

Re-Inventing Japan Project  
大学の世界展開力強化事業

Inter-university Exchange Program toward Medical and Dental Networking  
in Southeast Asia

東南アジア医療・歯科医療ネットワークの構築を目指した大学間交流プログラム

国際セミナーX

若手研究者による講義シリーズ

English Lecture Series on Dental Science  
and Education by Young Academic Staff

2016年10月



東京医科歯科大学  
TOKYO MEDICAL AND DENTAL UNIVERSITY

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平成28年度大学の世界展開力強化事業  
にかかると手研究者による講義シリーズの概要について

本学は平成24年10月より大学の世界展開力強化事業「東南アジア医療・歯科医療ネットワークの構築を目指した大学間交流プログラム」に取り組んでいる。今年度のTMDU Dental Training Program 2016の開催にあたっては、本学の若手研究者の語学力向上・育成を目的として、招聘対象であるチュラロンコーン大学、シーナカリンウィロート大学、インドネシア大学、ホーチミン医科薬科大学計30名の歯学生に対し、若手研究者が各分野の最新研究や歯科医療事情について英語で4回に渡り講義を実施した。

実施日程

1. 10月12日(水) 9:00~9:45  
**“Introduction of *Department of Oral Pathology In TMDU*”**  
口腔病理学分野 栢森 高 助教
2. 10月13日(木) 9:00~9:45  
**“*Fixed Prosthodontics*”**  
摂食機能保存学分野 大森 哲 助教
3. 10月14日(金) 9:00~9:45  
**“*Clinical Roles and Researches of Removable Partial Denture*”**  
部分床義歯補綴学分野 和田 淳一郎 助教
4. 10月17日(月) 9:00~9:45  
**“*Dental Anesthesiology in Japan*”**  
麻酔・生体管理学分野 松村 朋香 助教

# TMDU Dental Training Program 2016

	1	2	3	4	5	6	7
Date	October 6, 2016 Thu	October 7, 2016 Fri	October 8, 2016 Sat	October 9, 2016 Sun	October 10, 2016 Mon	October 11, 2016 Tue	October 12, 2016 Wed
AM	Arrival	9:00-12:00 Opening Ceremony Orientation, Survival Japanese, Disaster drill	<b>Global Retreat</b> @ Seminar House, University of Tokyo Special lecture, Teamwork Activity, Cultural Show, and more!			9:00 meeting time 9:30-11:30 Clinical/ Basic Lab visit ①	9:00-9:45 Lecture
PM		12:00-12:50 Welcome Lunch				10:00-12:00 Clinical/ Basic Lab visit ③	
15:30-16:00		13:00 Campus Tour				13:00-15:00 Clinical/ Basic Lab visit② 15:30-17:00 International Symposium VII	13:30-15:30 Clinical/ Basic Lab visit ④
	Report writing	Report writing				Report writing	Report writing

	8	9	10	11	12	13	14
Date	October 13, 2016 Thu	October 14, 2016 Fri	October 15, 2016 Sat	October 16, 2016 Sun	October 17, 2016 Mon	October 18, 2016 Tue	October 19, 2016 Wed
AM	9:00-9:45 Lecture	9:00-9:45 Lecture	Japanese Culture Experience	Japanese Culture Experience	9:00-9:45 Lecture	<Research Day> 9:00-10:15 Lecture 1&2 10:30-12:30 Poster Viewing & Lunch 12:45-16:00 Oral Presentation  <Int'l Symposium> 16:30-18:00  <Closing Ceremony & Reception> 18:30-20:30 Report Writing	Departure
	10:00-12:00 Clinical/ Basic Lab visit ⑤	10:00-12:00 Clinical/ Basic Lab visit ⑦			10:00-12:00 IT Simulation Learning		
PM	13:30-15:30 Clinical/ Basic Lab visit ⑥	13:30-15:30 Clinical/ Basic Lab visit ⑧	Japanese Culture Experience	Japanese Culture Experience	13:30- Dental Company Visit		
15:30-16:00	Report Writing	Report Writing	Report Writing				

1. 10/12(水) 口腔病理学分野 栢森 高 助教

*“Introduction of Department of Oral Pathology In TMDU”*



12<sup>th</sup> Oct, 2016

## TMDU Dental Training Program 2016 Mini-Lecture

Kou Kayamori  
Assistant Professor  
Department of Oral Pathology  
Graduate School of Medical and Dental Sciences  
Tokyo Medical and Dental University

## 1. Introduction

## About my profile

### Education

- 2005 D.D.S., School of Dentistry, Tokyo Medical and Dental University

From 2006, April : Clinical resident training system for dental graduates (in Japan)  
Dental Sciences, Tokyo Medical and Dental University

### Professional Training and Employment

- 2009-2011 Clinical Fellow, Clinical Laboratory in Dental Hospital, Tokyo Medical and Dental University
- 2011-2013 Chief Doctor, Department of Pathology, Ohme Municipal Hospital
- 2013- Assistant Professor, Department of Oral Pathology, Graduate School of Medical and Dental Sciences, Tokyo Medical and Dental University

### Licenses and Certification

- Dental License (No.153606)
- Certificate for Autopsy of Corpse (No.8574)
- Board Certified Oral Pathologist (No.152, by Japanese Society of Pathology)

## Why was I aiming to become a dental doctor, especially, pathologist?

### Bronchial Asthma:

Chronic relapsing inflammatory disorder

(Clinical symptoms)

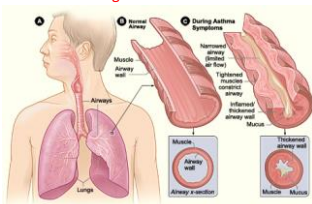
Episodic attacks of **wheezing**,

tightness of the chest,

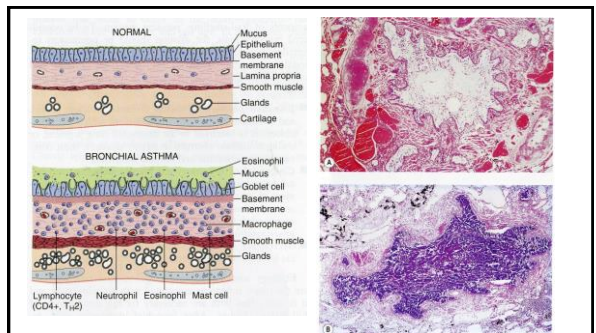
shortness of the breath and cough

(Cause)

Association with Atopy, which represents increased susceptibility to generate IgE in response to **external Allergens**.

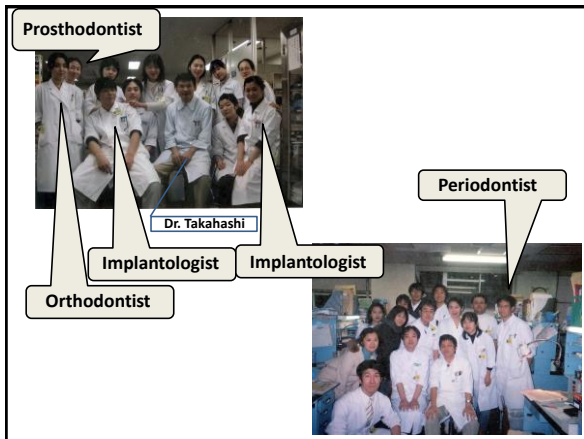
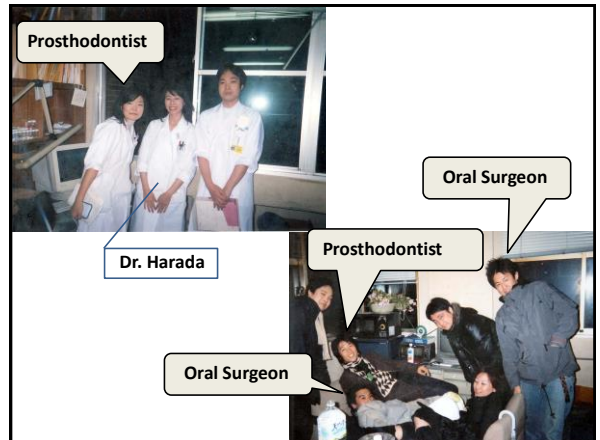


<http://www.nlm.nih.gov/health/health-topics/topics/asthma/>



- In those days, I was frequently absent from elementary school....
- For the treatment, I had to attend this university hospital **for 6 years!** ....

Why does there exist 'disease' in the world?  
 What causes 'disease' ?



In Japan, maybe similar to your countries...

- Most medical and dental students → Clinician
- Few students .....→ Basic scientist
- Most students are more interested in...
- Clinical Medicine > Basic Medicine

Most students often say that ...

- 'Pathology is too difficult! So, I dislike Pathology!'

### Why is Pathology so difficult for medical or dental students?



- Pathology is the study of disease.
- Pathology involves the investigation of the causes of disease and the associated changes at the level of cells, tissues, and organs.
- →
- To understand **abnormal** conditions, you must understand normal conditions.
- i.e. Basic medical science knowledge is very important! (Anatomy, Histology, Biochemistry, Physiology, Microbiology, Immunology, Molecular biology, ...)

So, ... Learning Pathology is challenging for many students.

