genetic and Intervention Studies Implicating Keystone Pathogens and Del-1 as Major Targets for the Treatment of Periodontitis

Assoc Prof Tomoki MAEKAWA

Niigata University, Japan

SPECIAL LECTURE

L1 Histological Assessment for Osteocyte Function



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Osteocytes, the most abundant cell type in bone, connect among themselves and to bone-covering osteoblasts by means of thin cytoplasmic processes that pass through the narrow channels traversing the mineralized bone matrix, *i.e.*, osteocytic canaliculi. Therefore, osteocytes can build up functional syncytia, *that is*, the osteocytic lacunar-canalicular system (OLCS). It has been suggested that the OLCS would serve as a passageway for bone minerals and other signaling substances related to mechanosensing and bone remodeling regulation. OLCS appears not only to secure nutrition to distant osteocytes, but to aid in the transport of small molecules and minerals from the extracellular fluid - as evidenced by tracer experiments. Interestingly, the spatial distribution of osteocytes and their cytoplasmic processes in woven, immature bone and in compact, mature bone differs significantly. In fact, OLCS' function may depend on its anatomical arrangement and outreach, since the network of connected osteocytic cytoplasmic processes represents the functional area of the OLCS. Thus, regularly distributed cytoplasmic processes of osteocytes suggest the existence of a fully functional OLCS - one capable of molecular transport, mechanosensing, repairing of load-related microdamage, and targeted bone remodeling. OLCS regularity might reflect - or be a reflection of - bone matrix maturity: biomechanical simulation analyses showed that not only bone-lining osteoblasts, but also a regularly-arranged OLCS are necessary for normal bone remodeling and adaptation to mechanical stresses. The relation between OLCS regularity and bone maturity is best pictured as one looks into the histology of long bones' metaphyses and diaphyses. In this lecture, we will introduce our recent findings on the biological function of osteocytes in bone.

Keywords: Bone, Osteocyte, OLCS

SPECIAL LECTURE

L2 Genetic and Intervention Studies Implicating Keystone Pathogens and Del-1 as Major Targets for the Treatment of Periodontitis



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Periodontitis is a prevalent chronic driven by exaggerated ‘Inflammation’ induced by ‘Dysbiotic microbial communities’. The regulation of both is a key to the treatment of periodontitis. The keystone-pathogen hypothesis holds that certain low-abundance pathogens can subvert host immunity in ways that favor the remodeling of a normally symbiotic microbiota into a dysbiotic and disease-provoking. For instance, *Porphyromonas gingivalis* (Pg) fails to cause periodontitis in germ-free mice despite colonizing this host; however, in conventional mice, Pg transforms the periodontal microbiota into a dysbiotic community and co-opts it to instigate destructive inflammation. Study showed that, at very low colonization levels, Pg induces periodontitis accompanied by significant alterations in the number and community organization of the oral commensal bacteria. Interestingly C3 deficient mice are protected from Pg-induced dysbiosis and periodontitis. In this regard, we have shown that C3-dependent inflammation in mice is crucial for the long-term sustenance of the dysbiotic microbiota and for induction of alveolar bone loss. Consistent with these findings, local C3 inhibition in a model of ligature induced periodontitis in young non-human primates (NHPs) prevents the development of gingival inflammation and alveolar bone loss. The proper function of homeostatic mechanisms is essential for protection against unwarranted inflammatory tissue damage. In this regard, Del1 acts homeostatically to suppress inflammation in various organs and tissues. We identified a novel regulatory mechanism of Del1 in osteoclast biology. Specifically, we showed Del-1 is expressed by human and mouse osteoclasts and regulates their differentiation and resorptive function. Mechanistically, Del1 inhibited the expression of NFATc1 in a Mac1 integrin-dependent manner. In vivo mechanistic analysis has dissociated the anti-inflammatory from the anti-bone-resorptive action of Del1 and

identified structural components thereof mediating these distinct functions. Locally administered human Dcl1 blocked inflammatory bone loss in NHPs.

Keywords: Keystone Pathogen, Inflammation, Non-Human Primates, Periodontitis

Symposium I

Advanced Research in Oral Science

S1-1: Lifestyle and Dementia: Why Lifestyle Change Can Reduce the Risk of Dementia

Prof Miho TERUNUMA

Niigata University, Japan

S1-2: Metformin, an Anti-Diabetic Agent Inhibits Oral Cancer Cell Proliferation and Migration

Dr Genki ITO

Niigata University, Japan

S1-3: Hedgehog Signaling Via Gli3 Is Essential for Peripheral Nerve Regeneration

Asst Prof Yurie YAMADA

Niigata University, Japan

S1-4: The Role of NF- κ B in Tooth Development

Dr Akane YAMADA

Niigata University, Japan

S1-5: New Findings in Organogenesis

Prof Atsushi OHAZAMA

Niigata University, Japan

S1-1 Lifestyle and Dementia: Why Lifestyle Change Can Reduce the Risk of Dementia

Miho TERUNUMA

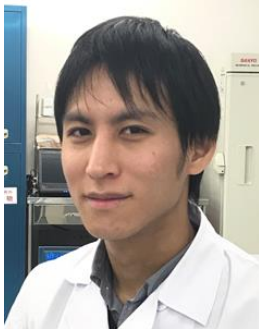
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Dementia is a disease associated with a decline in memory or other thinking skills, which is severe enough to reduce a person's ability to perform everyday activities. Recent evidences are emerging that dementia could be prevented by a healthy lifestyle.

In my talk, I would like to introduce how excessive alcohol drinking and unhealthy diet are associated with Alzheimer's disease.

Keywords: Brain, Dementia, Neuron, Astrocytes

S1-2 Metformin, an Anti-Diabetic Agent Inhibits Oral Cancer Cell Proliferation and Migration



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Metformin is the most used therapeutic drug for type 2 diabetes worldwide. Recent studies indicate its anti-tumor effect in many cancers including pancreas, liver, lung, colon, and breast cancer *via* its ability on activating AMP-activated protein kinase (AMPK), the most abundant protein kinase known as a sensor of cellular energy status. Here, we examined the anti-cancer effects of metformin in human gingival squamous cell carcinoma cell line, Ca9-22 cells, which were generated from Japanese male patient.

From time-lapse microscopic imaging, we identified that metformin effectively inhibited the proliferation and migration of Ca9-22 cells. In addition, the cellular morphology was significantly altered, which may link to reduced metastases. Biochemical analysis indicated that prolonged metformin treatment inhibits AMPK signaling pathways along with AMPK-mediated regulation of lipid metabolism. These results suggest that metformin may act as an anti-cancer agent in oral squamous cell carcinoma.

Keywords: Oral Cancer, Metformin, AMPK

S1-3 Hedgehog Signaling Via Gli3 is Essential for Peripheral Nerve Regeneration



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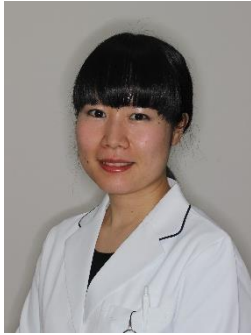
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The peripheral nervous system is known to exhibit high regenerative capacities after injury, whereas the central nervous system shows limited regenerative capacities. Therefore, elucidating the molecular mechanisms in peripheral nerve regeneration is essential to understand differences of regenerative abilities between the peripheral and central nervous system. We previously found that the Hedgehog (Hh) signaling pathway is activated in injured peripheral nerves. However, the role of Hh signaling in the peripheral nerve regeneration remains unclear. I will present recent data about Hh signaling in the sciatic nerve regeneration.

Keywords: Regeneration, Peripheral Nerve, Hedgehog Signaling

S1-4 The Role of NF- κ B in Tooth Development



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The NF- κ B signalling is known to play a critical role in the development of ectodermal organs and down-regulation of NF- κ B activity leads to hypohydrotic (anhidrotic) ectodermal dysplasia which is characterized by partial or complete absence of exocrine sweat glands, abnormally sparse hair, and an absence and/or malformation of teeth. However, the role of NF- κ B signalling in tooth formation is not fully understood. I will introduce recent findings of NF- κ B signaling in tooth development.

Keywords: NF- κ B

S1-5 New Findings in Organogenesis



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An unprecedented number of people around the world are growing older and living longer. Therefore it is a global issue to improve the health, function, and quality of life of older adults. Senescence or biological aging is known to be the gradual deterioration of functional characteristics. It is also believed that cellular senescence is a tumor suppressor response to act as a barrier to cancer development and progression. However, the molecular mechanisms of senescence remain unclear.

Senescent cells are characterized by shortened telomeres, increased activity of senescence-associated β -galactosidase (SA- β -gal), increased expression of p16INK4 and p21WAF1/Cip1, and histological changes. Surprisingly, it has been shown that these phenomena are observed in embryos to control organ development.

In this session, recent findings of senescence in organogenesis will be introduced.

Keywords: Organogenesis, Senescence

Symposium II

How Do We Understand and Treat Chewing and Swallowing Problems in the Elderly?

S2-1: Overview of Dysphagia- What Can We Do for Elderly Dysphagic Patients?

Prof Makoto INOUE

Niigata University, Japan

S2-2: Long-Lasting TRPV1 Activation Causes Impairment of Swallowing Initiation in Anesthetized Rats

Dr Midori YOSHIHARA

Niigata University, Japan

S2-3: Ingestive Function and Food Items of Elderly at Nursing Homes

Dr Sirima KULVANICH

Niigata University, Japan

S2-4: The Effect of Oropharyngeal Sensory Stimulation on Swallowing Motor System

Dr Jin MAGARA

Niigata University, Japan

S2-5: Relationship Between Oral Environment and Frailty Among Older Adults Dwelling in a Rural Japanese Community

Dr Yoko HASEGAWA

Niigata University, Japan

S2-6: Prosthodontic Approach for Dysphagic Elderly Patients

Prof Takahiro ONO

Niigata University, Japan

S2-1 Overview of Dysphagia -What Can We Do for Elderly Dysphagic Patients?



Makoto INOUE*,
Takanori TSUJIMURA, Jin MAGARA

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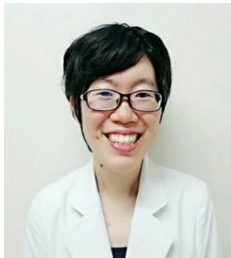
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In Japan, the pathophysiology of pneumonia in elderly people is primarily due to aspiration pneumonia which results in the highest mortality among cases of community-acquired pneumonia. Patients suffering from aspiration pneumonia often have a symptom of difficulty in swallowing, termed as dysphagia. Dysphagia occurs due to stroke, neurological diseases as well as post operation of head and neck cancer. In addition, some types of dementia or disuse syndrome may also cause dysphagia. I will briefly show a course of treatment for dysphagia and how oral function is important to improve the swallowing disorders.

At first, videoendoscopic and videofluoroscopic examinations as well as screening test are performed to view the mouth and throat while examining how the function is impaired. In the treatment or rehabilitation of dysphagia, changes may be in food texture, size, head and neck posture, or behavioral maneuvers. Treatment may involve muscle exercises to strengthen weak related muscles or to improve coordination. For others, treatment may involve learning to eat in a special way such as so-called head rotation. Preparing food in a certain way may help in some situations. For example, people who cannot swallow thin liquids may need to add special thickeners to their drinks. It should be noted that oral health care and dental treatment to improve chewing are included in the clinical management. Improving the oral environment is expected not only to prevent aspiration pneumonia but also to contribute to the maintenance or recovery of feeding functions.

Keywords: Dysphagia, Swallow, Chew, Food

S2-2 Long-lasting TRPV1 Activation Causes Impairment of Swallowing Initiation in Anesthetized Rats



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Patients suffering from chronic gastroesophageal reflux disease (GERD) have difficulty in swallowing. Those symptoms may occur following contentious stimulation with gastric acid including hydrochloric acid (HCl) which activates TRPV1.

The aim of this study was to investigate effect of long-lasting laryngeal TRPV1 activation on swallowing initiation.

Experiments were carried out on urethane-anesthetized Sprague-Dawley male rats. To investigate the involvement of TRPV1 on swallowing initiation, the number of swallows evoked by HCl (0.1 N, 3 µl), capsaicin (10⁻⁵ M, 3 µl) or airflow stimulation to the larynx was counted with or without pretreatment of TRPV1 blocker, SB366791 (10⁻² M, 3 µl) or DMSO (vehicle) application. Next, after 60-min either chemical stimulation as long-lasting stimulation, the number of airflow-evoked swallows was counted. Finally, the effect of capsaicin stimulation was investigated on the threshold of the superior laryngeal nerve (SLN)-evoked swallow. Minimum amplitude of electrical SLN stimulation (6-140 µA, 10 sec, 30 Hz, 0.2 msec pulse duration) to evoke at least one swallow over 10 sec was defined as the swallowing threshold. Changes in the swallowing threshold value was evaluated during 60-min long-lasting capsaicin stimulation.

