Anatomy

Schedule of First- and Second-Semester Major and Minor Subjects

Credits

Major subject: 6 credits per year

Minor subject: 1 credit per year

Supervising professors

Professor Shinichi Abe, Associate Professor Satoru Matsunaga, Senior Assistant Professor Masahito Yamamoto, Assistant Professor Hidetomo Hirouchi

Educational objectives

To understand the structure of the human body, which is the basis of dental treatment; to develop the ability to collect and analyze the information necessary for research in the field of anatomy; and to improve the ability to advance research by the acquisition of new research methods

I. Principal research activity

To investigate the morphology and internal structure of the jawbone in dentulous and edentulous jaws using micro-CT to facilitate nondestructive measurements of samples

II. Departmental features

In addition to reviewing macroscopic anatomy, we also conduct comprehensive research using the latest techniques in molecular biology.

III. Department-specific curriculum

Advanced content related to clinical dentistry will be taught to graduate students during cadaveric dissections.

IV. Objectives

○To explain the relationship between anatomy and other basic disciplines

○To explain the relationship between anatomy and clinical disciplines

V. Methods

○Abstract-reading sessions will be held regularly to incorporate the latest research knowledge in other fields.

○There will be active participation at clinical conferences where our research will be presented.

VI. Evaluation methods and criteria

○Students will undergo a comprehensive assessment related to the validity of experimental data, will provide a summary of experimental results, and will participate in report writing, daily observation records, and oral examinations.

○Students will be required to submit their papers to international journals with high impact factors for professional evaluation.

○Passing grade: a minimum of 7 points each for post-tests, oral examinations, and reports

VII. Prospects after completion of graduate school

○We hope that our students will become clinicians with a solid foundation and knowledge of anatomy and a commitment to continuous learning.

○Only graduate students with excellent research abilities and who wish to conduct research at overseas universities will be employed as researchers.

Lecture content

・Changes in jawbone morphology and nerve and blood vessel pathways associated with tooth loss

・The relationship between deciduous teeth roots, succeeding permanent teeth, and the surrounding permanent teeth in the jawbones of children

・Mechanobiology of the jawbone using the multiscale method

・Cell biology underlying the mechanisms of muscle reactivation

・Creation of epithelial-mesenchymal hybrid cell sheets

Histology and Developmental Biology

Unit

Major subject 6 unit/year

Minor subject 1 unit/year

Staffs

Professor, Hitoshi Yamamoto

Senior Assistant Professor, Norio Kasahara

Senior Assistant Professor, Kei Kitamura

Educational goals

Students will sufficiently learn study methods of and knowledge about development, growth, changes with aging, maintenance of homeostasis, and regeneration of structures in the maxillofacial area including the teeth and periodontal tissue in the histology, developmental biology, oral histology and developmental biology of the oral histology fields and accurately understand the morphological characteristics and functions. In addition, their ability of collecting information on new findings of the latest studies and objective analytical ability will be cultivated as well as cultivation of their research promotion ability and research instruction ability.

I. Main study content

・Studies on development, growth, aging, maintenance of homeostasis, and regeneration of structures in the maxillofacial area including the teeth and periodontal tissue

・Studies on ultrastructure of the teeth including crystal formation

II. Characteristics of the course

In the laboratory of this course, morphological studies are performed using various types of light microscope and transmission and scanning electron microscopes, and at the same time, the structures and functions are constantly investigated from biochemical or physiological data. The study subjects are all structures in the maxillofacial area, and development, formation and growth, destruction, repair, and regeneration of these are comprehensively investigated.

All full-time faculty members of this laboratory are concurrently in charge of the School of Dentistry, but all of them are familiar with light microscopic and electron microscopic research techniques including immunohistological/cytochemical study methods and are experts able to sufficiently utilize these. In addition, the equipment necessary to solve diverse subjects of the above studies is installed. Furthermore, joint research with universities and research institutions in Japan and other countries are actively performed and persons wanting to study abroad are also managed.

III. Original curriculum of the course

First year: Students will select a theme from the research area described above and design a research plan to solve it. If a graduate student desires a certain theme, it will be prioritized. They will widely collect references regardless of those from Japan or other countries to design a research plan and cultivate the ability to completely understand these. They will participate in various related academic meetings including international conferences and acquire the latest information. At the same time, they will learn lecture

and poster presentation methods. Furthermore, students will initiate learning technologies necessary to carry out research. They will also initiate preliminary experiment.

Second year: Students will more completely learn technologies necessary to carry out research and apply and develop these for their own study. Since characteristic and special methods are used in studies on hard tissue, such as teeth and bone, students will understand the principles of the methods and practice these. Specifically, students will comply various regulations and practice the methods, such as experimental animal handling and human sample collection methods including unique sample preparation to use various types of light microscope, electron microscope, and other research facilities. In addition, they will learn basic microscope operation methods and special application methods. Furthermore, they will learn immunohistochemical and biochemical search methods as needed. Students will also initiate training as an educator through participating in student practice from this year.

Third year: Students will collect and analyze data and present the study results in academic meetings of related areas in Japan and other countries. If possible, they will prepare and submit a doctoral dissertation for publication.

In addition, they will directly or indirectly instruct student practice to practice being an educator.

Fourth year: Students will prepare, defend, and submit a doctoral dissertation. If possible, they will summarize data not used in the doctoral dissertation into papers and submit these for publication. In addition, they will practice as an educator.