## 2. Oral Pathology Graduate School Education and Laboratory

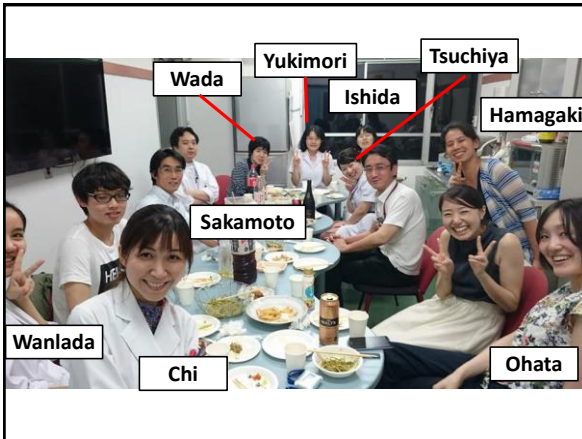
### Lab Member (2016)

#### (Staff)

- Junior Associate Professor: Kei Sakamoto✳, D.D.S., Ph.D.
- Assistant Professor: Kou Kayamori✳, D.D.S., Ph.D.
- Technical Officer: Miwako Hamagaki  
✳Board-certified Oral Pathologist by Japanese Society of Pathology

#### (Graduate School Students)

- Akane Yukimori, D.D.S., Wanlada Sawangarun, D.D.S. (4<sup>th</sup> grade)
- Yae Ohata, D.D.S. (3<sup>rd</sup> grade)
- Shoko Ishida D.D.S., Akane Wada, D.D.S. (2<sup>nd</sup> grade)
- Maiko Tsuchiya, D.D.S. (1<sup>st</sup> grade)



### Graduate School Education

#### 1. Surgical Pathology training

→for becoming a Board-certified Oral Pathologist

- Diagnostic pathology practice
- Autopsy practice



#### 2. Experimental Pathology

→for taking a Doctoral degree



### Clinical samples for pathological examination in Dental Hospital

- 2,600 samples (biopsy and operation )are annually submitted to the clinical laboratory for pathological examination.

ex)

Cystic lesion:

- Radicular cyst, Dentigerous cyst, Mucous cyst...

Inflammatory lesion:

- Lichen planus, ....

Neoplastic lesion (including benign and malignant):

- Odontogenic tumor, Salivary gland tumor, Tumor derived from oral epithelium, lymphoma, ...

- The Japanese graduate school students participate in pathological diagnosis of these clinical samples according to the guidance of staffs and also participate in autopsy practice in Medical Hospital.
- From all over the country, many dentists come to our oral pathology department with the aim of becoming **a board-certified oral pathologist** in the future.

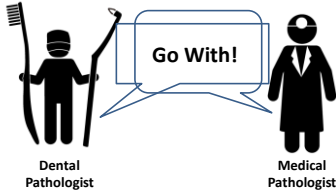


## G system

- In TMDU, Medical and Dental pathologists attend to pathological diagnosis and anatomy in corporation with each other.

→This characteristic system is called 'G System'

- 'G' means 'General' and 'Go With!'.

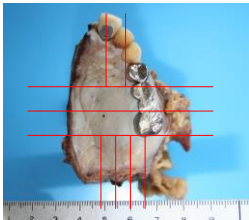


## For foreign graduate students

1. Surgical pathology
  - How to make histological specimens
  - Lecture the knowledge of microscopic diagnosis of various diseases
2. Experimental pathology
  - For taking a Doctoral degree



Preoperative radio-chemotherapy was performed



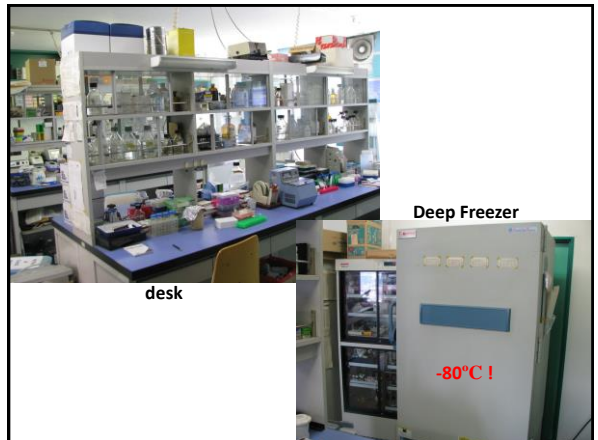
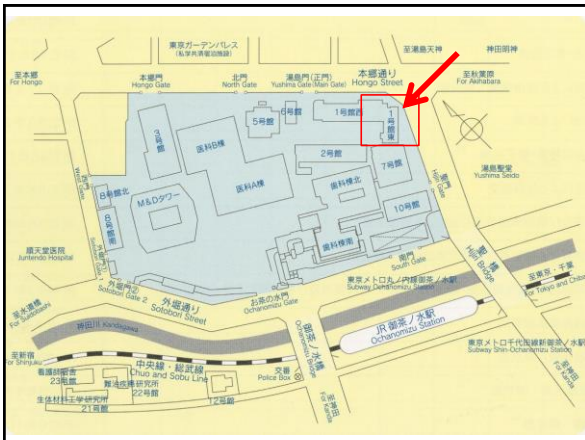
Through detailed observation.....

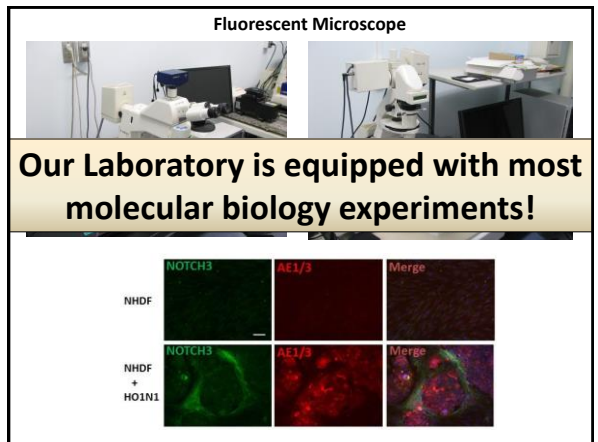
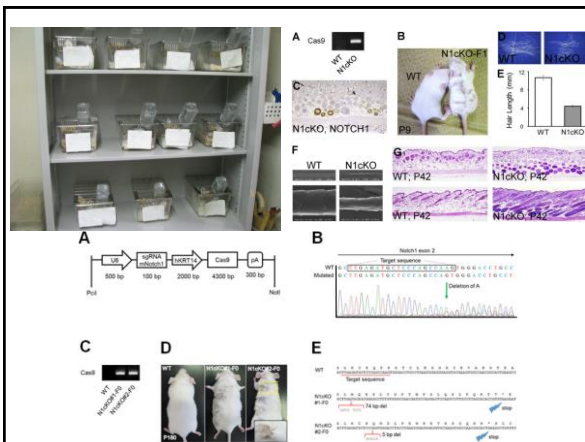
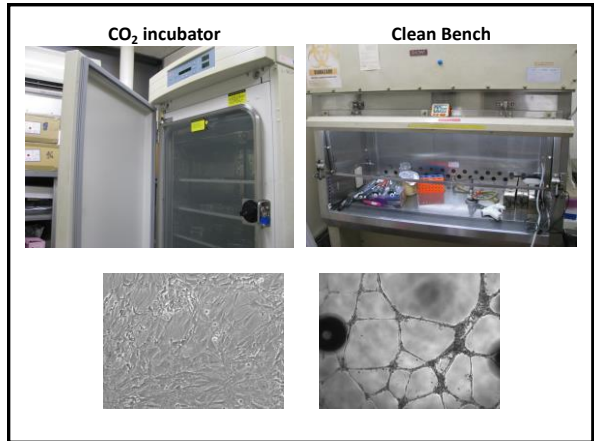
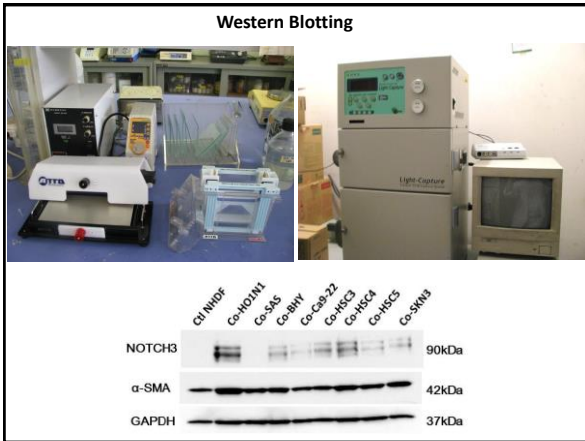
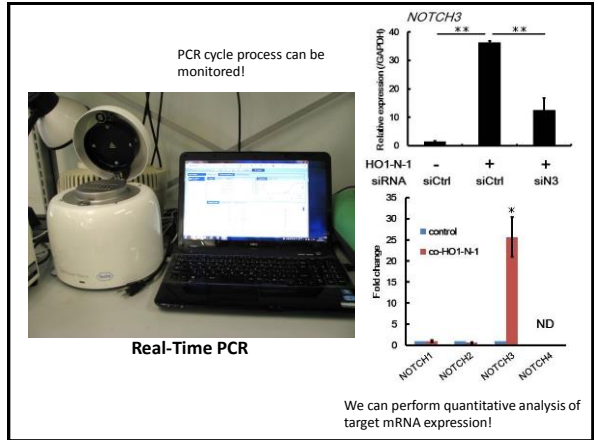
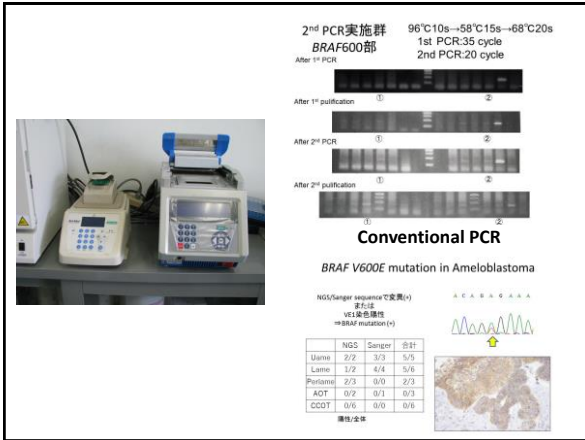
1. The histological type of cancer  
Ex) Squamous cell carcinoma