TRPV1 blocker drastically reduced the number of swallows evoked by capsaicin and HCl stimulation, but did not affect that evoked by airflow stimulation. The number of swallows during long-lasting HCl or capsaicin stimulation decreased in a time-dependent manner. The number of airflow-evoked swallows was significantly lower following long-lasting chemical stimulation compared with that following vehicle stimulation. The swallowing threshold of SLN stimulation was not significantly changed during 60-min capsaicin stimulation.

The modulation of excitability in peripheral nervous system may be involved in swallowing reduction by long-lasting laryngeal TRPV1 activation. We speculate that long-lasting TRPV1 activation may cause the swallowing impairment in GERD patients.

Keywords: TRPV1, Swallow, Superior Laryngeal Nerve

S2-3 Ingestive Function and Food Items of Elderly at Nursing Homes



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In Japan, one of the most common causes of death in elderly people is aspiration pneumonia. Maintenance of ingestive functions are important elements, especially in elderly not only to prevent aspiration pneumonia but also to maintain/improve quality of life (QOL). In this study, we examined the relationships between ingestive functions including oral and chewing function and food items.

Thirty-seven elderly participants ($n = 37$) at nursing homes were recruited. Including criteria was resident who takes food orally. Each participant's oral, chewing, swallowing and cognitive function were assessed. In addition, status of food items such as staple food (rice) and side dish were recorded. We investigated which factors of participants were important to determine the status of food.

Of 37 participants, more than half passed a screening test of swallowing, i.e., most participants were able to test with liquid ($n = 24$) and with jelly food ($n = 35$). Surprisingly, half participants ($n = 18$) were able to chew and swallow rice cracker without any confusion or coughing events regardless of their dental conditions. On the other hand, only 10 participants passed the cognition test, suggesting that the remaining ($n = 17$) were suggested not to realize what they ate. Food item of 10 participants were roughly chopped foods, those of 16 were finely chopped foods and those of 9 were mashed foods. Regarding the staple food, those of 26 participants was rice porridge (KAYU) and those of 11 was jelly rice. Although twenty-four participants needed denture, 21 participants did not use their dentures or they did not have dentures.

It can be suggested that food item provided to elderly at nursing home was determined by whether he/she used denture or not regardless of potentials of chewing function. We will further analyze the relationship between food items and function to clarify which factor is critical for elderly at nursing home to determine the food items.

Keywords: Elderly, Nursing Home, Food Item, Swallowing

S2-4 The Effect of Oropharyngeal Sensory Stimulation on Swallowing Motor System



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Neuroplasticity is capacity of neurons and neural networks in the brain to change their connections and behavior in response to new information, sensory stimulation, development, damage, or dysfunction. This concept can be therapeutically applied to the central nervous system damage in order to promote swallowing functional recovery in dysphagic patients. This functional reorganization of the human pharyngeal motor cortex is induced by sensory stimulation in oropharyngeal area.

One of the useful and noninvasive methods to measure neuromuscular activity is transcranial magnetic stimulation (TMS). The application of TMS over the sensorimotor cortex produces small electric currents in the region of the brain and induces the motor evoked potentials (MEP). The increase changes in amplitude of MEP are considered as the excitability alterations in brain.

These TMS measures in pharyngeal cortical area were performed before and after various sensory interventions; electrical stimulation, thermal stimulation, and chemical (weak carbonated acid) stimulation in oropharyngeal area. The results of the present studies can potential therapeutic methods for dysphagic patients and contribute to establish the high quality evidence of these therapies.

Keywords: Dysphagia, Sensory Stimulation, Transcranial Magnetic Stimulation

S2-5 Relationship Between Oral Environment and Frailty Among Older Adults Dwelling in a Rural Japanese Community



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Oral functions are known to decline with aging. However, there is limited evidence that supports the relationship between oral health and frailty. This survey aimed to clarify the relationship between oral hygiene conditions, measured by remaining teeth and mucosa, and frailty among elderly people dwelling in a Japanese rural community.

This study surveyed self-reliant elderly individuals aged ≥ 65 years who were dwelling in the Sasayama-Tamba area of Hyogo, Japan. Frailty was evaluated according to the total score of the Kihon Checklist (KCL). Based on the KCL score, elderly participants were divided into three groups: robust, pre-frail, and frail. The items measured to evaluate oral environment included the number of remaining teeth, denture usage condition, oral hygiene status, dry mouth condition, and salivary bacterial count. For statistical analysis, Fisher's exact test, one-way analysis of variance, and multiple comparison technique were used.

Of 308 elderly participants, 203 (65.9%), 85 (27.6%), and 20 (6.5%) belonged to the robust, pre-frail, and frail groups, respectively. The proportion of participants who were judged to have poor hygiene was significantly higher in the frail group than in the other two groups. The bacterial count was significantly smaller in the frail group than in the robust group, and the frail group had fewer number of remaining teeth than the other two groups, suggesting that the number of remaining teeth may be associated with bacterial count.

Oral hygiene status and the condition of the remaining teeth might be affected by the physical frailty of elderly adults.

Keywords: Frailty, Oral Health, Salivary Bacteria, Elderly

S2-6 Prosthodontic Approach for Dysphagic Elderly Patients



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With the rapid increase of elderly population, the aim of prosthodontic treatment will be broadened from recovering dentition to improving total oral functions. In dysphagia rehabilitation, prosthesis is considered to be intra-oral devices for supporting physiological process from food intake to bolus swallowing. For successful prosthodontic intervention to dysphagic patients, dentists should choose the proper prosthesis for rehabilitation according to the diagnosis of functional disturbances. Reconstructing oral cavity and occlusal support by complete dentures can improve not only food comminution but also bolus formation and generate proper swallowing pressure. For patients with tongue disability, tongue-palate contact during mastication and swallowing might be facilitated by palatal augmentation prosthesis (PAP). PAP is also expected to improve the articulatory disturbance like as palatal lift prosthesis. In this lecture, basic knowledge for applying those oral appliances to dysphagic patients will be introduced.

Keywords: Dysphagia, Oral Appliance, Complete Denture, Palatal Augmentation Prosthesis, Palatal Lift Prosthesis

Symposium III

Action for Oral Health in Global Initiatives

S3-1: WHO Integrated Care for Older People (ICOPE): Oral Function in the Care Pathways

Dr Arunee LAITEERAPONG

Chulalongkorn University, Thailand

S3-2: Phasing Down of Dental Amalgam Use -Future Challenge

Prof Hiroshi OGAWA

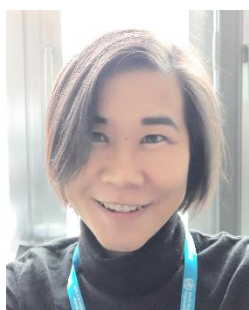
Niigata University, Japan

S3-3: A Mobile Teledentistry Model Evaluated in Australia

Prof Boyen HUANG

Charles Sturt University, Australia

S3-1 WHO Integrated Care for Older People (ICOPE): Oral Function in the Care Pathways



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Universal health coverage is the foundation for achieving the health objective of the Sustainable Development Goals (SDGs). To achieve this SDG, older people's health- and social-care needs must be addressed in an integrated manner and with continuity of care over the long term. The WHO Strategy and action plan on ageing and health (<http://www.who.int/ageing/global-strategy/en/>) outlines the role of health systems in promoting healthy ageing by optimizing intrinsic capacity.

In October 2017, the WHO published Integrated care for older people: Guidelines on community-level interventions to manage declines in intrinsic capacity (<http://apps.who.int/iris/handle/10665/258981>). These guidelines set out 13 evidence-based recommendations for care providers to help develop and carry out person-centered integrated care for older people at the community level. The ICOPE approach embodies the focus on optimizing intrinsic capacities and functional abilities as key to healthy ageing.

The primary intended audience for this handbook is health- and social-care providers working in the community and in primary health-care settings. The guidance should also inform health-care providers whose specialized knowledge will be called on, as needed, to assess and to plan care for people with loss in intrinsic capacities.

Professionals responsible for developing training in medicine, nursing and allied health which include dentistry and public health fields may draw on both the concepts and the practical approaches described here. Transforming of health education to include the concept of healthy ageing should be determined. While researches and innovation to support self-care and self-management should be the priority of the academic institutions.

This presentation will cover

1. the overview of The WHO Strategy and action plan on ageing and health
2. the introduction of Integrated care for older people: Guidelines on community-level interventions to manage declines in intrinsic capacity
3. the discussion on oral function, self-care and self-management in the ICOPE framework

Keywords: Ageing, ICOPE, Oral Function, Self-Care, Self-Management

S3-2 Phasing Down of Dental Amalgam use -Future Challenge-



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The Minamata convention addresses mercury-added products, including dental amalgam, which is made of approximately 50% of elemental mercury by weight, and proposes nine measures to phase down the use of dental amalgam. These measures show the interconnected and interdependent nature of phasing down dental amalgam and reinforce the need for a multipronged approach as called for by WHO.

Quality mercury-free materials are now selected and used as alternatives to dental amalgam, as a part of informed people-centered oral health care. However, it is important to distinguish between offering quality mercury-free materials as alternatives to dental amalgam and suggesting that one of these alternative materials could be a global replacement for dental amalgam. Large-scale systematic studies on the economic and social costs and benefits of quality mercury-free materials would be needed more.

Efforts to phase down the use of amalgam should be directed towards a multipronged approach that combines waste management, knowledge management and health systems strengthening. It is suggested that a national coordination committee would facilitate efforts to phase down the use of dental amalgam. Such a committee could raise public awareness and support country level communication strategies, which must be an early priority in the process.

Oral health societies are in a period of transition from a conventional model of restorative dentistry, one largely based on the use of dental amalgam, to an oral health model oriented towards health promotion and integrated disease prevention. The phase down of the use of dental amalgam can become a catalyst to renew and revitalize dentistry and tackle the health, social and economic burden of oral disease by prioritizing oral health as part of the global health agenda.

Keywords: Minamata Convention, Dental Amalgam

S3-3 A Mobile Teledentistry Model Evaluated in Australia



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An image acquisition Android App was created to facilitate the acquisition and transmission of dental images to a store-and-forward based telemedicine server. Participants who were attending routine check-ups at dental clinics were enrolled. Following a face-to-face oral screening by a screener (dentist), images of patients' teeth were obtained using a smartphone camera. These images, along with patient information, were then transmitted from the Android App to the server through the Internet for later independent assessment by two charters (off-site dentists). The assessments of these charters were then compared to the benchmark face-to-face caries assessment. Sensitivity values for the photographic method when compared to the benchmark face-to-face caries assessment were moderate. Despite some limitations, the mobile teledentistry approach has shown the potential to detect occlusal caries from photographs taken by a smartphone camera with an acceptable diagnostic performance compared to traditional face-to-face screening. Telemedicine and cellular phone technology can be combined to create an inexpensive and reliable screening tool.

Keywords: Smartphone, Teledentistry, Caries

Symposium IV

Dentistry in the 5G Era

S4-1: Digital Technology in Esthetic Dentistry

Asst Prof Dr Chaimongkon PEAMPRING

Prince of Songkla University, Thailand

S4-2: Photodynamic Therapy: A New Way to Treat Oral Lichen Planus

Assoc Prof Dr Teerasak DAMRONGRUNGRUANG

Khon Kaen University, Thailand

S4-3: A Targeted Next-Generation Sequencing Assay for the Molecular
Diagnosis of Rare Diseases with Tooth Involvement

Dr Supawich MORKMUED

Khon Kaen University, Thailand

S4-1 Digital Technology in Esthetic Dentistry



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To date, CAD/CAM technology involves in almost every step in esthetic dentistry including virtual planning, virtual wax-up, digital impression, fabrication of restorations using computerized systems. Digital technology has simplified the restorative workflow and made the patient feel much more comfortable during the treatment because of less time-consuming procedures. Also, the patient can see the planned final restoration much more clearly in the virtual planning procedure especially in a complex case. CAD software can integrate the extraoral profile and intraoral structure for the designing esthetic restorations. This presentation gives an overview of utilizing CAD/CAM technology in esthetic dentistry and shows the step-by-step procedures in simple cases and more complex cases. Also the presentations will include the limitations and further innovation of digital restorative dentistry.