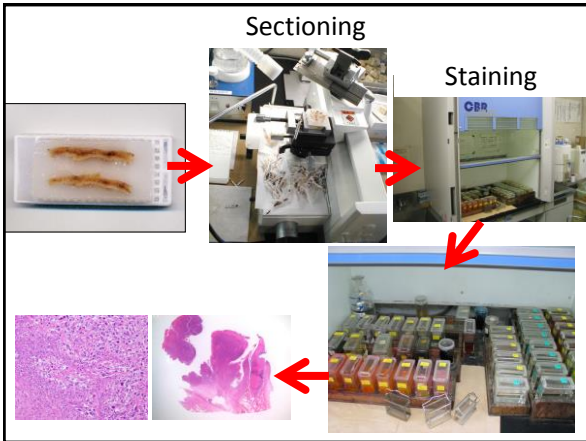
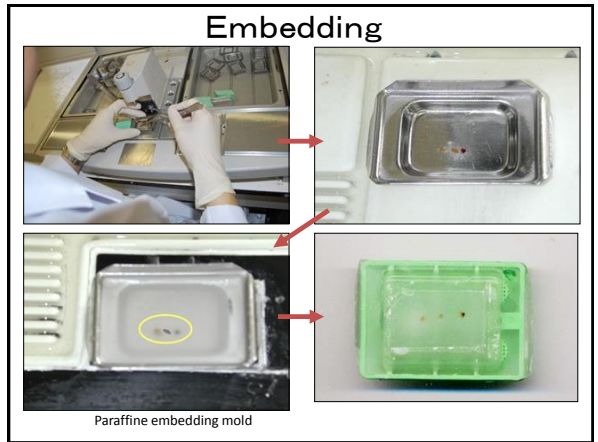
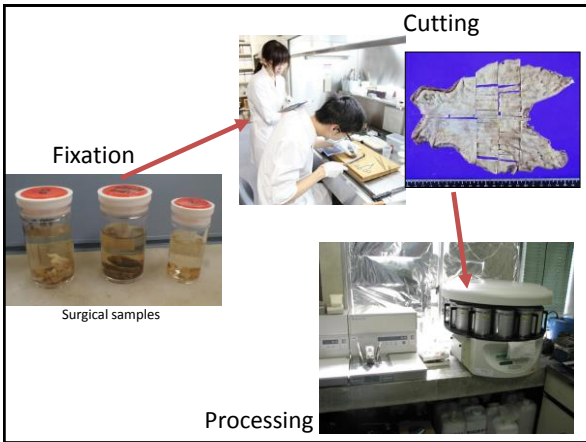
2. The extent of cancer cells within these materials  
Ex) margin check

3. The histological evaluation of  
Preoperative radiation and/or chemotherapy effect

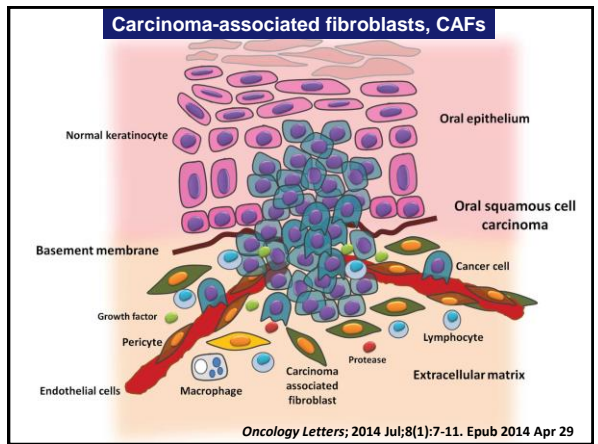
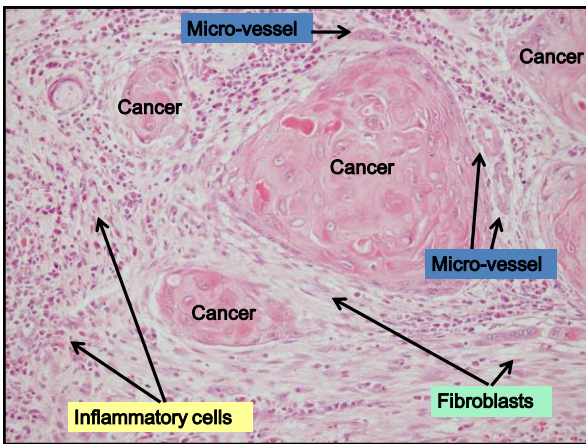
(mapping)

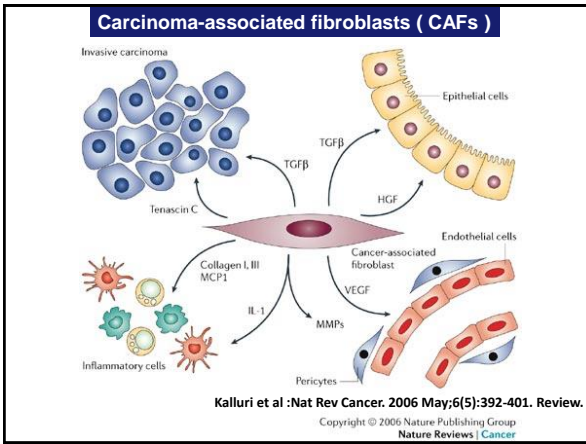






3. About My Research

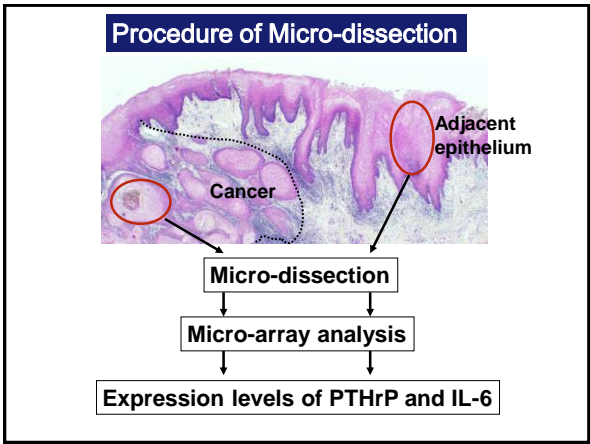
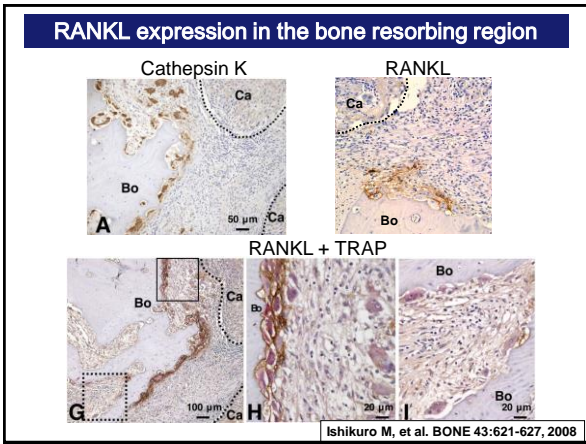
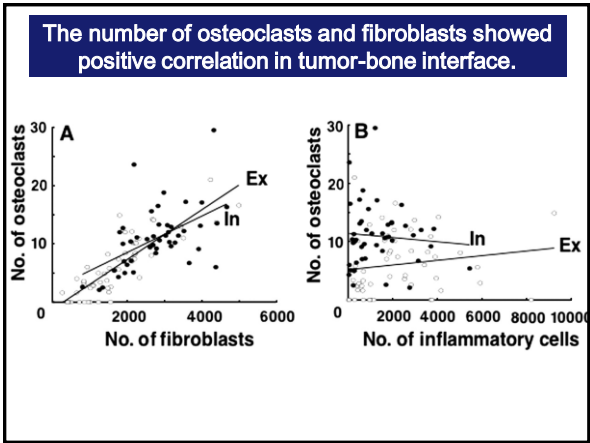
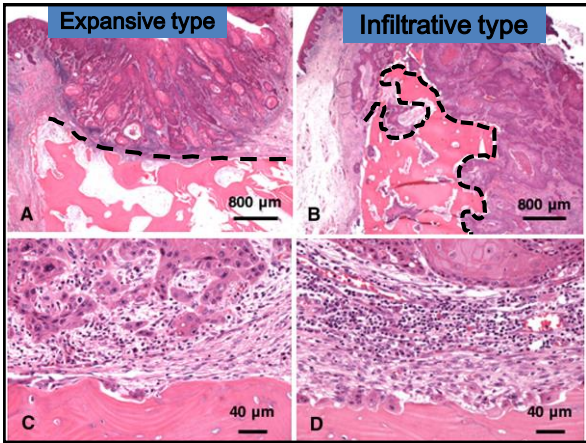


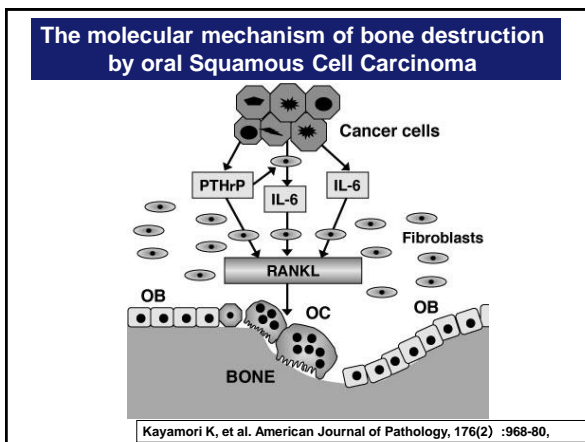
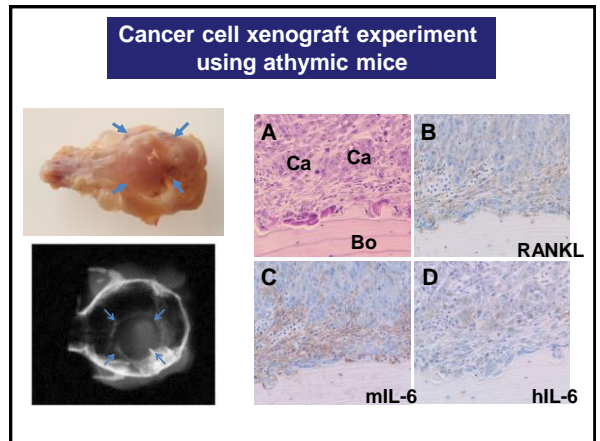
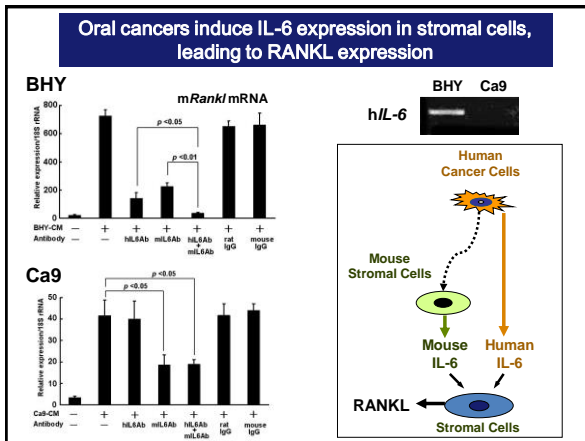
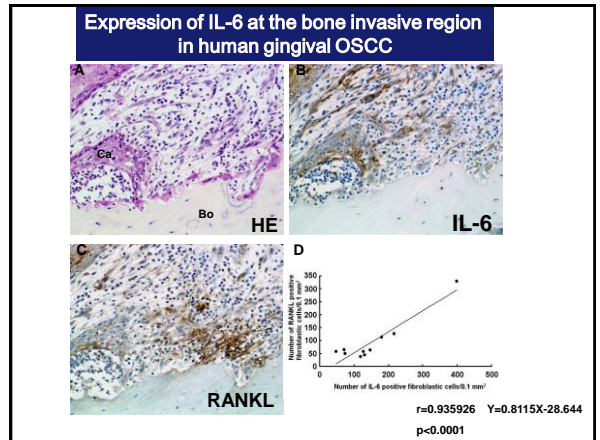
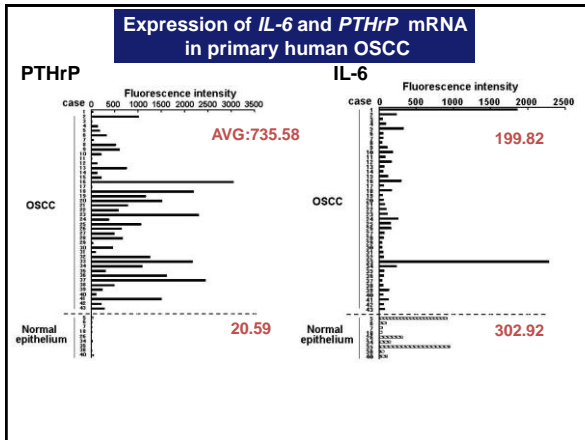