Keywords: CAD/CAM, Esthetic Dentistry

S4-2 Photodynamic Therapy: A New Way to Treat Oral Lichen Planus



Teerasak DAMRONGRUNGRUANG

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Recently, photodynamic therapy is emerging as one of a promising therapy in dentistry. Three main factors involved in this novel therapy; **photosensitizer**, **light**, and **oxygen**. Based on the concept of using the specific photosensitizer that preferentially deposits to abnormal cells and/or intraoral microorganisms to be deteriorated, upon stimulation by the energy from the proper light source, it can provide free radical that in turn capable of selective damage the undesired cell as well as pathogenic species without damage adjacent normal cells/tissues. The sublethal level of free radical will be useful to quiescent cell hyperfunction.

This lecture will provide the basic principle of photodynamic therapy, a new class of photosensitizers named azulene and introducing a paradigm shift of treatment of immune-mediated oral diseases especially oral lichen planus. Antimicrobial photodynamic therapy will be introduced as adjunctive therapy of chronic oral diseases. Finally, the future development and potential of targeted therapy to relieve lesions in a longer period will also be discussed.

Keywords: Photodynamic Therapy, Photosensitizer, Immune-Mediated, Oral Mucosal Diseases, Antimicrobial

S4-3 A Targeted Next-Generation Sequencing Assay for the Molecular Diagnosis of Rare Diseases with Tooth Involvement



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Orodonal diseases include several clinically and genetically heterogeneous disorders that can present in isolation or as part of a genetic syndrome. We have developed a novel targeted next-generation sequencing (NGS) assay for the efficient molecular diagnosis of a wide variety of orodental diseases with a panel that targets 585 known and candidate genes in orodental disease.

Here, we report a unique dominantly inherited disorganized supernumerary cusp and single root phenotype presented by 11 affected individuals belonging to 5 north-eastern Thai families. Using whole exome sequencing (WES) we identified a common single missense mutation that segregates with the phenotype in exon 6 of *CACNA1S* (Ca_v1.1) (NM_000069.2: c.[865A > G];[=] p.[Ile289Val];[=]), the Calcium Channel, Voltage-Dependent, L Type, Alpha-1s Subunit, OMIM * 114208), affecting a highly conserved amino-acid isoleucine residue within the pore forming subdomain of CACNA1S protein. This is a strong genetic evidence that a voltage-dependent calcium ion channel is likely to play a role in influencing tooth morphogenesis and patterning.

Nevertheless, due to the vast number of genes implicated in these disorders, establishing a molecular diagnosis is still challenging. Furthermore, this panel will contribute to better understanding the contribution of genes to each orodental disease.

Keywords: NGS, Human, Rare Disease, Mutations, Dental Anomalies

Oral Presentations

O1 Development of a Micropatterned Fish Scale Collagen Scaffold to Manufacture a Tissue-Engineered Oral Mucosa

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Background: Development of microenvironment at the interface between the epithelial layer and scaffold, specific to oral mucosa, is necessary to enhance the quality of a tissue-engineered oral mucosa.

Objectives: This study aimed to develop a two-step protocol to fabricate several types of micropatterned collagen scaffold by using MEMS technology and evaluate the epithelial regeneration.

Materials and Methods: We attempted to design two types of micropattern, grid and pillar, associated with rectangle and wave-shape, respectively. The dimensions of connective tissue papilla were 200 µm in height and 100 µm in thickness, with 200 µm of channel width. With a combination of isotropic and anisotropic etching, we first built a silicon semiconductor substrate, then fabricated four types of micropatterned mold, as a negative mold for collagen gel matrix, made of dimethyl polysiloxane (PDMS). After the collagen solution was poured into the PDMS molds, they were placed into an incubator to induce fibrogenesis. Then the collagen gels received γ irradiation for cross-linking and sterilization. According to our human clinical protocol, TEOMs were manufactured by seeding primary oral keratinocytes onto the scaffolds at a density of 2.6 x 10⁵ cells/cm², with EpiLife® medium. They were then prepared for histologic examination.

Results: The dimension of the PDMS negative molds having wave-shape was fabricated as designed, in contrast to the rectangle ones showing slight deformation. Subsequently, we were able to fabricate the scaffold, grid patterned with rectangle shape, as designed. In contrast, other scaffolds had minor defects, mostly due to incomplete solution filling. All of the TEOMs developed a continuous, fully-differentiated epithelial layer, which was thicker than two control TEOMs generated on the flat surface scaffold and a human cadaver dermis.

Conclusion: Although our protocol to fabricate collagen gels needs to be further improved, our platform technique would be an effective tool to investigate the optimal topography for oral mucosa tissue engineering.

Keywords: Tissue Engineering, Micropatterning, Fish Scale Collagen

O2 Quantitative Measurement of Cell Colony Mobility Using Image Analysis Methods for Quality Control of Oral Keratinocytes

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Background: To achieve successful clinical outcomes of epithelial transplantation in regenerative medicine, there is a need to develop a non-invasive approach to monitor cells prior to grafting as quality control. Recent study revealed that monitoring cell colony mobility could be used to predict their proliferative capacity in an early stage of cell culture for eliminating substandard cell populations. To quantitatively measure the mobility of cell colony, we developed two methods, normalized cross correlation (NCC) and optical flow (OF).

Objectives: This study aimed to examine the feasibility and correlation with a proliferative capacity of oral keratinocytes.

Materials and Methods: After informed consent agreement, oral mucosa samples were obtained from patients. Dissociated primary oral keratinocytes were plated into a 35 mm tissue-culture dish at a density of 3.0×10^5 cells and cultured without a feeder layer with EpiLife® medium containing 0.06 mM of Ca^{++} . Four days after plating, when multiple cells colonies have been generated, they were monitored by time-lapse microphotography for 24 hours. The film frames were captured at an interval of 15 minutes. When cells were fixed after another two days of cultivation, the proliferating potential was estimated by counting cell number in the colony time-lapse photographed. By using the value of NCC, we determined a specific parameter, referred to as “dynamic index (DI)”, which computes the difference in the state of target colonies between consecutive frames and its value reflects the shape and size of colony that change over time. By using OF, we determined the mean velocity magnitude (MVM) (pixel/frame) of the colony.

Results: Although the number of samples examined was very limited, the proliferative capacity of oral keratinocytes significantly correlated with DI as well as MVM.

Conclusion: This study suggested cell mobility could be used for quality control of cultured oral keratinocytes.

Keywords: Oral Keratinocytes, Cell Mobility, Proliferative Capacity

O3 Induction of Cyclin-Dependent Kinase Inhibitor p27kip-1 and Suppression of Complex Cyclin E-CDK-2 as a Target Therapy of Papua's Myrmecodia Pendans in Human Oral Tongue Cancer Cell

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Background: Oral tongue cancer is one of the most common cancers encountered in Indonesia due to the prevalent habits of tobacco chewing, alcohol drinking and smoking. Oral tongue cancer is characterized by a high degree of local invasion and a high rate of metastasis to the cervical lymph nodes and distant. Treatment options for this cancer are still limited. However, a new strategy for refractory tumor, Papua's Myrmecodia pendans as a new plant of herbal medicine has been given more attention.

Objectives: to examine the antitumor activity of Papua's Myrmecodia pendans (ant nest plant) in a human oral tongue cancer cell line (B88) and to explore the possible mechanism in it.

Materials and Methods: In the present study, the pure laboratory experimental with post-test only control group design was performed. B88 cells were treated with various concentration of ethanol extract of Papua's Myrmecodia pendans. Cell growth inhibition test or MTT assay was carried-out by ELISA reader. Boyden chamber assay was used for analysing the cell invasion. Cell apoptosis assay was detected by caspase-3 and -9, and protein assay was detected by Western blotting analysis.

Results: B88 cells treated with Papua's Myrmecodia pendans were remarkable suppressed in cell growth and cell invasion, and had a significant induction of apoptosis characterized by an increase in activation of caspase-3 and -9. Furthermore, up-regulation of p27Kip1 and down-regulation of complex cyclin E-CDK-2 protein was detected in B88 cells treated with Papua's M. pendans.

Conclusion: Papua's Myrmecodia pendans exhibited a high potential antitumor activity in human oral tongue cancer through induction of p27Kip1 and suppression of complex cyclin E-CDK-2 protein. Targeting this molecule could represent a promising new therapeutic approach for this type of cancer.

Keywords: Oral Tongue Cancer, Papua's Myrmecodia pendans, p27Kip1, Cyclin E-CDK-2

O4 The Novel Bone Regeneration Strategy Using Secretomes from Mesenchymal Stem Cells

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Background: Mesenchymal stem cells (MSCs) have the potency to differentiate into various kinds of cells, and they can be applied to regenerative medicine. The effect of MSCs on tissue regeneration are not only facilitated by their multipotency, but also by stimulating the activity of recipient cells through paracrine mechanism. Our previous studies have shown that serum-free conditioned media from human bone marrow-derived mesenchymal stem cells (MSC-CM) accelerating bone regeneration in vitro and in vivo. MSC-CM contain numerous secretomes including growth factors and exosomes. Exosomes are nanovesicles released by all cell types and act as intercellular communication vehicles which may contribute to tissue regeneration.

Objectives: The concentration of the growth factors in MSC-CM was examined, MSC-CM mimicking cytokine cocktail (CC) was created. Exosomes were isolated from MSC-CM (MSC-Exo), and the effects of MSC-CM, CC, MSC-Exo on bone regeneration were investigated.

Materials and Methods: MSC-CM was collected from human MSCs. Cytokine cocktail (CC) was created by mixing recombinant human insulin growth factor-1(IGF-1), vascular endothelial growth factor-A (VEGF-A) and transforming growth factor- β 1 (TGF- β 1) at same concentration as MSC-CM. MSC-Exo were isolated from MSC-CM by the centrifugation methods. MSCs were co-incubated with MSC-CM, CC and MSC-Exo. Osteogenic and angiogenic potential of each group were examined by real-time polymerase chain reaction. Also, rats' calvaria bone defects models were prepared, and bone regeneration by each material was evaluated using microcomputed tomography and histological analysis.

Results: Osteogenic and angiogenic gene expressions in MSCs were enhanced by MSC-CM, CC and MSC-Exo in vitro. Bone regeneration in rats' calvaria was also promoted in CC and MSC-Exo as almost equally as MSC-CM.

Conclusion: These results suggest that not only MSC-CM but also CC and MSC-Exo have great osteogenic potential. The key constituent factors related to bone regeneration of MSC-CM could be partially clarified, and these factors can be used as bioactive agents for novel bone regeneration strategy.

Keywords: Bone Regeneration, Angiogenesis, Osteogenesis, MSC-CM, Conditioned Medium, Secretome, Growth Factors, Exosome

O5 Effect of Local Hyaluronic Acid Administration to Trigeminal Nerve Lesion on Nociceptive Behavior in Rats

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Background: Peripheral nerve injury is believed to be regenerated naturally but patients claim intractable pain after regeneration. Our morphological study demonstrated that hyaluronic acid can facilitate regeneration of injured trigeminal nerve.

Objectives: We aimed to test the effects of the local administration of Hyaluronic acid to injured trigeminal nerve on nociceptive behavior after regeneration.

Materials and Methods: Sprague-Dawley rats (6-10 weeks) were anesthetized under general anesthesia (sevoflurane, followed by i.p. 4% chloral hydrate at 2.5 g/kg). The inferior alveolar nerve (IAN) was cut completely using sharp micro-scissors. The lesion was then treated with 3 µl of 1% Hyaluronic acid solution, or phosphate-buffered saline as a control, and then covered with Terudermis to prevent leakage. Changes in nociceptive response were measured in rats using an operant-based orofacial pain assessment device before and after nerve injury for mice in the control group and 1% Hyaluronic acid group.

Results: Nerve injury without Hyaluronic acid lowered the licking number in all animals of the control group. In contrast, the local administration of Hyaluronic acid did not necessarily lower the licking number after the operation.

Conclusion: Locally administered Hyaluronic acid is effective for the regeneration of injured axons without altering nociceptive responses.

Keywords: Hyaluronic Acid, Trigeminal Nerve, Peripheral Nerve Injury, Neuropathic Pain

O6 Silver Nitrate Effects on Oral Mucosa: To Burn or Not to Burn

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Background: Silver nitrate is a chemical agent that is often used to stop bleeding, as chemical cautery and treatment for burns, especially in the skin and ear-nose-throat. In dentistry, silver nitrate has also been widely studied as a treatment for aphthous ulcers. Despite its useful effect, this substance can cause oral mucosal burn since it's also a caustic solution.