### Oral Cancer

- ✓ 1-5% of total malignant tumors
- ✓ Localization  
Tongue > Gingiva > Floor of mouth > Buccal mucosa
- ✓ Almost cases are squamous cell carcinoma (SCC)
- ✓ Gingival Carcinomas
  - Easily invade jaw bones
  - Bone invasion is a critical factor that regulates prognosis

Courtesy of Professor Ken Omura





**CXCL2 synthesized by oral squamous cell carcinoma is involved in cancer-associated bone destruction**

- Oue E, Lee JW, Sakamoto K, Iimura T, Aoki K, Kayamori K, Michi Y, Amagasa T, Yamaguchi A, *Biochem Biophys Res Commun*, 2012 Aug 3;424(3):456-461

**RANKL synthesized both stromal cells and cancer cells plays a crucial roles in osteoclastic bone resorption induced by oral cancer**

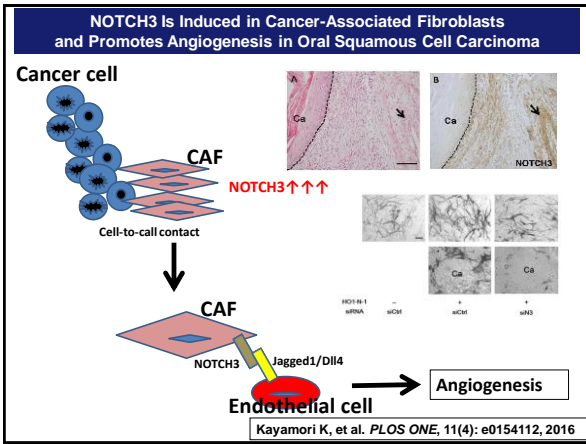
- Sato K, Lee JW, Sakamoto K, Iimura T, Kayamori K, Yasuda H, Shindoh M, Yamaguchi A, *American Journal of Pathology*, 2013 May; 182(5):1890-9

**Transforming growth factor- $\beta$  synthesized by stromal cells and cancer cells participates in bone resorption induced by oral squamous cell carcinoma**

- Nakamura R, Kayamori K, Oue E, Sakamoto K, Harada K, Yamaguchi A, *Biochem Biophys Res Commun*. 2015 Mar 20;458(4):777-82.

**Establishment of a xenograft model to explore the mechanism of bone destruction by human oral cancers and its application to analysis of role of RANKL**

- Tohyama R, Kayamori K, Sato K, Hamagaki M, Sakamoto K, Yasuda H, *J Oral Pathol Med*. 2016 May;45(5):356-64



## *Report from students |*

### <Chulalongkorn University>

- In the beginning of the day, I took a lecture from Oral Pathology department. Professor presented his amazing research about discovery of NOTCH3 role in angiogenesis. It was a very interesting knowledge to prevent cancer metastasis.

— Pranmas Teeranuwat

- I have learned a lot today. First, at the orofacial pain department, the professor gave me a lecture on the topic about the management of Temporomandibular disorder in Japan which quite different from Thailand. They have a concept called Tooth Contacting Habits. It's about the time that upper and lower teeth contact each other in one day and if the contacting time is higher, it's may lead to the TMD. So, the treatment is about to lower the contacting time by mainly rehabilitation. But in Thailand, we mainly use the splint and rehabilitation as a combination.

— Ditspol somsirivatana

### <Srinakharinwirot University>

- I had a lecture class in the morning which was started from 9:00~9:45 am. The lecture was about Pathology. I had learnt about

- Real time PCR: A chain reaction
- Western blotting: To detect target protein in sample
- Tissue processing: Embedding in paraffin mold, sectioned by microtome before stain

—Pornchanok Sangsuriyothai

- Assistant Professor Kou Kayamori told us about why he wanted to be a pathologist. He introduced about lab and taught us about specimens preparation step.

—Anusara Tongpoon

### <University of Indonesia>

- I got a chance to attend a lecture about Oral Pathology by dr. Kayamori. It was a good lecture that explained so many advantages of learning oral pathology in determining clinical diagnosis in dentistry.

—Johan Adiyasa

- We had the lecture about oral pathology by Kayamori Sensei. He is really a nice teacher and delivered such a nice presentation.

—Yohanes Bosko Ardy Winoto

- Today I attended a lecture from Dr. K. Kayamori about oral pathology. I learned about oral

pathology and how to diagnose the patients.

—Nadia Safira Ninda

### <University of Medicine and Pharmacy at Ho Chi Minh City>

- I started this day with the lecture by Dr. Kajamori about Pathology. Through this lecture, I widely understood what Pathology was, what Pathologist investigated and the relationship between Oral Pathology with other Medical Departments. Therefore, I was keen on the department and hoped to have a chance to have the further study for it once day.

—Nguyen Anh Phuc

- Dr. Kayamori introduced us to his major, his Department and especially Pathology implemented in Dentistry. I absorbed more about the pathological process, RANKL, Squamous Cell Carcinoma (SCC).

—Nguyen Ngoc Tan

- We had a lecture with Dr. Kou Kayamori, an Oral Pathologist. He taught us about the process to become a board-certified oral pathologist. The Pathology department has a lab at Building which is equipped with a Deep Freezer (down to -80 Celsius degree) and each doctor who works here have their own desk. This is the process of making a histological specimen: Fixation -> cutting -> processing -> embedding -> sectioning -> staining.

—Nguyen Dang Khoa

- Prof. Kayamori introduced for us many issues including Pathology studying, Graduate school Education. Japan education academy is quite similar to the other countries: most of dental and medical students intend to be clinician while the rest few one become researcher. He also explained why the pathology is difficult for medical student to understand. I was also reminded how to study pathology principal: if we want to understand unormal condition we have to know about normal condition. Additionally, He also introduced us pathological lab with many equipments and machine as well like freeze machine to store samples, conventional PCR, Realtime PCR, Western Blotting, CO2 incubator, Clean Bleaching and flouorescent microscope. Also, I had learn all steps to prepare sample for pathological research and diagnosis.

—Nguyen Nhu Hau

- Dr. K.Kayamori said that the percentage of localization of tongue cancer was the highest. In my perspective, oral pathology is one of the most stimulating subject that I have been studying. I am considering to do a research in this subject in the fifth year. That is why the lecture that I studied today will be useful for me.

—Nguyen Tran Yen Xuan



- Today's schedule began with a lecture by Dr. Kayamori. When he was young, he suffered asthma. For treatment, he had to attend this university hospital for six years and saw many patients suffering various diseases and he kept asking why disease existed in the world. That's the reason why he wanted to become a doctor and study oral pathology, which is a very difficult subject for me. Many doctors from Japan come to TMDU to become a board-certified oral pathologist. Then he showed us a case and introduced the Oral Pathology Department clinic with various high-tech instruments, including BRAF V600E, PCR machine, Western blotting machine, CO2 incubator, fluorescent microscope and so on. They used experimental mice to indicate the pathogenesis. At last, he introduced his research of carcinoma-associated fibroblasts "NOTCH3 Is Induced in Cancer-Associated Fibroblasts and Promotes Angiogenesis in Oral Squamous Cell Carcinoma." According to Dr. Kayamori, Japan is similar to Vietnam where most medical and dental students prefer clinical to basic research. I think doing researches is also very essential to enhance our clinical work.

—Bui Ngoc Huyen Trang

- Dr. Kou Kayamori gave the lecture about his specialty- Pathology and his researching topic. As what he said, Pathology is a basic science which is necessary for clinical treatment. However, only a few people choose to become a pathology scientist while most students want to become a clinician. He also introduced some modern technique that he always uses for researching. In my country, people prefer being a clinician than a researcher which is alike to Japan. I think they are all important but researching the basic sciences is necessary. Dr. Kayamori showed his enthusiasm in Pathology which made me want to study Pathology more even though it is hard.

—Doan Thi Phuong Hong

2. 10/13(木) 摂食機能保存学分野 大森 哲 助教


*“Fixed Prosthodontics”*



**- Fixed Prosthodontics -**

**Satoshi OMORI**  
 Fixed Prosthodontics,  
 Department of Restorative Science,  
 Graduate School,  
 Tokyo Medical and Dental University


**General introduction of Fixed Prosthodontics**



- Main research and clinical subjects of the department of **fixed prosthodontics** are the restoration and maintenance of occlusion, the function of jaw, metal-free restorations and dental allergy. We also have education course of fixed prosthodontics ( crown and bridge ) for undergraduate students of the dental school.