Objectives: This case report will discuss a case of oral mucosal burn caused by silver nitrate which was used as a hemostatic agent in sinonasal mass bleeding.

Materials and Methods: A 41-year-old female patient with sinonasal mass, experienced bleeding from the left maxilla which was stopped using silver nitrate locally. On examination, black staining was found on the perioral skin to the left side of the chin and painful white desquamations with erythematous base on the left labial and buccal mucosae, dorsum of the tongue, and floor of the mouth. Clinical features are consistent with the appearance of oral mucosal burn.

Conclusion: Silver nitrate is commonly used for hemostasis and chemical cauterization purposes but has side effects of staining on the skin and oral mucosal burn, so that its use should have the right rationalization and under supervision. As dentists, we should be able to identify oral mucosal burn caused by silver nitrate so that it can be managed properly.

Keywords: Silver Nitrate, Hemostasis, Oral Mucosal Burn

O7 Three-Dimensional Motion Analysis of Spoon Feeding -Effect of Food Properties and Mouthful Amounts

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Background: It is assumed that proper feeding will be achieved by recognizing the food properties and size in the anticipatory stage, coordinating and interlocking head, oral cavity and upper limbs with tableware in food capturing. Appropriate food capturing in the anticipatory stage is essential for mastication and swallowing. However, it has not been clarified how the food properties and size affect the functioning of the lips and upper limbs with tableware in food capturing.

Objectives: To clarify the effect of food properties and size in the anticipatory stage, in this study, we evaluated how different foods and bite amounts influence the lip function (lip-closing pressure, LCP) or three-dimensional (3D) spoon motion.

Materials and Methods: Fifteen young healthy male participated in this study. They were asked to eat the test food feely with the spoon. The test foods were cheese (Kiri, Bel Japon K.K., Japan) and yogurt (Bulgaria-yogurt-LB81, Meiji Co., Ltd., Japan), which were 3 g, 5 g, and 10 g. The LCP was measured by a strain gage transducer (PSS-AE, KYOWA, Japan) embedded in the surface of the spoon (Light-spoon, AOYOSHI, Japan). Spoon-feeding motion was recorded by an optical 3D motion analysis system (VICON-MX, Inter Reha, Japan). We analyzed the duration and length of spoon insertion into the oral cavity, spoon angle at insertion and withdrawal, maximum mouth opening length and LCP.

Results: The duration of spoon insertion was significantly longer in cheese feeding. The maximum mouth-opening length and spoon insertion length increased with increase in the mouthful amounts. However, the spoon angle at insertion and withdrawal were no significant difference between the two different foods and the three different mouthful amounts.

Conclusion: In spoon-feeding, the spoon insertion length, insertion time, maximum mouth-opening length, and LCP vary depending on the food properties or mouthful amounts.

Keywords: Food Capturing, 3-D Motion Analysis, Lip Closing Pressure

O8 Naïve-Like Conversion from Human Deciduous Teeth Dental Pulp Cells-Derived iPS Cells and the Differentiation

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Background: Mouse ES cells are pluripotent cells and therefore known as “naïve stem cells (NSCs) or ground-state cells”. In contrast, human ES cells/iPS cells are thought to be epiblast stem cells (EpiSCs) that are slightly more differentiated than NSCs.

Objectives: In this study, we examined whether human iPS cells, which had been derived from human deciduous tooth dental pulp cells (HDDPCs), become to show expression of SSEA-1 molecule when they are induced to convert to NSCs. We also demonstrated the triploblastic differentiation from NSCs.

Materials and Methods: Human deciduous teeth extracted because of replacement disturbance were collected under aseptic conditions from a patient aged 8 years. The HDDPC-derived iPS cells were generated using human OCT3/4, SOX2, KLF4, L-MYC and LIN28 cDNAs using an electroporation-based Neon® microporation system (Invitrogen). HDDPC-derived iPS cells which we established were cultured in NSC medium and EpiSC medium.

Results: In order to convert EpiSC to NSC, EpiSC were cultivated in NSC medium containing feeder cells. They exhibited NSC-like morphology, as exemplified by dome-like colonies within 4 days when cultured in NSC medium after the 2nd passage. Immunocytochemical staining of these cells with anti-SSEA-1 revealed increased expression of this epitope. RT-PCR analysis also confirmed increased expression of FUT9 transcripts as well as other stemness-related transcripts such as Rex-1 (Zfp42) and alkaline phosphatase. We also demonstrated the pluripotent differentiation from NSCs.

Conclusion: These results suggest that HDDPCs can be an efficient cell source.

Keywords: Naïve Stem Cells, Human Deciduous Teeth Dental Pulp Cells, Induced Pluripotent Stem Cells (iPS cells)

O9 Streptococcus Pyogenes CAMP Factor Promotes Bacterial Adhesion and Invasion in Pharyngeal Epithelial Cells Without Serum

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Background: Streptococcus pyogenes is a bacterium that causes systemic diseases, such as pharyngitis and toxic shock syndrome, via oral- or nasal-cavity infection. Initial stage of infection requires the adhesion of S. pyogenes to epithelial cells, followed by production of various pathogenic proteins that promote epithelial-cell adhesion and invasion. Previous studies of S. pyogenes adhesins/invasins supposed infection from the wound site; therefore, these were assumed to occur in the presence of serum. However, serum is scant in the pharynx and oral cavity. CAMP factor is secreted by several bacteria. It is reported that Propionibacterium acnes CAMP factor contributes to bacterial invasion in skin keratinocytes.

Objectives: We hypothesize that S. pyogenes CAMP factor is related to the bacterial adhesion and invasion in pharyngeal epithelial cells. In this study, we examined mechanisms that involved in S. pyogenes adhesion and invasion in the pharynx without serum components.

Materials and Methods: Human pharyngeal carcinoma Detroit562 cells were pre-treated with several inhibitors, incubated with 5 µg/ml of rCAMP factor in the presence or absence of fetal bovine serum, and then incubated with S. pyogenes wild-type strain SSI-9 or isogenic Δcfa mutant. We performed colony counting assay, fluorescent microscopy assay, western blot analysis, and ELISA assay.

Results: CAMP factor promoted streptococcal adhesion and invasion in Detroit562 cells without serum. CAMP factor initially localized on the cell membranes and then became internalized in the cytosol following S. pyogenes infection. Additionally, CAMP factor phosphorylated phosphoinositide 3-kinase and serine-threonine kinase in the cells. Furthermore, ELISA results demonstrated that CAMP factor affected the amount of phosphorylated phosphoinositide 3-kinase and serine-threonine kinase in Detroit562 cells.

Conclusion: These results suggested that S. pyogenes CAMP factor activated the phosphoinositide 3-kinase/serine-threonine kinase -signaling pathway, promoting S. pyogenes invasion of Detroit562 cells without serum. Our findings suggested that CAMP factor played an important role on adhesion and invasion in pharyngeal epithelial cells.

Keywords: Streptococcus pyogenes, CAMP Factor, Invasion, PI3K/Akt Signaling Pathway, Endocytosis

O10 Suitability with Vietnamese Harmonious Faces in Class III Malocclusion Orthognathic Patients– 3D

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Background: Orthodontic and orthognathic surgery are crucial treatments for skeletal class III malocclusion patients to achieve good function and esthetic. Vietnamese harmonious facial index is essential criteria for postoperative assessment.

Objectives: Evaluating the suitability with Vietnamese harmonious facial index in skeletal class III malocclusion orthognathic patients.

Materials and Methods: 40 skeletal class III malocclusion orthognathic patients at Hanoi National Hospital of Odonto-Stomatology, Viet Duc University Hospital and Hong Ngoc Hospital from April 2017 to October 2018; descriptive and longitudinal study, follow 1 month, 6 months and 12months post-operation.

Results: Orthognathic surgery effectively pushed maxilla forward and set back mandible, achieved skeletal class I intermaxilla, corrected cross bite, improved esthetic of soft tissue. After 12 months post-operation, the skeletal, dental, soft tissue index were stable, 100% patients satisfied and had quality of life improved. Around 80% patients achieved harmonious facial Vietnamese King ethic index

Conclusion: In order to improve surgical effectiveness, Vietnamese harmonious facial index should be applied in planning and pre-surgical simulation, especially in 3D approach.

Keywords: Class III Malocclusion, Orthognathic Surgery, Harmonious Faces

O11 A Study on Dental Student's Self-Assessment Ability in Japan and a Comparison with The United States

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Background: Self-assessment is a critical skill for health professionals and is an essential component in dental education. In the United States, low-performing students overestimate their performance, while high-performing students self-assess themselves more accurately. Self-assessment skills are also influenced by personality and are likely multifactorial. Currently, there are few studies on cultural background and its affect on students' self-assessment ability.

Objectives: To compare students' self-assessment abilities in Japan and the US using preclinical procedures.

Materials and Methods: Forty-five students at Niigata University were required to prepare a crown as a part of their preclinical course. Students then assessed their preparation using a standardized grading form. Three independent faculty graded their preparation using the same criteria as on the students' self-assessment forms. Dental students (105 students from Class of 2016-2018) at Harvard School of Dental Medicine (HSDM) completed preclinical practical assessments of Class II amalgam and Class III composite preparations. They self-assessed their performance using the same rubrics as faculty (three evaluators) used for grading. For both schools, an average faculty score was calculated and the difference between the student and the faculty score was determined to examine the student's ability to self-evaluate. Scores from each school were statistically analyzed and compared.

Results: Both schools showed lower-performing students tended to overestimate their performance, while the higher-performers were more likely to underestimate. Interestingly, students from HSDM overestimated more in contrast to students from Niigata.

Conclusion: The differences between Japan and United states results might be the cause of the difference of curricula at each university and culture at each country. As dental educators continue to implement self-assessment throughout our curricula, it is important to develop a process that provides adequate student and faculty training.

Keywords: Dental Education, Technical Training, Self-Assessment

O12 Preventive Effect of Preschool and School-Based Fluoride Mouth Rinsing Program on Dental Caries in Early Adulthood

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Background: In recent decades, the incidence of dental caries is decreased, mainly due to widespread use of fluoride contained toothpaste. Someone claims that fluoride mouth rinsing program is no longer necessary for public health.

Objectives: The purpose of this study is to evaluate the caries preventive effect of fluoride mouth rinsing program on caries as to whether it can decrease the number of persons with caries and the number of DMF teeth in the period there is a decrease in caries.

Materials and Methods: 587 subjects were randomly recruited from about 3,000 new university students ranging from 18 to 25 years of age who received a dental examination on admission. Informed consent was obtained. An experienced dentist screened tooth surfaces for dental caries (Kappa value = 0.888). Subjects were asked to provide information on their experience of fluoride mouth rinsing program in their childhood.

Results: Most students (98.4%) have used fluoride-containing toothpaste. However, the fluoride group (n = 224, 51.3% with DMF, mean DMFS = 2.81, SD; 5.14), in which the subjects had been participated in fluoride mouth rinsing program in their childhood, had lower prevalence of dental caries than the reference group (n = 363, 64.5% with DMF, mean DMFS = 4.47, SD; 6.74), which had not participated in fluoride mouth rinsing program (t = 9.385, p = 0.002). Furthermore, the fluoride group had lower prevalence of dental caries in pits & fissures (29.1% lower) and proximal surfaces (44.8% lower) than the reference group.

Conclusion: Fluoride mouth rinsing program in childhood reduced the prevalence of dental caries in young adults who have used fluoride-containing toothpaste. More preventive effect was found in proximal surfaces than in pits & fissures. Therefore, Fluoride mouth rinsing program is effective as a public health application.

Keywords: Fluoride Mouth Rinsing Program, Caries Preventive Effect, Early Adulthood

O13 Drinking Habits and Periodontal Tissue Condition in Community-Dwelling Elderly Japanese

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Background: The relationship between drinking habits and periodontitis is a controversial issue.

Objectives: To examine the associations among drinking habits, other lifestyle factors, and periodontal condition, in community-dwelling elderly Japanese of a specific age.

Materials and Methods: Participants were 438 dentate elders aged 73 years from a larger cohort survey of elders in Niigata City, Japan. Data collected from oral examination of each participant, including number of the existing teeth, mean probing pocket depth, and mean clinical attachment level (CAL) were used for the analyses. A lifestyle habit questionnaire were used to assess alcohol consumption, smoking experience, frequency of tooth brushing, interdental brush use, and visits to a dental clinic during the previous year. Participants were classified into the following three groups according to approximate daily alcohol consumption: non-drinkers (0 g), light-moderate drinkers (1-39 g for men, 1-19 g for women), and heavy drinkers (40 g for men, 20 g for women). To clarify the association between the state of periodontal tissue (CAL) and each variable, logistic regression analysis was performed. The mean CAL (high-risk/non-high-risk groups) was used as the dependent variable and the statistically significant factors identified by univariate analysis were used as independent variables.

Results: According to logistic regression analysis, the mean CAL was significantly associated with the number of existing teeth (odds ratio [OR]=0.90; $p<0.001$), being a heavy drinker (OR=2.44; $p<0.05$), and smoking experience (OR=2.37; $p<0.01$).

Conclusion: The present study showed that increased mean CAL was significantly associated with heavy drinking in community-dwelling elderly Japanese (aged 73 years) compared with non-drinking. Our results provide new evidence that high alcohol consumption is associated with an increased risk for periodontal disease and its progression.

Keywords: Drinking Habits, Community-Dwelling, Elderly People, Periodontal Tissue Condition

O14 The Association Between Oral Health Condition, Serum C-Reactive Protein and Depressive Symptoms in Yogyakarta Community-Dwelling Elderly

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Background: Indonesia's percentage of elderly people is estimated to increase to 11.4% of the total population in 2020. The Daerah Istimewa Yogyakarta (DIY) which is known as the province with the highest life expectancy in Indonesia, is estimated to have 168 thousand elderly people aged 60-64 years in 2017 (around 5% of the total population). Poor oral health condition can affect general health, and some oral diseases are known to be associated with chronic degenerative diseases, including depressive symptoms, particularly in the elderly.

Objectives: To determine the relationship between the oral health condition, serum c-reactive protein (CRP) and depressive symptoms.

Materials and Methods: One hundred and twenty three randomly chosen elderly participants from 10 Posyandu Lansia (elderly local health station) were involved in this cross-sectional study. Oral examination was performed to assess oral health conditions such as Oral Hygiene Index (OHI), Community Periodontal Index (CPI) and Loss of Attachment (LA) as well as DMFT index based on the World Health Organization (WHO) method. Depressive symptoms were identified using the 9 question's version of the Patient Health Questionnaire (PHQ) questionnaire, while the serum CRP was analyzed by the Laboratory Installation of Universitas Gadjah Mada (UGM)'s Hospital. Univariate and multivariate analysis using a 95% confidence interval (CI) and significance level of $p < 0.05$ were done to analyze the collected data.

Results: There was significant differences of OHI, LA, bleeding on probing (BOP), and hs-CRP between rural and urban originated participants with a p of < 0.001 , 0.041 , 0.017 , and 0.029 respectively. Bivariate and multivariate analysis showed that among all of the oral health parameters, only OHI that was significantly affecting depressive symptoms in the elderly ($r = 0.209$; $p = 0.021$).

Conclusion: The results suggest that higher OHI increased the risk of developing depressive symptoms in an elderly population.

Keywords: Oral Health, Depressive Symptoms, Serum CRP, Elderly Population

O15 The Relationship Between Serum Cholesterol Levels and Salivary Flow Rate in the Community Dwelling Elderly

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Background: Saliva is produced from blood in salivary glands. Arteriosclerosis for which high low-density lipoprotein (LDL) and low High-density lipoprotein HDL are a risk factor is a disease related to blood flow. The relationships of these was not reported.

Objectives: The objective was to assess the relationship between serum cholesterol levels and salivary flow rate in the community dwelling elderly.

Materials and Methods: The subjects were 345 people (172male, 173female; aged 78–79 years). Unstimulated salivary flow rate (UFR) was assessed by cotton roll method. Low-UFR was defined 0.10 g/30s. Stimulated salivary flow rate (SFR) was assessed by having participants chew tasteless gum test for 3 min. Low-SFR was defined 1.0 ml/min. Fasting blood samples were drawn for the measurement of systemic status. These measured variables were categorized as below. Borderline and high levels of LDL were defined 140-159 mg/dL and ≥ 159 mg/dL, respectively. Low-HDL level was defined ≤ 40 mg/dL. High levels of HbA1c, rheumatoid factor and creatinine were $\geq 6.5\%$, ≥ 15 IU/mL and ≤ 0.65 mg/dL, for the male, ≤ 0.46 mg/dL for the female, respectively. To assess depression was using the General Health Questionnaire 30. A standardized questionnaire was completed, covering the participants' current and previous medication, smoking and drinking status.

Results: The multiple logistic regression analysis gave odds ratios for low- UFR and SFR. After controlling for the covariates, the levels of LDL and HDL were associated significantly with low- UFR and SSR. The odds ratio (with 95% confidence interval) of high-LDL and low-HDL levels for low-USF were 5.15 (1.44-18.5) and 3.16 (1.26-7.94), respectively. That of high-LDL level for low-SFR was 3.92(1.44-10.7).

Conclusion: The findings of the present study suggest that low USF and SSF were associated significantly with serum LDL and HDL levels in the elderly.

Keywords: Salivary Flow Rate, Serum Cholesterol, Elderly

O16 The Relationship Between the Number of Remaining Teeth and ADL in 90 Years Old Community-Dwelling Elderly

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Background: Activities of Daily Living (ADL) is defined as the ability to perform basic self-care tasks in everyday life and is used widely in the field of elderly research to monitor one's functional capacity and dependency. Understanding the effects of a decreased functional capacity on oral health as well as the reverse effects of oral factors on the functional capacity could provide us guidelines on how design public health policies in the upcoming aging society. Therefore, the cross-sectional study was performed.

Objectives: To assess relationship between the number of remaining teeth and ADL in community-dwelling elderly aged 90

Materials and Methods: In 2018, the community-based survey was accomplished when all the subjects aged 90 years old. 88 Subjects (41 men and 47 women) were participated in the survey. Oral examination, blood test, anthropometric evaluation, and physical assessment were conducted in this survey. The Tokyo Metropolitan Institute of Gerontology Index of Competence (TMIG-IC) was used for the assessment of ADL while the General Health Questionnaire (GHQ) was used to for the assessment of depression. Statistical analysis was then performed by linear regression at the significant level .05.

Results: TMIG-IC Score correlated with the number of remaining teeth (including pontics of fixed prostheses), serum albumin level, handgrip power and GHQ score. There was no significant difference between male and female participants in terms of TMIG-IC score. The linear regression analysis showed the number of remaining teeth (including pontics of fixed prostheses) was correlated positively with ADL in community-dwelling 90-year-old elderly.

Conclusion: Oral public health policies should emphasize on maintaining the number of the remaining teeth in elderly.

Keywords: Remaining Teeth, Tooth Numbers, ADL, TMIG, GHQ

O17 Relationship Between the Masticatory and Obesity with Using Wearable Device

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Background: It has been widely recognized that masticatory ability is integral for healthy long life, and sufficient number of mastication during meal is recommended. In addition, recent studies suggested that the number of mastication decreased due to the changes in dietary habits that may be related to the general health status. However, there is no evidence-based tool available to measure these dietary habits. We have developed an ear-hung wearable device (bitescan, SHARP Co.) to monitor the daily mastication.

Objectives: This study aimed to investigate the relationship between the number of mastication and obesity with using developed device.

Materials and Methods: Ninety-nine healthy volunteers (50male and 49female, 36.4 +/- 11.7y) participated in this study. The number of mastication for eating up one rice ball (100g) with wearing bitescan, height, body weight and BMI were measured. We examined the correlation between the number of mastication and body weight, BMI using Spearman' rank correlation, and divided the participants into two groups using WHO criteria for obesity (obesity group; BMI \geq 25, non-obesity group; BMI<25) and were compared between groups using Mann-whitney's U test.

Results: The average number of mastication for eating up one rice ball was 215 +/- 85.2 times. Weak significant correlations were found between body weight and the number of mastication, and between BMI and the number of mastication. Thirteen participants were classified to obesity. The number of mastication upon ingestion of one rice ball in obesity group was significantly higher than non-obesity group. Our results consist with previous studies on the relationship between masticatory behavior and obesity.

Conclusion: This study suggested that our novel wearable device might be useful for developing the health promotion system by monitoring masticatory behavior.

Keywords: Mastication, Number of Mastication, Obesity, Wearable Device

O18 The Effect of Thickner on Tongue Motion and Pressure Production Against Hard Palate

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Background: Thickend water is common practice in rehabilitation for dysphagia patients. There have been lots of reports about the effect of thickner on swallowing function, but little is known about the tongue movement due to the difficulty of measurement and analysis.

Objectives: The purpose of this study is to clarify the influence of thicker on tongue movement by simultaneous measurement of tongue motion and tongue pressure.

Materials and Methods: Subjects were 8 healthy young men (average age 30.0 ± 3.3 years old). Deglutitive tongue motion and tongue pressure production against hard palate were recorded simultaneously by using electromagnetic articulography (EMA, AG-501, Karlsten) and original tongue pressure sensor system (Swallow Scan System, Nitta) respectively. Two EMA sensors were attached to the anterior and posterior part of the tongue. Tongue motion and pressure during swallowing 3ml of liquid and thickend water were recorded. The time lag between anterior and posterior part of tongue and the tongue-palate contact time were calculated and compared between liquid and thickend water.

Results: Almost same tongue motion was observed during swallowing liquid and thickend water. The time lag between anterior and posterior tongue motion was observed just before the tongue attached hard palate, whereas the other time events of tongue motion was almost similar. And the time lag tended to be larger at liquid swallowing than thickend water. The hard palate contact time observed on the tongue motion significantly prolonged when swallowing thickend water compared with liquid swallowing. The duration of tongue pressure during swallowing thickend water was also significantly longer than that of liquid swallowing, suggesting that the change in tongue motion affected the appearance of tongue pressure.

Conclusion: It was suggested that the application of the thickening on liquid had an influence on the biomechanics of the tongue during swallowing.

Keywords: Electromagnetic Articulography, Tongue Pressure, Tongue Movement, Thickner

O19 Histological Evaluation of Peri-implant Bone Response to Abutment Screw Preload

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Background: Implant treatment success is highly influenced by peri-implant bone resorption that could occur at any time after implant placement. While peri-implant bone resorption around implants caused by occlusal loading has been investigated, the effect of abutment preload installation without the application of occlusal forces had not been studied yet.

Objectives: The purpose is to investigate peri-implant bone alternations around osseointegrated implants caused by the abutment screw preload using a recommended and high tightening torque.

Materials and Methods: Eight Japanese white male rabbits were used. Each rabbit received two implants on the right and left femur shaft. After eight weeks of osseointegration, a test and control implants were randomly selected. A 35Ncm recommended torque delivered to the abutment screw (n=8) as a recommended preload group (RP). Other abutment screws (n=8) were subjected to 70Ncm tightening torque as a high preload group (HP). Tightening groups (HT) received only a 70Ncm tightening torque without preload (n=8) as the screw untightened immediately. Control group (Cont) implants remained in situ (n=8). Animals were sacrificed at 4 and 6 weeks after abutment screw attachment. MicroCT images were taken, then a undecalcified MMA ground sections were prepared, stained with Toluidine Blue and studied under light microscope and polarized light.

Results: A cross section of cortical bone showed bone remodeling adjacent to the implant in all groups. While bone marrow spaces were relatively small in the Cont and HT groups, RP and HP groups showed larger area of bone marrow especially at 6 weeks. Bone-to-implant contact was significantly lower for RP and HP compared to HT and Cont groups at 6 weeks ($P<0.05$). Furthermore, RP and HP groups showed a statistical significant lower bone area compared to HT and Cont groups at 4 and 6 weeks ($P<0.05$). Nevertheless, there were no significant statistical difference in the new bone formation between groups.

Conclusion: These findings indicated the possible transfer of preload stresses from the implant-abutment joint to the surrounding bone without occlusal load application. Clinicians should take into consideration the applied preload values during abutment screw insulation.

Keywords: Dental Implant, Abutment Screw, Preload, Tightening Torque, Peri-Implant Bone, Bone Remodeling

O20 Effects of Sub-Minimum Inhibitory Concentration of Chlorhexidine Gluconate on Development of in Vitro Novel Multispecies Biofilm

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Background: Antibiotics of sub-minimum inhibitory concentration (sub-MIC) promote biofilm formation in recent studies. The concentration of the antibacterial component including the mouthwash is clinically diluted by the saliva and becomes sub-MIC as time elapses, so there is a possibility of promoting biofilm formation.

Objectives: In this study, chlorhexidine gluconate (CHG) of sub-MIC was applied to in vitro multispecies biofilm model of three bacterial species, *Streptococcus mutans*, *Streptococcus oralis* and *Actinomyces naeslundii*, which are regarded as caries-associated bacteria. Biofilm formation mode, changes in expression level of biofilm-related genes were examined.