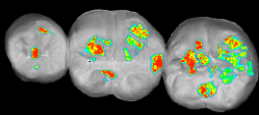
**Lectures & Courses**

- The major subjects of the studies are occlusion of Cr-Br prostheses (fixed restoration such as crown and fixed partial denture), analysis of mandibular movement, influence of crown and periodontal tissue and its systemic affect, accuracy of manufacturing processes of crown (i.e. casting, soldering, luting and adjustment of occlusion), functional analysis of stomatognathic system and development of apatite ceramic implant.




**Lectures & Courses**

- The research themes are investigated with measurement systems of mandibular movement, measuring instruments of tooth micro-displacement, electromyography, measurement apparatus of dimensional accuracy, EPMA (electron probe microanalyzer) for analyzing very small amount of dental alloy and histopathological methods, new dental materials, post and core, zirconia ceramics, and so on.




**Lectures & Courses**

- Clinical training and general lecture on prosthodontics are prepared for the graduate students in the first year. After the second year they will have special training for their research methods and experiments will be performed according to the research plan. In the last year the students will write the paper for thesis under the direction of the professor.



**Clinical Services**

- ✓ **Clinic for prosthodontics** (Prosthodontics practice clinic)  
 This clinic is organized by clinical teams, and 4 to 8 dentists compose 1 team working in cooperation between teams. Here offers a complete range of restorative, rehabilitative, and esthetic dentistry, treatment types include since simple one teeth to complete oral rehabilitation using the latest technologies.



## Clinical Services

### ✓ Clinic for dental allergy (Dental allergy clinic)

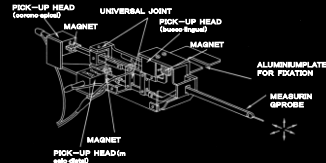
This clinic provides allergy tests test for dental alloys and dental materials on potential patients before dental treatment, besides, patients with skin and/or oral diseases histories induced by previous dental restorations. The causal allergen/s is/are identified by patch tests or if some metal restoration is allergy set on, is analyze by Electron Probe Micro Analyzer (EPMA), removing out only restoration such content allergens.



## Research

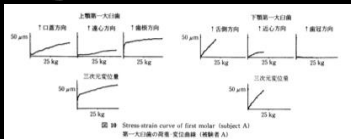
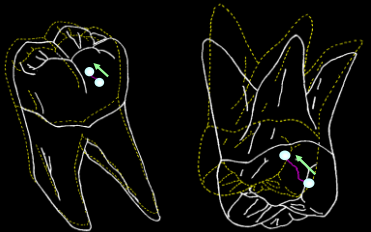
### 1. Occlusion and Mastication

- mandibular position, mandibular movement, articulator, masticatory efficiency



The displacement transducer Type M-3

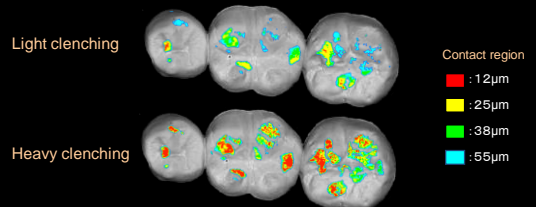
## Research



## Research

### 2. Influence of mechanical stress caused by occlusal contact on stomatognathic system

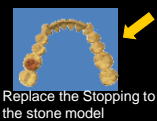
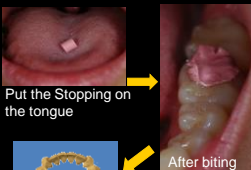
- Tooth displacement, distortion of alveolar bone, occlusal contact, proximal contact etc.



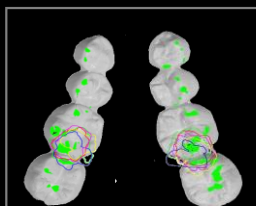
Change of close occlusal contact areas in lower left posterior teeth depending on clenching force.

## Research

### 3. Relationship of main occluding area and occlusal contact



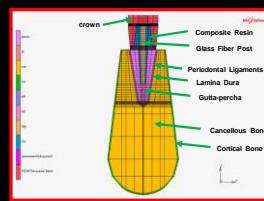
Measurement of main occluding area



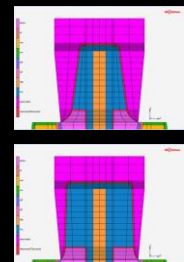
Main Occluding Area and Contact region under 50 μm (Adults)

## Research

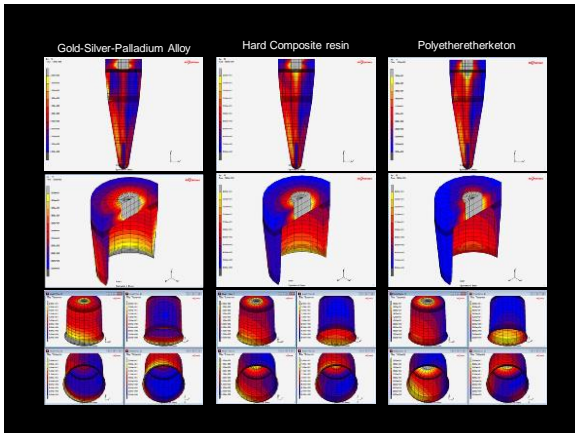
### 4. Research on post and core



Finite Element Model



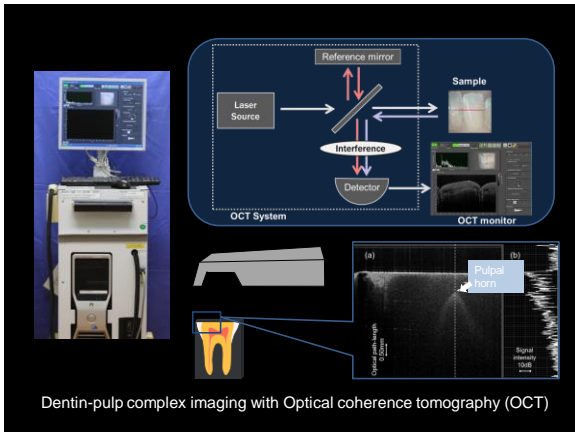
Finite Element Model (Different Crown Thickness)



## Research

### 5. Clinical application of latest technology and development of new materials

- (CAD/CAM, Zirconia, digital impression, optical coherence tomography(OCT) etc.)



## Research

6. Influence of dental materials for periodontal tissues and biological body.
7. Functional analysis of abnormal stomatognathic function
8. Dental allergy

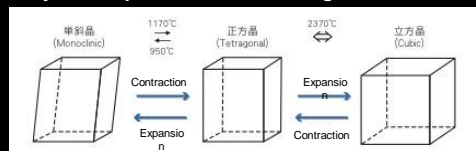
## What is Zirconia ?

- Zirconia is a crystalline dioxide of zirconium.
- Its mechanical properties are very similar to those of metals and its color is similar to tooth color. In 1975, Garvie proposed a model to rationalize the good mechanical properties of zirconia, by virtue of which it has been called "ceramic steel".
- Zirconia is used in machine parts, medical device, electronic device.



## Characteristics of Zirconia

### ① Crystalline phase & Volume change



By mixing  $ZrO_2$  with other metallic oxides, such as  $MgO$ ,  $CaO$ , or  $Y_2O_3$ , great molecular stability can be obtained.

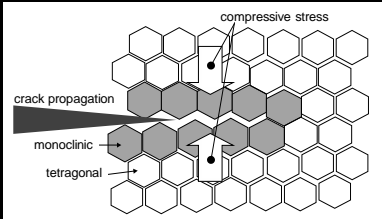
### ② Low-Temperature Aging Degradation (LTAD)

This is a phase transformation from tetragonal to monoclinic structure over a rather narrow but important temperature range, typically room temperature to around  $400^\circ C$ , depending on the stabilizer, its concentration, and the grain size of the ceramic.

## Characteristics of Zirconia

### ③ Stress-induced phase transformation

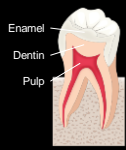
The transformation from tetragonal (t) into the monoclinic (m) form can occur under high localized stress. The phase t→m transformation is associated with 3–4% volume change. This transformation leads to the development of localized compressive stresses being generated around and at the crack tip preventing further crack propagation.



## Effect of thickness of zirconia-ceramic crown frameworks on strength and fracture pattern

*My Recent Research*

## Introduction



Essential tooth structure consists of enamel, dentin and pulp from outside to inside.

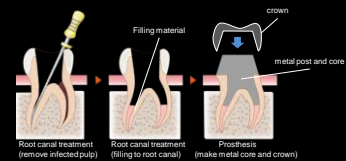
If we have deep or extensive dental decays (caries), we need to restore the missing enamel and dentin with crown in order to recover the ability of occlusion.

Classification of dental caries



Deep or extensive caries → Need root canal treatment  
Restore with crown

## Introduction



- First, root canal treatment is performed. (remove infected pulp)
- Second, to fill the filling material to root canal.
- Third, dental prosthesis is performed. (make metal post and core to restore the cavity and make crown to restore the shape of original tooth)

## Introduction

- In the **dental prosthesis**, crown restorations were made of precious metal for a long time. But, metal material doesn't have high esthetics compared to the tooth color.
- On the other hand, ceramic material was also used to make the restorations. Ceramic material has high esthetics compared to the metal.



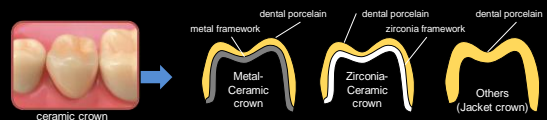
metal crown



ceramic crown

## Introduction

- Ceramic crown was classified 3 groups (Metal-ceramic crown, Zirconia-ceramic crown, others).