Materials and Methods: Each bacterium was grown in tryptone-yeast extract broth (TYE), and these bacterial suspensions were mixed at the rate; [*S. mutans*: *S. oralis*: *A. naeslundii*=1:1:103]. Biofilms were formed on Calgary Biofilm Device for 12h. At this point, the culture medium was replaced with TYE with 0.05% sucrose, then, the biofilms were incubated in TYE with CHG of sub-MIC for 2 days. TYE only was as control. After 6 days, we observed the biofilm formation by Scanning electron microscopy and Confocal laser scanning microscopy. Viable cell number was counted by CFU. The bacterial populations and the expression profiles of *S. mutans* genes was measured by RT-qPCR.

Results: Spherical bacteria were mainly observed morphologically in both control group and CHG group. The biofilm thickness was significantly increased three-dimensionally in the CHG group compared to the control. There was no significant difference in viable cell number in biofilm. Streptococci accounted for more than 90% of the proportion of bacterial species in biofilm of both groups. Expression of biofilm-related genes was significantly increased in *S. mutans* in the 0.06 µg/ml CHG-treated.

Conclusion: It was suggested that CHG of Sub-MIC does not affect bacterial growth in multispecies biofilm and promotes biofilm formation by influencing biofilm-related genes of *S. mutans*.

Keywords: Streptococcus mutans, Multispecies Oral Biofilm, Sub-Minimum Inhibitory Concentrations, Chlorhexidine Gluconate

O21 The Rice Peptides Restrain Periodontal Inflammation and Bone Loss

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Background: Food-derived peptides have been reported to exhibit antibacterial activity against periodontal pathogenic bacteria. However, no effect has been shown on inflammation and bone resorption in periodontal pathology.

Objectives: The overall objective of the current study was to investigate how rice peptides influence biological defense mechanisms against periodontitis-induced inflammatory bone loss, and identify their novel functions as a potential anti-inflammatory drug.

Materials and Methods: The rice peptide (REP) was then fractionated into 20 fractions, and the osteoclast differentiation amongst the fractions was investigated. Based on the results, fractions 9 (REP9) and 11 (REP11) were selected as candidates for further consideration, and fraction 15 (REP15) as negative control. The expression of inflammatory and osteoclast-related molecules was examined in mouse macrophage-derived RAW 264.7 cell cultures using qPCR. Subsequently, the effect of these peptides on inflammatory bone loss in mouse periodontitis was examined using a mouse model of tooth ligation. Briefly, periodontal bone loss was induced for 7 days in mice by ligating the maxillary second molar and leaving the contralateral tooth un-ligated (baseline control). The mice were microinjected daily with the peptide in the gingiva until the day before euthanization. One week after the ligation, TRAP-positive multinucleated cells (MNCs) were enumerated from five random coronal sections of the ligated sites in each mouse.

Results: Rice peptides REP9 and REP11 significantly inhibited transcription activity of inflammatory and osteoclast-related molecules in RAW264.7 cell. Local treatment with REP9 and REP11, in mice subjected to ligature-induced periodontitis, inhibited inflammatory bone loss, explaining the decreased numbers of osteoclasts in bone tissue sections. Some these effects were not showed by REP15.

Conclusion: Therefore, these data suggested that the rice peptides REP9 and REP11 possess a protective effect against periodontitis.

Keywords: Food Peptide, Periodontitis, Inflammation, Bone Loss, Osteoclastogenesis

O22 Differentiation of Eating Behaviors by The Aspect of Masseter and Supra-Hyoid Muscles

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Background: Elderly people with disorders in mastication and swallowing are often provided soft food, like jelly or puree. Semi-solid food tend to be squeezed with their tongue while eating.

Objectives: This study aimed to clarify the difference in electro-myographic activities of the masseter and supra-hyoid muscles between chewing and squeezing.

Materials and Methods: Seventeen male subjects (30.8 ± 4.2 years) were recruited. Four kinds of the gels were prepared i.e. two kinds of hardness and deformation as test samples. The subjects were instructed to consume the test products in 3 ways i.e. squeezing, chewing and eat freely until swallowing. The number and time to consume were not limited. The masseter and supra-hyoid muscles activities were recorded during eating whole time and the videofluorography was recorded during free ingestion simultaneously. The scatter charts were made from the EMG data and linear approximation was made to determine the slope. The gradient of correlation of EMG activities of masseter and supra-hyoid muscles during first stroke was calculated. The gradient was compared between squeezing and chewing using Mann–Whitney U test. The optimum cutoff value for these behaviors was established using the ROC curve and the sensitivity and specificity were calculated from free ingestion.

Results: The masseter and supra-hyoid muscles were active simultaneously during squeezing with their tongue. On the other hand, the masseter was active after supra-hyoid muscles during chewing. Additionally, the gradient of correlation between masseter and supra-hyoid muscles activities during squeezing was positive whereas that during chewing was negative. By using the ROC curve, the cutoff value of the gradient for differentiating eating behaviors was 0.097 with the sensitivity of 95.3% and specificity of 98.4%.

Conclusion: These results suggested that the aspect of muscle activities was different among the way of oral processing and the gradient was useful identify ingestion behaviors.

Keywords: EMG, Masseter Muscle, Supra-Hyoid Muscles, Chewing, Squeezing

O23 Exploring the Possibility of Dental Metal Allergy Related to the Pathophysiology Mechanism of Psoriasis

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Background: There are about 125 million people is suffered by Psoriasis in the world. The main symptoms are erythema, scales and desquamation that make downing quality of life. At the psoriasis site, after TNF- α and TIP-DCs (TNF/iNOS-producing Dermal Cells) produce Interleukin 23 (IL-23), keratinocytes will become active and accelerate epidermal keratinization. It is thought that psoriasis begins from TIP-DCs generation as a starting point, which contribute to keep dermal inflammation. On the other hand, psoriasis can be seen with dental metal allergy sometimes. It has been reported that the dermal symptoms improve after removing dental metal in patients with metal allergy and psoriasis. Furthermore, TIP-DCs was observed in the epidermis that induced metal allergy skin in the animal model. However, there is no research on the relationship between psoriasis and metal allergy based on TIP-DCs.

Objectives: In this study, we investigated the relationship between psoriasis and metal allergy using combination of animal models.

Materials and Methods: Animal: 6 week-old-female mice. Metal allergy model generation: To induce a hypersensitivity reaction to Ni, we injected to intraoral 1mM NiCl₂ + IFA (Incomplete Freund's adjuvant) 50 μ l. After 2 weeks later, we injected to intradermal on auricle 0.2mM NiCl₂ + CFA (Complete Freund's adjuvant) 10 μ l for recall immune response. Control group injected PBS as a sham. Psoriasis model generation: After metal allergy treatment, we shaved back on mice and received 62.5mg imiquimod cream on 6 consecutive days to induce like psoriasis symptom. We observed the skin symptoms and analyzed by histological staining.

Results: The skin symptoms worsened and prolonged in metal allergy group than control.

Conclusion: It was suggested the possibility that metal allergy may become an exacerbating factor of psoriasis.

Keywords: Metal Allergy, Dermatology, Immunology

O24 Interaction Between Neural and Non-Neuronal Cells in The Pathogenesis of Periodontitis

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Background: Transient receptor potential vanilloid 1 (TRPV1), is a thermosensitive ion channel abundantly expressed in peripheral sensory neurons. There are several reports that neural TRPs are involved in the pathogenesis of inflammatory diseases by interacting with non-neuronal cells. However, the physiological role of neural TRPV1 in periodontal disease is unclear.

Objectives: To evaluate the distribution of TRPV1 in experimental periodontitis model, as well as peptidergic properties in osteogenesis in vitro.

Materials and Methods: Alveolar bone resorption in ligature-induced periodontitis model was compared in wild-type, Trpv1 knock-out (Trpv1^{-/-}), and mice lacking TRPV1-positive neurons by administration of resiniferatoxin (RTX). To examine the effect of TRPV1 activation, mice were treated with TRPV1 agonist capsaicin and evaluated by measuring bone loss. To explore the cellular mechanisms, osteogenic properties of neuronal TRPV1 signaling were examined using osteoclast-like cell line in vitro.

Results: Both Trpv1^{-/-} and RTX-treated mice developed severe bone loss compared to wild-type mice. Innervating nerves in gingival tissue co-express TRPV1 and neuropeptide, calcitonin gene-related peptide (CGRP). The treatment of CGRP attenuates RANKL-induced osteoclast formation in RAW264.7 cells. Furthermore, oral administration of the TRPV1 agonist, capsaicin, suppressed ligature-induced bone loss in mice with fewer tartrate-resistant acid phosphatase (TRAP)-positive cells in alveolar bone.

Conclusion: Neural TRPV1 signaling in periodontal tissue is crucial for the regulation of osteoclastogenesis by interacting with osteoclast via CGRP. Therefore, TRPV1 agonists may become potential targets for therapeutic application of periodontal diseases.

Keywords: Periodontitis, TRP Channel, Osteoclastogenesis

O25 The Anti-Oxidative Function of a Bioactive Microbial Metabolite in Gingival Epithelial Cells

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Background: The reactive oxygen species (ROS) are the inducers of oxidative stress, which is defined as an imbalance between prooxidant and antioxidant systems, has been implicated in the development and/or progression of a number of inflammatory diseases including periodontal diseases. Recently, it has revealed that several metabolites derived from fatty acid in gut have various beneficial effects on several biological responses. Among them, 10-Oxo-trans-11-octadecenoic acid (KetoC), a metabolite which is generated by lactic acid bacteria such as *Lactobacillus*, has anti-oxidative stress effect via nuclear factor related factor 2 (Nrf2)- antioxidant response element (ARE) pathway in human hepatic cell. However, the anti-oxidative activity of KetoC in gingival epithelial cells remains unclear.

Objectives: The aim of present study is to clarify the property of KetoC for induction of anti-oxidative stress effects in gingival epithelial cells, and investigate its involvement in pathogenesis of periodontitis.

Materials and Methods: A SV40-T antigen-transformed human gingival epithelial cell line (Epi4) was used for in vitro experiments. The cellular ROS levels were evaluated by flow cytometry using CellROX Green reagent. To explore its molecular mechanisms, ARE promotor activity in epi4 was analyzed by luciferase assay using ARE-luciferase construct. The alteration of anti-oxidative stress related genes was analyzed by qPCR; the involvement of mitogen-activated protein kinase (MAPK) was evaluated by western blotting.

Results: Pretreatment with KetoC significantly suppressed tert-butyl hydroperoxide (TBHP)-induced ROS generation in epi4. In addition, KetoC significantly increased phosphorylation of ERK, ARE promotor activity, and expressions of anti-oxidative stress effect related gene.

Conclusion: KetoC activates antioxidative effect in gingival epithelial cells by inducing anti-oxidant gene expressions through MAPK-Nrf2-ARE signaling.

Keywords: Microbial Metabolite, Anti-Oxidative Function, Gingival Epithelial Cells

O26 Bioactive Metabolite Prevents Alveolar Bone Loss in Periodontitis Model Through Its Antimicrobial Effect

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Background: Periodontitis is occurred due to an interaction between periodontopathogens and host immune system, leading to a chronic inflammation and result in bone loss. *Porphyromonas gingivalis* (P. g) is one of the most investigated pathogens which highly associated with the initiation of periodontitis. Although bioactive metabolite (KetoC) has been investigated to show various beneficial effects, its antimicrobial function remains unknown.

Objectives: Herein, we investigated the effect of KetoC in periodontitis mice model and explored the underlying mechanism.

Materials and Methods: In vivo, eight-week-old male C57BL/6N mice were given a KetoC (15mg/mL) or vehicle for 14 days. At day 7, periodontitis was induced by ligature placement on the second maxillary left molar. Along with this, P. g strain W83 (109 CFU) suspension was administered orally to the mice once in every 3 days. At day 14, all mice were euthanized. Then, alveolar bone loss was measured from the level of alveolar bone crest (ABC) to cemento-enamel junction (CEJ). Number of P. g was quantified by real-time polymerase chain reaction (RT-PCR). In vitro, the antimicrobial effect of KetoC on P. g was investigated and observed using a fluorescence microscope. To elucidate the efficacy of double bonds structure in KetoC, other metabolite (KetoB) was used as a comparison.

Results: In vivo, KetoC prevented alveolar bone destruction induced in periodontitis model. P. g levels were elevated in the periodontitis group, then reduced in KetoC-treated group. In vitro, KetoC down-regulated the proliferation and viability of P. g in a dose-dependent manner, but not KetoB.