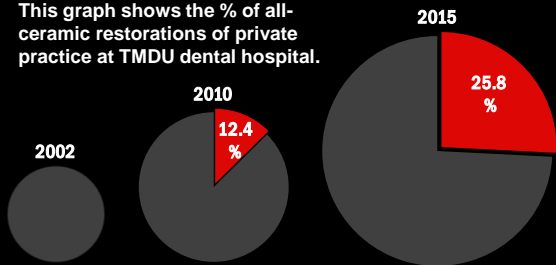


- In this study, we focused on the zirconia-ceramic crown. Zirconia-ceramic crown consists of zirconia framework and dental porcelain.
- Zirconia-ceramic crown has many advantages (superior mechanical properties, high esthetics, high biocompatibility, low risk of metal allergy) compared to metal-ceramic crown. However, it has a clinical problem concerning about chipping and fracture of porcelain.

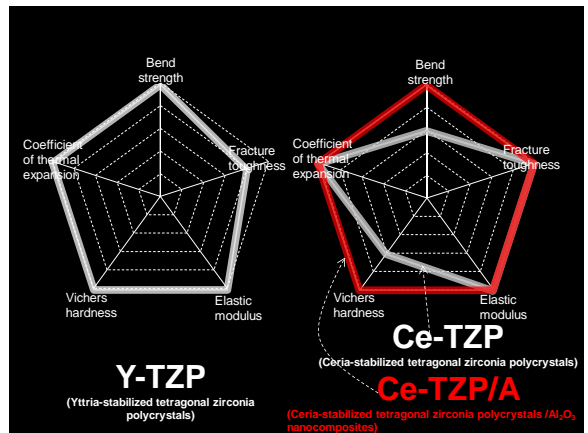
## Introduction

Recently, all-ceramic restorations have become popular.

This graph shows the % of all-ceramic restorations of private practice at TMDU dental hospital.

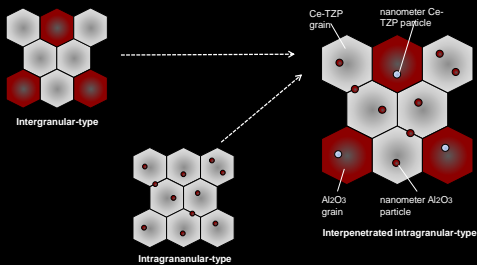


Rate of all-ceramic crown in the single crown restoration of private practice at dental hospital of Tokyo Medical and Dental University  
Shin C, et al., Statistical Analysis of Prostheses Restorations at Dental Hospital of Tokyo Medical and Dental University  
(The 120<sup>th</sup> Scientific Meeting of Japan Prosthodontic Society)



## Ce-TZP/A

(Cerium-stabilized tetragonal zirconia polycrystals / Al<sub>2</sub>O<sub>3</sub> nanocomposites)



Ce-TZP/A has superior mechanical properties

Possibility of **thin** Ce-TZP/A ceramic crown framework

**Thin** Ce-TZP/A ceramic crown framework provide...

- Less reduction for tooth preparation
- Minimal Intervention
- Preservation of pulp vitality

Expanding the clinical applications of zirconia-ceramic restorations

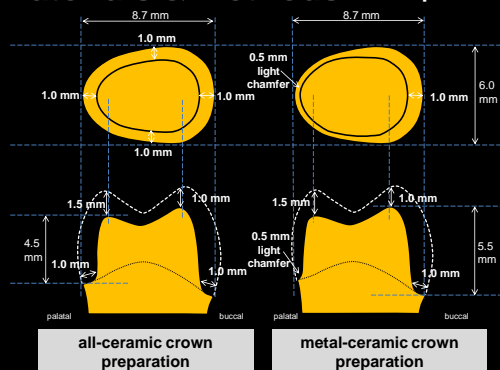
## Objectives

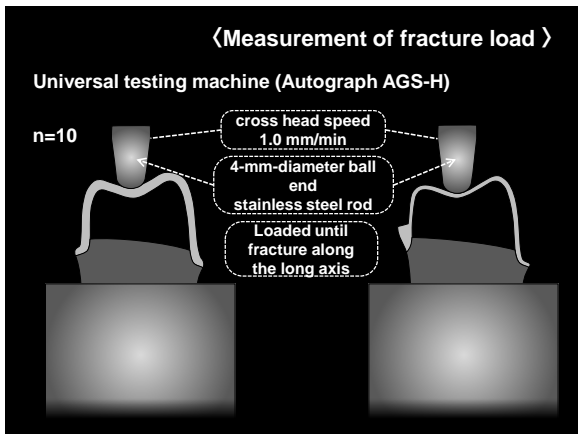
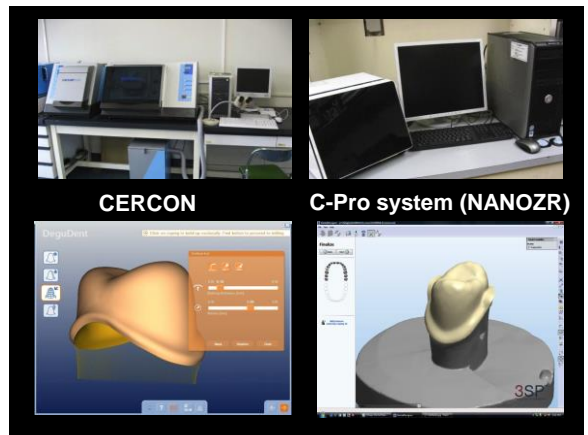
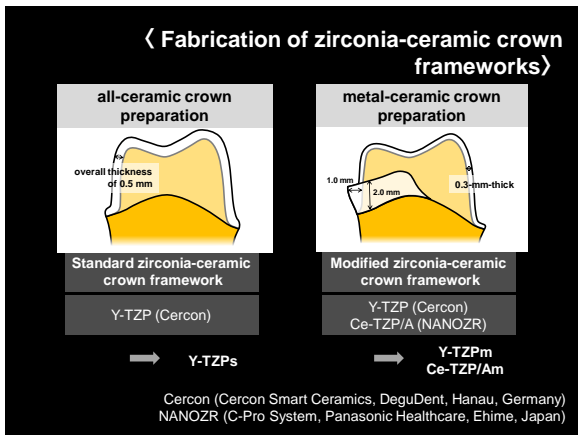
The aim of the present study was

to evaluate the **fracture load** and **fracture mode** of Ce-TZP/A and Y-TZP ceramic crown frameworks

in order to assess the feasibility of thin Ce-TZP/A ceramic crown frameworks.

## Materials & Methods (Preparation)





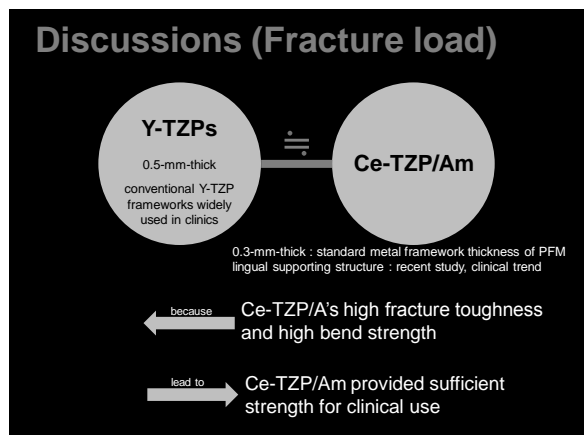
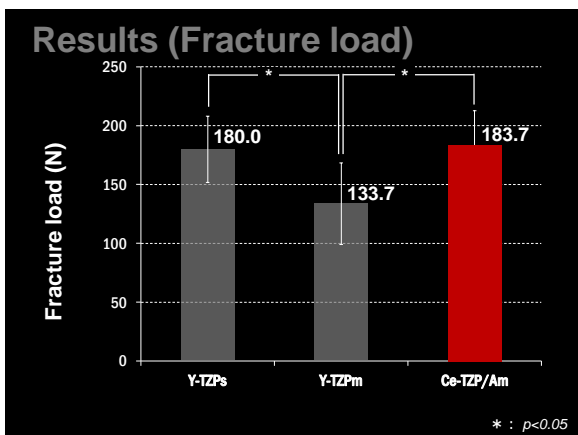
### 〈 Fracture mode 〉

Type A : fracture limited to the occlusal surface

Type B : fracture extending from the occlusal to axial surface or marginal line

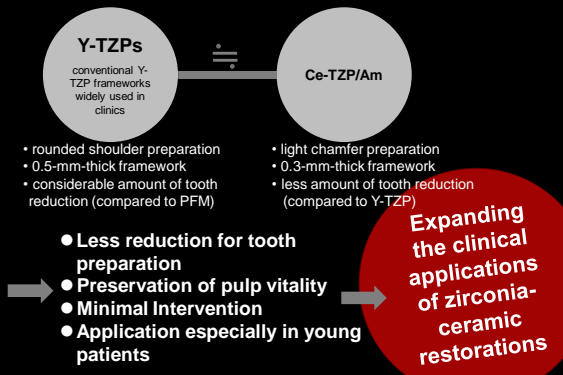
### 〈 Statistical analysis 〉

One-way analysis of variance (ANOVA) ( $\alpha=0.05$ )  
 Tukey HSD test ( $\alpha=0.05$ )





## Discussions (Fracture load)



## Conclusions

- **Ce-TZP/Am** provide sufficient strength for clinical application.
- **Ce-TZP/A** can be used with 0.3-mm-thick as zirconia-ceramic crown frameworks. And adding lingual supporting structure would be preferable.
- **Amount of tooth preparation** can be reduced using a Ce-TZP/A ceramic crown framework.

## *Report from students II*

### <Chulalongkorn University>

- Today in the morning I learned about fixed prosthodontics . The professor showed us more about Zirconia and his research . I learned that evidence -based learning is becoming more interesting and beneficial .

—Onkamon Budsabong

- The first thing we have learnt today was about Fixed Prosthodontics which including many subjects such as occlusion of Cr-Br prostheses, analysis of mandibular movement, etc. It helped me to scope this department briefly.

—Ornjira Wiriyapongsukit

- I took a lecture from Oral Pathology department. Professor presented his amazing research about discovery of NOTCH3 role in angiogenesis. It was a very interesting knowledge to prevent cancer metastasis.

—Pranmas Teeranuwat

- I had a lecture of fixed prosthodontics which was about some of researches such as zirconia research. This research studied the effect of thickness of zirconia-ceramic crown frameworks on strength and fracture pattern. It was found that nano-zirconia was used for minimal intervention and preservation of pulp vitality. The lecture was very useful and up-to-date knowledge for fixed prosthodontics. Zirconia is now more popular than the past so it is good to know about zirconia as much as possible.

—Thansinee Kunapinun

- I had a lecture of the progression for fixed prosthodontics using Zirconia with Professor Satoshi. It is really interesting because it was a new knowledge for me. I have never learned about it before. I think this method will be popular in Thailand soon due to its advantage.

—Suphiwat Chantapattarangure

### <Srinakharinwirot University>

- Today I had a prosthodontics lecture class, which was about fixed prosthodontics by Dr. Satoshi Omori. There were many research about fixed prosthodontics for example, research about occlusion and mastication, influence of mechanical stress caused by occlusal contact on stomatognathic system and dental allergy. Moreover, there were a research about Zirconia.

—Pornchanok Sangsuriyothai

- I started the day with fixed prosthodontics lecture by Professor Satoshi Omori. He introduced

about the department, main research and clinical subjects. He gave us an examples of research topic that performed in this department such as research about occlusion and mastication, post and core, influence of mechanical stress caused by occlusal contact on stomatognathic system etc. He also taught us what is zirconia and characteristics of zirconia. And he told us about his recent research “Effective of thickness of zirconia ceramic crown frameworks on strength and fracture pattern”.

—Anusara Tongpoon

#### <University of Indonesia>

- I learned about fixed prosthodontics from Dr. Satoshi Omori who gave a lecture today. He explained so many things about fixed prosthodontics. To be honest, I have already learned fixed prosthodontics in my university, but this lecture reinforces all my knowledge and practical skill. It also showed me the difference between prosthodontics treatment in UI and TMDU. I was so amazed by the research that he is currently doing now.

—Johan Adiyasa

- Doctor Satoshi Amori. explained about Fixed prosthodontics . The main research and clinical subject of fixed prosthodontics are restoration and maintenance of occlusion, the function of jaw, metal-free restoration and dental allergy, in undergraduate student also learn about crown and bridge. The presentation was great, he explained all kinds of the treatment which can do in Department of Fixed Prostodontics.

—Andre Kurniawan

#### <University of Medicine and Pharmacy at Ho Chi Minh City>

- Dr. Omori made a general introduction of his Department, then a brief talk on some researches including “Influence of mechanical stress caused by occlusal contact on stomatognathic system”, “Dental allergy”, ... The most interesting part was his recent research on Zirconia. I have known Zirconia before but after this lecture I knew more about its characteristics and especially the effect of thickness of Zirconia-ceramic crown frameworks on strength and fracture pattern.

—Nguyen Ngoc Tan

- I took part in a lecture in special auditorium in Dental Building North. The lecture was about essential and basic knowledge about fixed prosthodontics by Doctor Satoshi Omori. I had learned about this last year, but I also learned many new thing that related to mordern technique in Prosthodontics treatment. He introduced for us in detailed about general introduction including education, research, study or courses related to fixed Prosthodontics and clinical training. This was the first time that I have heard there is a special clinic for

dental allergy in order to test for dental alloys and dental materials on potential patients before dental treatment, including patch test and EPMA. I was also introduced about research topic consisting of Occlusion and Mastication, Influence of mechanical stress caused by occlusal contact on stomatognathic system, relationship of main occluding area and occlusal contact and so on. Additionally, I was introduced about Zirconia including the characteristics and his recent research related to effect of thickness of zirconia- ceramic crown frameworks on strength and fracture.

—Nguyen Nhu Hau

- We had general introduction of lectures, courses, clinic services and some of researches before he focused on Zirconia which was a crystalline dioxide of zirconium. His recent research was about effect of thickness of zirconia-ceramic crown frameworks on strength and fracture pattern. They have been expanding the clinical applications of zirconia-ceramic restorations as thin Ce-TZP/A ceramic crown framework provide not only less reduction for tooth preparation, but also minimal intervention and preservation of pulp vitality.

I had studied the subject of Dental Materials including ceramics. In our faculty, ceramic crown is classified into 3 groups consisting of porcelain, glass ceramics and oxide ceramics and zirconia is a type of oxide ceramics but hadn't had an opportunity to know much about zirconia.

—Nguyen Tran Yen Xuan

- Dr. Satoshi omori presented about his fixed prosthodontics department. They have many lectures, courses and reseaches mainly focus on the occlusion of Cr-Co prostheses, analysis of mandibular movement, influence of crown, functional analysis of stomatognathic system and development of apatite ceramic implant. Then we studied basic knowledge of zirconia-which is a useful material in fixed prosthodontics.

—Doan Thi Phuong Hong

3. 10/14(金) 部分床義齒補綴学分野 和田 淳一郎 助教

“Clinical Roles and Researches of Removable Partial Denture”





# Clinical Roles and Researches of Removable Partial Denture

Junichiro WADA

Assitant Professor

Department of Removable Partial Denture Prosthodontics



## AGENDA

1. What's a RPD?
2. The Gap Between Patients and Dentists
3. QoL depends on Patients
4. What is needed to bridge the gap? (Researches)

### 1. What's a RPD ?

RPD's **Strong Points** are ...

- ✓ Medically Compromised Patients (Minimally invasive)
- ✓ Heavy Ridge Resorption
- ✓ Secondary Splinting



Almost all patients can be applied.



### 1. What's a RPD ?

RPD's **Weak Points** are ...

- ✓ Foreign matter sensation
- ✓ Speech impairment
- ✓ Esthetic disturbance

"feel like sucking on a big lollipop all day!"



Does someone notice that I'm wearing a denture...?



### 2. The Gap Between Patients and Dentists

#### Patient's Wish

- ✓ No pain
- ✓ Low cost
- ✓ Low risk
- ✓ Look good
- ...etc

VS

#### Dentist's Goal

- ✓ Save remaining teeth
- ✓ Long-term prognosis
- ✓ Function recovery
- ...etc



### 3. QoL depends on Patients

Who can understand what I feel ??



No one but you...



4. What's needed to bridge the gap?

Compromise!

Patients Dentists

We need Informed Consent

4. What's needed to bridge the gap?

1. The relationship between Patient's QoL and RPD
2. Novel Material and Method to meet Patient's hope
3. The Clinical Effect of RPD

My Researches

1. Evaluation of Influence of RPD on Speech Production
2. Novel Material and Method to Fabricate RPD without Metal Clasps
3. The Effect of RPD on Patients with Severe Periodontitis

Available online at www.sciencedirect.com

ScienceDirect

Journal of Prosthodontic Research

Original article

Influence of the major connector in a maxillary denture on phonetic function

Junichiro Wada DDS<sup>a,\*</sup>, Masayuki Hideshima DDS, PhD<sup>a</sup>, Shusuke Inukai DDS, PhD<sup>a</sup>, Tomohiro Ando DDS, PhD<sup>a</sup>, Yoshimasa Igarashi DDS, PhD<sup>a</sup>, Hiroshi Matsuura PhD<sup>b</sup>

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Received 28 October 2009; received in revised form 24 February 2011; accepted 23 March 2011

Available online 25 May 2011

The middle type of the major connector would be recommended from a viewpoint of phonetic function.

Folia Phoniatrica et Logopaedica

Folia Phoniatrica Logop 2014;66:227-236  
DOI: 10.1159/000369429

Received June 2, 2014  
Accepted October 28, 2014  
Published online February 5, 2015

Influence of the Width and Cross-Sectional Shape of Major Connectors of Maxillary Dentures on the Accuracy of Speech Production

Junichiro Wada<sup>a</sup>, Masayuki Hideshima<sup>a</sup>, Shusuke Inukai<sup>a</sup>, Hiroshi Matsuura<sup>a</sup>, Noriyuki Wakabayashi<sup>b</sup>

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The width and cross-sectional shape of connector has **limited effects** on the articulation of consonants at the posterior areas of the palate.

Acta Odontologica Scandinavica, 2015, 73: 33-37

informa

ORIGINAL ARTICLE

A comparison of the fitting accuracy of thermoplastic denture base resins used in non-metal clasp dentures to a conventional heat-cured acrylic resin

JUNICHIRO WADA<sup>a</sup>, KENJI FUEKI<sup>a</sup>, MASARU YATABE<sup>a</sup>, HIDEKAZU TAKAHASHI<sup>a</sup> & NORIYUKI WAKABAYASHI<sup>b</sup>

<sup>a</sup>Section of Removable Partial Prosthodontics, Department of Maxillary Function Rehabilitation, Graduate School of Medical and Dental Sciences, and <sup>b</sup>Oral Biomaterials Engineering, Department of Oral Materials Sciences and Technology, Faculty of Dentistry, Tokyo Medical and Dental University, Tokyo, Japan

Conventional RPDs with metal clasps are associated with growing old.

NMCDs with resin clasps make patients aesthetically satisfied.

The effect of removable partial denture placement on periodontal structures of abutment teeth in patients of periodontitis: A digital subtraction analysis

Watanabe C, Wada J, Mizutani K\*, Watanabe H\*, Wakabayashi N

Department of Removable Prosthodontics, Graduate School of Dentistry Tokyo Medical and Dental University, \*Department of Periodontology, \*\*Department of Oral Radiology

- ✓ Digital Subtraction technique can evaluate the qualitative & quantitative change.
- ✓ RPD has **no harmful effect** on the abutment teeth weakened by severe periodontitis.
- ✓ RPD placement caused increase of the total occlusal force and decrease of the pressure on abutment teeth.

RPD can **protect the abutment teeth** in patients with severe periodontitis.

## *Report from students III*

### <Chulalongkorn University>

- I started the day with lecture about Removable partial denture which I got lots of knowledge for example, the principle advantage of RPD is cross-arch stabilization and almost every patient can be applied because of minimally invasive so patient who has heavy ridge resorption also can be got treatment moreover it can be used as secondary splinting.

—Ornjira Wiriyapongsukit

- I had a removable partial denture class in the morning. I learned the basic of RPD, the gap between the patients and the dentists, and also the research that can improve the weak points such as NMCDs with resin clasps.