Conclusion: KetoC with double bonds structure reduced alveolar bone loss in periodontitis model via its antimicrobial function. In the future, this bioactive metabolite might potentially valuable to prevent periodontal disease and support periodontal therapy.

Keywords: Antimicrobial, Metabolite, KetoC, Periodontitis

O27 A Bioactive Metabolite Prevents *P.gingivalis*-Induced Gingival Epithelial Barrier Disruption

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Background: Accumulating evidence suggests remarkable roles of the human microbiota and their metabolites in health and diseases. 10-Hydroxy-cis-12-octadecenoic acid (HYA), a *Lactobacillus*-derived bioactive metabolite in the process of fatty acid metabolism, has been reported for its protective effects on the epithelial barrier impairment in the intestine.

Objectives: To examine the effect of HYA on the gingival epithelial barrier function and its possible applications for the prevention and treatment of periodontal disease.

Materials and Methods: A SV40-T antigen-transformed human gingival epithelial cell line (Epi4) was used for in vitro experiments. The expression of GPR40, a fatty acid receptor, was examined by PCR and immunofluorescence staining. An epithelial permeability assay was performed using an FITC-labeled dextran method to assess the barrier function. In order to examine the expression of adherens junction protein, morphological analyses using transmission electron microscopy and western blotting analysis were performed. The clinical relevance of HYA in periodontitis was examined using an experimental periodontitis model in mice. The expression levels of several genes in gingival tissue and the level of alveolar bone loss were analyzed to evaluate the severity of periodontitis. The expression of E-cadherin in gingival tissue was observed by immunofluorescence staining.

Results: The expression of GPR40 in Epi4 cells was detected in both mRNA and protein levels. The treatment with HYA significantly suppressed the excess epithelial permeability, and the effect was partially inhibited by pretreatment with GW1100, a GPR40 antagonist. HYA inhibited the reduction of the number of adherens junctions and the degradation of E-cadherin. The oral inoculation with HYA in experimental periodontal disease mice suppressed inflammatory cytokine production of gingival tissue and the degradation of E-cadherin in epithelium.

Conclusion: HYA has protective functions against *P. gingivalis*-induced gingival epithelial barrier dysfunction and contribute to suppress the inflammatory response in periodontal diseases, suggesting a candidate product for prevention/treatment of periodontitis.

Keywords: Fatty Acid, Barrier Function, Metabolite, Periodontitis

O28 In vivo Analysis of Cell Cycle Dynamics During the Course of Periodontal Ligament Development

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Background: Periodontal ligament (PDL) is a fibrous tissue, connecting the tooth to the alveolar bone socket. It has been shown that the high proliferative activity of PDL cells allows the rapid turnover of PDL tissue. While the proliferative activity of PDL-derived cells in vitro has been studied extensively, that in vivo remains elusive.

Objectives: The purpose of this study was to investigate the cell cycle dynamics of the developing PDL, by using a cell cycle reporter mouse.

Materials and Methods: Fucci2 mouse was obtained from RIKEN Center for Developmental Biology. Periodontal tissues were harvested from maxilla of Fucci2 mouse at 7, 15 and 28 days of age, and decalcified paraffin-embedded sections were prepared. 5-ethynyl-2'-deoxyuridine (EdU) was intraperitoneally injected 3, 6, 9 and 12 h before sacrifice. Fluorescence proteins (mVenus, mCherry) and cell surface markers (Cbfa1/Runx2, Osterix) were detected by means of immunohistochemistry.

Results: Fucci2 mouse marks the cells in two different fluorescence probes; proliferating cells in green (mVenus), and quiescence cells in red (mCherry). Since mVenus was not detected any time point analyzed, EdU was injected to label the proliferating cells. At 7 days of age (Crown completion stage), EdU-positive, proliferating cells accounted for more than 90% of PDL cells, while quiescence cells were not detected. At 15 days of age (Root developing stage), proliferating cells accounted for 40%, and quiescence cells became detectable at the surface of cementum. At 28 days of age (Root completion stage), quiescence cells occupied entire PDL tissue, while proliferating cells were found only 10%.

Conclusion: The Fucci2/EdU system enables to segregate the proliferating and quiescence cells in PDL tissue. Our results clearly demonstrated that the cell cycle dynamics is different, depends on the developmental stage and location of PDL.

Keywords: Periodontal Ligament, Cell Proliferation, Cell Cycle

Poster Presentations

P1 Shear Bond Strength Differences Between Dry, Wet, and Rewetting Dentin Bonding Technique Using Chitosan 2% Solution

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Background: There are several techniques can be used on dental adhesive system which are dry, wet, and rewetting technique. However, it is difficult to achieve good bond strength between composite restoration and dentine tissue compared with enamel. Chitosan is a natural polymer hydrophilic polysaccharide, derivate from chitin, it has natural bonding ability.

Objectives: The purpose of this study is to determine shear bond strength of several dentine adhesive system which are dry, wet, and rewetting bonding technique using chitosan 2% solution.

Materials and Methods: This experimental study used 30 samples of free caries first-premolars teeth. Teeth soaked in normal saline solution before cut straight up to 2 mm above CEJ. Samples divided into three groups. Dentine surface treated with dry bonding technique for the first group, wet bonding technique for the second group, and rewetting technique using chitosan 2% for the last group. Samples were tested for shear bond strength using LLOYD Testing Machine with a speed of 0.5 mm/minute. The data were analyzed using one-way ANOVA statistic test.

Results: The average shear bond strength of three groups are, 6.919 MPa, 17.818 MPa, and 11.528 MPa for groups 1, 2, and 3. The highest shear bond strength is in group 2, which is the wet bonding technique. There is significant shear bond strength difference between the three groups, that is $p=0.000$ ($p<0.005$).

Conclusion: The best shear bond strength between the three bonding technique is the wet bonding techniquip. Chitosan 2% solution used in rewetting technique of this study don't have significant effect on raising shear bond strength between dentine and dental composite.

Keywords: Shear Bond Strength, Dentine Bonding Technique, Chitosan 2%

P2 Assessment of Temporomandibular Disorders Treatment with Celebrex Drugs Coordinated with The Mandibular Exercises

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Background: Patients frequently consult a dentist because of pain or dysfunction in the temporomandibular region. The most common causes of temporomandibular disorders (TMDs) are muscular disorders, which are commonly referred to as myofascial pain and dysfunction. These muscular disorders are generally managed with a variety of reversible nonsurgical treatment methods. Pharmacologic therapy and mandibular exercises are important aspects of nonsurgical management of TMD.

Objectives: To evaluate the results of treatment with Celebrex in combination with exercises of lower jaw in the group of patients TMD.

Materials and Methods: A case series study was performed on 48 patients diagnosed with TMD type I and II according to RCD / TMD 1992 and treated at Department of Dentistry, Hanoi Medical University Hospital from September 2017 to June 2018.

Results: VAS index before treatment was 7.52 ± 1.98 ; 1 month after treatment was 3.65 ± 1.58 ; after 3 months 0.90 ± 1.06 . Maximum preoperative mouth opening was 16.44 ± 6.80 mm; after one month increased to 23.71 ± 6.60 mm; after 3 months reached 37.88 ± 5.60 mm. The maximal protrusion of mandible was 2.52 ± 1.54 mm; after one month increased to 3.71 ± 1.18 mm; after 3 months reached 5.88 ± 0.96 mm. The maximum preoperative right lateral movement of mandible was 2.54 ± 2.23 mm; after one month increased to 5.04 ± 1.87 mm; after 3 months reached 7.83 ± 1.16 mm. The maximum preoperative left lateral movement of mandible was 2.27 ± 2.28 mm; after one month increased to 4.15 ± 1.62 mm; after 3 months it was 7.12 ± 1.35 mm.

Conclusion: After 1 and 3 months of treatment, the symptoms were decreased compared to before treatment, all patients had positive improvement.

Keywords: Temporomandibular Disorders, Celebrex, Mandibular Exercises

P3 Dental Caries Risk Factors in 12-Year-Old Pupils: One Year Cohort Study

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Background: The study belongs to the research programme “Dental caries risk factors – Link of individual and community evidences” of the Faculty of Odonto – Stomatology, University of Medicine and Pharmacy at HoChiMinh city.

Objectives: To identify dental caries predictors, and then to establish the prediction model of dental caries in future.

Materials and Methods: The sample of 149 (12-year-old) pupils was collected randomly from the An Lac school. Dental caries were recorded according to ICDAS (International Caries Detection and Assessment System) criteria at the baseline and after one year. Clinical factors (presence of caries lesions, saliva, bacterium, pH of dental plaque, oral hygiene status) and socio-behavioral factors (education level and income of parents, sucrose and acid intake, tooth-brushing frequency) were collected at the baseline. Multivariable logistic regression analysis was used to determine caries risk predictors and then to establish a prediction model of dental caries. Prediction values were based on the sensitivity (Sn), specificity (Sp), positive value (PV+), and negative value (PV-).

Results: Multivariable logistic regression analysis showed that bad buffering capacity of saliva ($p=0.023$) and presence of dentine lesion ($p<0.001$) were two significant predictors. The prediction model of dental caries from these predictors had the Sn of 100%, the Sp of 95.5%, PV+ of 86.7% and PV- of 100%.

Conclusion: We have established a high values prediction model of dental caries with the Sn of 100%, the Sp of 95.5%, PV+ of 86.7% and PV- of 100%.

Keywords: Dental Caries Predictors, Prediction Model of Dental Caries

P4 Abnormal Mineralization in Bone and Aorta Induced by the Disrupted Function of FGF23/klotho

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Background: Fibroblast growth factor (FGF) 23 secreted by osteocytes has been reported to reduce serum phosphate (Pi) in kidney by binding to its receptor complex (FGFR1c/ α klotho) in the proximal renal tubules. However, it is still unknown whether the serum Pi concentration regulated by FGF23/ α klotho is critical for normal mineralization in bone, and also affect vascular mineralization.

Objectives: In this study, we have examined femora and aorta with defective FGF23/ α klotho axis using mice carrying mutations in the α klotho promoter gene (kl/kl) and α klotho deficient (α klotho^{-/-}) mice.

Materials and Methods: Four-week old male α klotho^{-/-} mice, kl/kl mice and the age-matched wild-type mice were kept with normal diet or Pi insufficient diet for 3 weeks. The femora, tibiae and aortas of these mice were extracted for histochemical examination and ultrastructural observation. Other femora and tibiae were extracted for examination of the gene expression by RT-PCR and real time PCR.

Results: Both kl/kl mice and α klotho^{-/-} mice demonstrated a broad non-mineralized bone matrix in femora despite highly-elevated serum calcium/Pi. Many matrix vesicles were seen in osteoid underneath ALP-reactive and ENPP1-positive mature osteoblasts, while few mineralized nodules were developed, being accompanied with no collagen mineralization in kl/kl mice and α klotho^{-/-} mice. Meanwhile, the tunica media of kl/kl aorta was markedly-mineralized, localizing osteoblasts, osteoclasts, and osteocytes, as well as expressing the bone-related genes, therefore, implicating vascular ossification rather than vascular calcification. Interestingly, Pi insufficient diet improved these abnormalities of bone and aorta in kl/kl mice but not α klotho^{-/-} mice, and kl/kl mice fed with Pi insufficient diet demonstrated type II collagen-immunoreactive matrix and chondrocytes in the aorta.

Conclusion: It seems likely that FGF23/ α klotho axis may influence bone/vascular mineralization in an alternative pathway rather than by regulating the serum Pi concentration.

Keywords: klotho, Mineralization, Matrix Vesicle

P5 Histological Assessment of Bone Formation Induced by the New Bone Prosthetic Material Contained Phosphorylated-Pullulan

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Background: Phosphorylated-pullulan (PPL) is a polysaccharide with a high affinity to calcified tissues like tooth and bone. PPL has been reported to show the biocompatibility and absorbability in vivo.

Objectives: We have histologically examined regenerated bone by using combined biomaterials of PPL+ β -TCP (non-self-curing type) or PPL+ α -TCP (self-curing type).

Materials and Methods: Ten-weeks-old male Wistar rats were used in this study. The cavities with 1-2 mm diameter were prepared in the anterior cortical bone of tibiae, and were divided into 4 groups-being filled with 1) only β -TCP, 2) only α -TCP, 3) PPL+ β -TCP or 4) PPL+ α -TCP.

After 1, 2 and 4 weeks, all specimens were fixed with 4% paraformaldehyde and embedded into paraffin prior to histochemical examinations.

Results: No inflammatory response was seen around newly-formed bone in all groups. In groups 1) and 3), β -TCP particles were dispersed out of the cavity at 2 and 4 weeks after the operation, but stout trabeculae were formed. In contrast, groups 2) and 4) showed many thin trabeculae around the α -TCP until 4 weeks after operation. Unlike β -TCP, in the group 2) and 4), there was little cellular infiltration into the self-curing α -TCP material. The volume of the regenerated bone appeared to be dependent of the ratio of PPL and β -TCP or α -TCP: The amount of regenerated bone mass seemed to be increased, when using higher ratios of PPL. Therefore, PPL appeared to keep space between the TCP particles to allow cellular infiltration.

Conclusion: The combined biomaterials PPL and α -TCP/ β -TCP may be applicable for bone regeneration.

Keywords: Phosphorylated-Pullulan (PPL), Bone Regeneration

P6 Multiple and Unspecific Oral Lesions Becoming a Medical Dilemma and Complicating Management in Patient with Acute Lymphoblastic Leukemia

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Background: Leukemia is hematological malignancy which represented by abnormal proliferation of immature blood cells (leucocytes). Acute leukemia subtypes can be lethal without treatment and can result in pancytopenia and its consequences. Oral manifestations are commonly associated with acute leukemia; oral ulceration, bleeding, and infections being the most common.

Objectives: Here, we reported multiple oral lesions with unusual appearance found in patient diagnosed with acute leukemia, febrile neutropenia, and pancytopenia, which rendered complication in patient's disease management.

Case Presentation: The 30-year-old male inward patient of Dr. Cipto Mangunkusumo Hospital Jakarta, Indonesia had been diagnosed with acute lymphoblastic leukemia (ALL), pancytopenia and febrile neutropenia; and already underwent chemotherapy. The patient was referred to oral medicine clinic for evaluation and elimination of oral infection foci. Upon initial examination, the patient complained of oral pain and had oral thrush, multiple major oral ulcers, and unusual yellow-brownish necrotic plaques on dorsal of the tongue. Oral thrush was treated with nystatin oral suspension and systemic fluconazole; and showed positive response. The oral major ulcers and unspecific dorsal tongue lesions which were thought as leukemia-associated lesions were initially administered with chlorhexidine gluconate 0.12% mouth rinse, but the lesions persisted. The treatment was then switched to doxycycline mouth rinse and the lesions showed improvement. The necrotic plaques on the dorsal tongue were able to be peeled off after topical application of 3% hydrogen peroxide. The oral lesions became a dilemma since chemotherapy can further worsen patient's oral condition. Unfortunately, the systemic condition of the patient deteriorated and he passed away before complete resolution of his oral condition.

Conclusion: Along the course of the disease progression, patient with ALL can experience unspecific oral lesions which may occur as ALL manifestation or secondary to immunosuppression, and these lesions can complicate disease management.

Keywords: Leukemia, Oral Ulcer, Febrile Neutropenia, Pancytopenia, Oral Medicine

P7 Influence of Polishing System on Color Changes for Microhybride Resin Composites After Immersion in A Turmeric Solution

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Background: Polishing procedure is important to enhance the esthetics and longevity of resin composite restoration. Various polishing system can produce different surface texture that can affect the resistance of staining.

Objectives This study aimed to assess a polishing system's influence on the color changes of microhybride resin composites after immersion in a turmeric solution.

Materials and Methods: Forty-two microhybride resin composite specimens with a diameter of 6 mm and 2 mm in thickness were divided into 2 groups consist of G-aenial Anterior™ dan Filtek Z250™ (n=21). Each group was divided into 3 subgroups; unpolished, polished using Sof-Lex™ XT Disc and PoGo™ (n=7). The curing procedure was done by Light Curing Unit (Ledmax Hilux Model 450) for 20 seconds and irradiance of 700 mw/cm². All specimens were immersed in a turmeric solution for one hour. The color was then determined using a Colorimeter and color changes values were evaluated using a CIELAB system. The data were analyzed using one-way ANOVA and Post-hoc Bonferroni test.

Results: There were significant color changes values ($p < 0.05$) for both of the groups that were polished using Sof-Lex™ XT Disc and PoGo™. After immersing into a turmeric solution, there were significant color changes values ($p < 0.05$) for all the subgroups of Filtek: Z250™. The color changes values for the G-aenial Anterior™ were not statistically significant between Sof-Lex™ XT Disc and PoGo™ subgroups.

Conclusion: The immersion of unpolished and polished microhybride resin composites in a turmeric solution will result into color changes and the smallest variations in this case occurred for the Filtek Z250™ that was polished using PoGo™.

Keywords: Polishing System, Microhybride Resin Composites, Turmeric Solution, Color Changes

P8 Teaching and Learning About Dysphagia During a Short-Course Training in Gerodontology at Thammasat University

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Background: Oral health is particularly important in patients with dysphagia. Oral function is part of swallowing and poor oral hygiene and infection increases the risk of aspiration pneumonia. However, teaching and learning about dysphagia in dental curriculum has been new and still scarce.

Objectives: The objective of this presentation aims for 1) describing the development of a multidisciplinary module of oral health and dysphagia, and 2) discussing future directions.

Materials and Methods: Description of module components; specific topics and activities; rationale and goals; and course evaluation by 23 participating dentists will be laid out.

Results: We have developed a multidisciplinary module comprised of instructors from 1) rehabilitation medicine; 2) occupational therapy; 3) physiotherapy; 4) nutrition; 5) critical care nursing; and 6) dentistry. The main components included 1) basic mechanism of swallowing; 2) non-instrumental assessment; 3) indirect rehabilitation (oromotor exercises); 4) diet modification; and 5) oral care/dental care for patients with dysphagia. Suggestions for curriculum improvement and the skill-mix in Thailand's healthcare workforce will be discussed.

Conclusion: Thailand is approaching the aged society. Integration the teaching and learning about dysphagia into a dental curriculum or continuing education, with some practical hands-on is needed.

Keywords: Dental Education, Dysphagia, Oral Health

P9 The Influence of Culture on Older Adults' Perceived Needs for Dental Prosthesis: A Systematic Literature Search and Narrative Review

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Background: Loss of teeth hold a complex relationship with oral health-related quality of life (OHRQoL). A recent survey in Thailand revealed that only half of Thai elderly population with remaining teeth fewer than 20 had their dentures made, despite a national policy promoting dentures free of charge. Many studies suggested that cultural background play a vital role in the variation of how tooth loss impacts QoL.

Objectives: The objective of this presentation aims for reviewing how anthropology, sociology, and psychology can help to better understand the perception of older adults regarding tooth loss and the needs for dental prosthesis.

Materials and Methods: We conducted a systematic search of literature through PubMed using a search strategy: ("Prosthodontics"[Mesh] OR "Dental Prosthesis"[Mesh] OR "Tooth Loss"[Mesh] OR Denture*) AND ("Anthropology, Medical"[Mesh] OR "Anthropology, Cultural"[Mesh] OR "Sociology, Medical"[Mesh] OR "Psychology[Mesh]"), with a filter for English and the age of 45+. We also hand-searched the reference list for related studies. We excluded historical articles and studies reporting OHRQoL instruments. We then created a narrative synthesis of the selected studies to explore the voice of the patients.

Results: The PubMed search revealed 40 articles, 24 were selected. We identified concepts emerged: e.g. 'the explanatory model of illness' (their understanding of the disease, ability to cope, and sense of well-being); 'compound awareness contexts'; 'theory of status passage', and 'the contexts of vulnerability'. Also, culture had a key influence on the value placed on certain parts of the dentition.

Conclusion: This review comprehensively comprises literature integrating social science and dentistry which will act as the foundation guide for future research to ultimately seek practical solutions to reduce the discrepancy between the recommendation for replacing missing teeth by dentists and the perceived needs of older adults; whilst balancing the OHRQoL of the patients themselves.

Keywords: Medical Anthropology, Perceived Needs, Dental Prosthesis, Tooth Loss, Aged

P10 FTIR Investigation of Chitosan-Based Mucoadhesive Films Containing Mangosteen Pericarp and Guava Leaf Extracts

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Background: Mangosteen pericarp and guava leaf extracts have antimicrobial effects against common oral pathogens. Therefore, developing of soluble mucoadhesive film containing the extracts may lead to the development of a new preventing agent for those oral diseases.

Objectives: The aim of this study was to develop the chitosan-based and mucoadhesive films for treatment of common oral infectious diseases. Fourier Transform infrared spectra (FTIR spectra) of the extracts and the prepared films were analyzed to assess chemical components.

Materials and Methods: Films were prepared by mixing moisturizing agents, acetic acid, and chitosan with deionized water. Crude extracts of mangosteen pericarp, guava leaf, and the mixture of the guava and mangosteen extracts were added. The films were left dried in an incubator at the controlled temperature of 60 °C for 24 hr. FTIR-ATR was used to analyse the FTIR spectra of chemical components in the films. FTIR spectra between 700 – 4000 cm⁻¹ at the bottom of the samples were obtained.

Results: Thin mucoadhesive films (diameter of ~ 1-2 um) were prepared. The addition of crude extracts (1.5 wt%) was not inhibit the film formation. Peaks representing α -mangostin and quercetin were observed from FTIR spectra. Peak at 2866 cm⁻¹ (stretching of aliphatic C-H) attributable to α -mangostin was observed in mangosteen pericarp extract. Additionally, peak at 1643 cm⁻¹ (o-quinone molecules) attributable to quercetin was detected in guava leaf extract. Films containing mangosteen pericarp and guava leaf crude extracts showed comparable FTIR spectra. Peaks at 2866 cm⁻¹ and 1643 cm⁻¹ were however not evident in the prepared films due probably to low level of the extracts were used.

Conclusion: The mucoadhesive films containing mangosteen pericarp and guava leaf extracts can be successfully developed by using chitosan-based formulation with added low level of the extracts. The presence of α -mangostin and quercetin in the crude extracts can be confirmed by obtaining FTIR spectra. The peaks attributable to the active ingredients in the mucoadhesive films were however undetected due possibly to low level of extracts was used.

Keywords: Mangosteen Pericarp Extract, Guava Leaf Extract, Chitosan-Based Film

P11 Effects of Erythrosine with/out Nano-TiO₂ Mediated Photodynamic Therapy on HGF-1 and HOK Cells

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Background: The photodynamic therapy (PDT) is an alternative treatment for localized target tissue (e.g. tumors, cancers, etc.) that mainly results in target cell death in oxidation mechanism in producing reactive oxygen species (ROS). Erythrosine dye, not only is known as a standard disclosing agent in Dentistry, with its photosensitizer (PS) property, it also has been used as an antimicrobial Photosensitizer. However, the cell viability of normal human oral cells of Erythrosine dye tested with Nano-titanium dioxide (Nano-TiO₂) which is widely utilized as a photo-catalyst in order to enhance a photodynamic reaction still has been unknown.

Objectives: To study the effects of Erythrosine with/out Nano-TiO₂ as a photosensitizer on viability and morphology of normal human gingival fibroblast cell line (ATCC® CRL-2014, HGF-1) and Primary Human Oral Keratinocytes; HOK (ATCC® PCS200-014™) primary cells.

Materials and Methods: Eleven test groups of each HGF-1 and HOK were tested by Erythrosine as a photosensitizer in different concentration namely, Erythrosine (Ery) at 0 µM, 55 µM, 110 µM, 220 µM, and 440 µM in the presence and/or absence of 1% w/w Nano-TiO₂ with blue light, Nano-TiO₂ alone, and control groups (positive control = DMEM, and negative control = H₂O₂). With LED-dental curing light (BA Optima 10, 420-480 nm, 16-19 J/cm²) for 1 min, at 1, 6, or 24 hrs, cell viability assays using PrestoBlue® (Invitrogen, Life Technologies GmbH, Darmstadt Germany) with Varioskan™ at excitation/emission wavelength 560/590 nm. Cell morphology was investigated by SEM (S3000N, Hitachi, Japan).

Results: Erythrosine 440 with/out TiO₂ 1% µM that significantly reduced cell viability observed at 24 hrs in both HGF-1 and HOK. by utilizing one-way ANOVA (Tukey and Bonferini test). Furthermore, cell morphology changes e.g. increased intercellular width, cell shrinkage, etc. were observed by SEM.

Conclusion: Erythrosine with Nano-TiO₂, a novel PDT photosensitizer in the range of the present study exerted toxicity on HGF-1 and HOK cells at Erythrosine 440 with/out TiO₂ 1% µM, however the further cytotoxicity on multi layers cells and BrdU cell metabolism should be investigated.

Keywords: Photodynamic Therapy, Erythrosine, Blue LED Light, Human Gingival Fibroblast, Human Oral Keratinocytes

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