—Pranmas Teeranuwat

### <Srinakharinwirot University>

- I had a lecture about removable partial denture. Advantage and disadvantage for removable partial denture. Advantages are RPD is use in patient with medically compromise, heavy ridge resorption and secondary splinting. Disadvantages are speech impairment, esthetic disturbance and may be a foreign matter sensation. Teacher also told me about his research.

—Pornchanok Sangsuriyothai

- My day started with a special lecture by assistant professor Junichiro Wada about RPD. I learnt from his research that the width and crosssectional shape of connector has limited effects on the articulation of consonants at the posterior areas of the palate. From his another study showed that RPD can protect the abutment teeth in patients with severe periodontitis.

—Chatruethai Kanchanasobhana

### <University of Indonesia>

- Today, I attended a very special lecture about removable prosthodontics in the morning. It was very great, I enjoyed it so much.

—Johan Adiyasa

- Doctor Junichiro Wada explained about Removable partial denture (RPD). He also explained that removable partial denture has some good points, those are medically compromised patient (minimal invasive), to prevent heavy ridge resorption, and as secondary splinting. I think that class was really interesting besides I also like prosthodontic much.



—Andre Kurniawan

**<University of Medicine and Pharmacy at Ho Chi Minh City>**

- I had a lesson taught by Dr. Junichiro Wada about the clinical roles and researches of Removable partial denture prosthodontics. He analysed the strong and weak points of removable partial denture; then the gap between patients and dentists. The patient's wish was no pain, low cost but good looking, and the dentist's goal was long-term prognosis and the function recovery. Finally he showed us some of his researches in order to bridge this.

—Nguyen Anh Phuc

- My studying day got started with the lecture and today's lecture was about "Clinical roles and researches of Removable partial denture" by Dr. Wada. The part of his lecture I loved the most is the gap between Patients and Dentists.

—Nguyen Ngoc Tan

- Dr. Wada introduced generally about RPD- removable partial denture including strong points and week points and its value and role in dental treatment. I also knew about the gap between patients and dentists. There were many problems that the patient usually comment when they had a dental treatment, such as the cosmetic disturbance, pain during eating, morbidity or foreign sensation, setting many challenges for cosmetic professional particularly and dentistry generally. Besides, he shared his very practical research related to what needed to bridge the gap. I was provided lots of knowledge related to removable patial prosthodontics like the differnce and cosmetic improvement of conventional RPD and NMCDs, or secondary splinting and primary splinting. I could realize the importion role of RPD and it should be the basic knowledge for me to get in prosthodontic aspect.

—Nguyen Nhu Hau

4. 10/17 (月) 麻醉・生体管理学分野 松村 朋香助教

*“Dental Anesthesiology in Japan”*



## Dental Anesthesiology in Japan

Tomoka Matsumura, DDS, PhD.  
Anesthesiology and Clinical Physiology

TMDU

## What is Dental anesthesiology?

1. Systemic Management of Dental Patients
2. Pain Clinic in Dentistry
3. Dental Anesthesiologists and Local Community

## Systemic Management of Dental Patients

- ◆ General Anesthesia
- ◆ Sedation
  - Nitrous Oxide Inhalation Sedation
  - Intravenous Sedation
- ◆ Monitored Anesthesia Care
- ◆ Emergency Service

## General Anesthesia (in operation room)



## General Anesthesia (Ambulatory anesthesia )



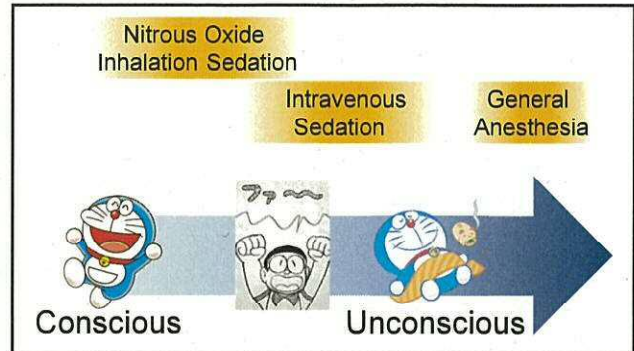
1. The persons with disabilities
2. Less expensive than hospitalization
3. Minimal hospitalization



## Sedation for dentistry

- Nitrous Oxide Inhalation Sedation
- Intravenous Sedation

- Different from GA  
(conscious, reflexible)
- Needs Local Anesthesia



## Nitrous Oxide (N<sub>2</sub>O) Inhalation Sedation



## Intravenous Sedation (IV sedation)

- ◆ Sedation using drugs
- ◆ Spontaneous breathing  
– nonintubated
- ◆ Amnesia
- ◆ Anesthetic level adjustment

## Drugs for Sedation

- ◆ Benzodiazepine Derivatives
  - Diazepam
  - Midazolam
  - Flunitrazepam
- ◆ Intravenous Anesthetics
  - Propofol
  - Thiamylal
  - Ketamine

## Monitored Anesthesia Care



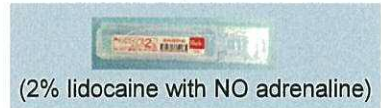
- Patients with
- ◆ Hyper tension
  - ◆ Diabetes
  - ◆ Heart disease
- so on...



The percentage of elder people is increasing in Japan.



+

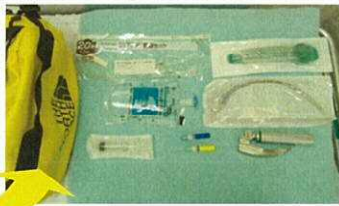


↓

(2% lidocaine + 1/160000 adrenaline)



Emergency Service



## Pain Clinic in Dentistry

### Orofacial Pain




- ◆ Trigeminal neuralgia
- ◆ Burning mouth syndrome
- ◆ Postoperative residual paralysis

### Treatment

- ◆ Counseling
- ◆ Medication
  - ex) anti-seizure drugs
  - vitaminB12
- ◆ Chinese medicine
  - Herbal treatment
  - Acupuncture



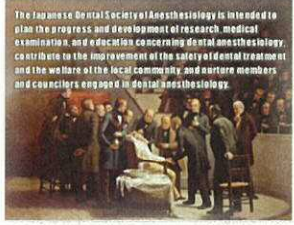
## Dental Anesthesiologists and Local Community

 **The Japanese Dental Society of Anesthesiology (JDASA)**

[Home page](#) [Japanese](#)

- About JDASA
- Info
- Meeting
- Journal
- Specialist
- Link

The Japanese Dental Society of Anesthesiology is intended to plan the progress and development of research, medical examination, and education concerning dental anesthesiology, contribute to the improvement of the quality of dental treatment, and the welfare of the local community, and our members and councilors engaged in dental anesthesiology.



William T. G. Morton was a dentist who first publicly demonstrated the use of ether as a anesthetic at the Ether Dome of the Massachusetts General Hospital in 1846.  
(A reproduction of Robert C. Hinckley's "First Operation Under Ether" owned by the Boston Medical Library.)

## The Certification System

- ◆ Japanese Board of Dental Anesthesiology  
1,255 certified members
- ◆ Consultant of Dental Anesthesia Specialty  
283 certified members

## For Disabled, and Elderly Dental Patients



- Evaluation of the patient
- Monitoring
- Sedation
- General anesthesia



Thank you for your attention!

Tomoka Matsumura  
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## *Report from students IV*

### <Chulalongkorn University>

- Today we had a lecture on the topic of Dental Anesthesiology in Japan. I got a lot more knowledge about Anesthesia such as Systemic management of dental patients, Pain clinic in Dentistry and sedation.

—Onkamon Budsabong

- The first class is Dental Anesthesiology in Japan by Tomoka Matsumura. I learned a lot of basic principle of anesthetics. It is very useful for me.

—Pranmas Teeranuwat

### <Srinakharinwirot University>

- I had a lecture class, which was about dental anesthesiology in Japan. Dental anesthesia was improving dental treatment in patient that may be non-cooperative or disabilities. I learnt about the level of consciousness of patient that had to sedate and also drugs in use for sedation. While patients were in a sedation or general anesthesia, dentists and doctors must monitored vital sign closely.

—Pornchanok Sangsuriyothai

- The lecture was so interesting because providing the dental treatment under sedation is not so popular in Thailand due to its extra cost of treatment but it seems to be popular in Japan. I learnt about Nitrous Oxide Inhalation Sedation, Intravenous Sedation and General Anesthesia about its effect and depth of anesthesia.

—Chatruethai Kanchanasobhana

- We learned the differences among general anesthesia, nitrous oxide inhalation sedation, and intravenous sedation. We also learned about how to manage and monitor anesthesia care. Pain clinic (in dentistry) is for treating patients with orofacial pain such as trigeminal neuralgia, burning mouth syndrome, and postoperative residual paralysis. There are three different kinds of treatment that are counseling, medication, and Chinese medication. For example, in case of medication, we give patients anti-seizure drugs to relieve trigeminal neuralgia's symptoms.

—Ornuma Srihawan

### <University of Indonesia>

- The lecture was pretty interesting because Anaesthesiology department is one of the most exciting department I've been visited.

—Kirana Suciati

- The teacher gave us a presentation about the role of dental anesthetics in clinic. She told us that dental anesthetics have an importance in handling systemic disease patients. The presentation really informative since there are no dental anesthesiology in Indonesia. In Indonesia general anesthesia and intra vena sedation still operated by the medical doctor not the dentist.

—Albar Abshar Muhamad

### <University of Medicine and Pharmacy at Ho Chi Minh City>

- Dr. Tomoka Matsumura introduced us some anesthesia procedures that were applied in TMDU hospital. Those videos showed clearly the process of general anesthesia, nitrous oxide inhalation sedation and intravenous sedation. I seemed to directly observe these clinical cases. I learnt about orofacial pains such as trigeminal neuralgia, burning mouth syndrome, postoperative residual paralysis and how to treat them effectively.

—Nguyen Anh Phuc

- Dr. Tomoka Matsumura gave us information of dental anesthesiology, which consisted of three main parts: systemic management, pain clinic in dentistry and dental anesthesiologists and local community. Her explanation was interesting and easy to understand. I learned more about the nitrous oxide inhalation sedation. I had tried this method in Dentistry for People with Disabilities Department.

—Bui Ngoc Huyen Trang





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