IV. Attainment goal

・The acquisition of basic knowledge necessary for a study in histology, developmental biology, oral histology and the oral tissue development

・Acquirement of various histological and developmental research methods

・Collection of information about the new findings of the highest study

・Acquisition of the ability about histology and the developmental biology for education

V. Strategy

1) Passive methods: Lectures and practices

2) Active methods: Experiments, sample preparations, microscopic examinations

3) Media: Various reference books and reports, participation in academic conferences

VI. Assessment method/criteria

Assessment method: Comprehensively assessed based on the validity of experimental data, way of summarizing experimental results, report preparation, records of daily observation, and oral examination.

Grading criteria: Oral examination and reports graded 6 or higher each will be regarded as a pass.

VII. Prospects after completion of graduate school

Students will mainly become an educator or researcher (in Japan or other countries), but they may become a clinician. Even if a student aims at becoming an educator or researcher, he/she will practice being a clinician through gaining the cooperation of part-time instructors as needed.

講座名	Department of Physiology
特色	**Features of the course**
	To develop the ability to think logically, practice evidence-based medicine/dentistry and explain physiological/biological responses or processes in clinical settings as well as to acquire the research ability in the broad fields of physiological sciences, postgraduate students will learn the physiological mechanisms of sensory, motor and autonomic functions in not only the orofacial area but also the organ systems by experiments- and classroom-based leanings and understand the regulatory mechanisms in maintenance of homeostasis of the whole body.
一般目標	
	To develop the ability to think logically, practice evidence-based medicine/dentistry and explain physiological/biological responses or processes in clinical settings as well as to acquire the research ability in the broad fields of physiological sciences, postgraduate students will cultivate knowledge in the orofacial/whole organ system physiology, various experimetal skills, presentation skills, paper writing skills, information retrieval skills, skills in an information technology, internationality, and educational skills, by classroom- and experiment-based learning.
行動目標	**Specific Behavioral Objectives**
	Postgraduate students will become to be able to acquire and explain followings; 1) To be able to acquire experimental skills, 2) To be able to acquire research skills for problem formulation and solving, 3) To be able to collect and organize research information and to acquire the ability to objectively analyze them, 3) To be able to make presentations, write papers, and present research results in both Japanese and English. 4) To acquire the ability to retrieve information for the research as well as for practicing evidence-based medicine/dentistry, 5) To acquire the teaching ability for basic physiology to the undergraduate dental students, 6) To be able to explain mechanism of mechanical-electrochemical transduction in sensory generation, 7) To be able to explain transmembrane ion mechanism of tooth-forming cells (ameloblasts, cementoblasts and odontoblasts) and bone cells, 8) To be able to explain mechanism of functional expression of intracellular clock genes, 9) To be able to explain pain receptive/integrative mechanism in the peripheral and central nervous systems, 10) To be able to explain regulatory mechanisms in maintenance of homeostasis of the orofacial area and whole body, and 11) To be able to play an active role in clinical practice as a dentist who is able to understands biological phenomena scientifically and physiologically that occur in clinical settings in dentistry.
	Learning Strategy

	Evaluation
	Pre and Post study

	Text and Reference Book
	Office hour
講義内容	**Contents of lecture**
	Students will learn followings by lectures with or without experiments; 1. Mechano-electrochemical transduction mechanism of sensory receptor cells 1） Morphological characteristics of sensory receptors in the oral mucosa 2） Characteristics of mechano-sensitive ion channels in sensory receptor cells 2. Ionic mechanisms in tooth-forming cells 1） Characteristics of various ion channels 2） Characteristics of intracellular second messenger signaling, and intercellular signaling mechanisms 3. Mechanism of saliva secretion 4. Functional expression of intracellular clock genes 5. Pain receptive and integrative mechanism in the nervous system 6. various experimental methods, 7. information retrieval skills 8. presentation, paper writing skills in both Japanese and English. 9. orofacial physiology 10. systemic physiology

■ S.mutans の分子遺伝学
■ 幹細胞の機能解明とその癌の診断及び、治療への応用
■ iPS 細胞、組織幹細胞維持機構の解明
■ 組織再生におけるサイトカインの役割
■ iPS 細胞と組織幹細胞の増殖分化・細胞死制御機構
■ 「幹細胞の運命決定機構」の解明
■ 癌と iPS 細胞、組織幹細胞
■ 幹細胞の Epigenetics
■ 疾患細胞由来 iPS 細胞を用いた疾患病態解明
■ 遺伝子編集技術を用いた疾患細胞 iPS の正常化

■ Molecular genetics of S.mutans
■ The function of tissue stem cell
■ The maintenance mechanism of tissue stem cell
■ Role of cytokines in tissue regeneration
■ Proliferation and cell death mechanism of tissue stem cells and iPS cells
■ The fate determination mechanism of stem cell
■ iPS cells as a cancer stem cell, tissue stem cells
■ The epigenetics of stem cell
■ The understanding of disease mechanism by patients derived iPS cells
■ Normalization of patient derived iPS cell by gene editing technology

Pathology
Lecture plan for major and minor subjects of the first and second semesters

Credit:
Major subject, 6 credits/ year
Minor subject, 1 credit/ year

Person in charge
Professor: Kenichi Matsuzaka
Senior lecturer: Katsutoshi Kokubun
Assistant professor: Kei Nakajima
Assistant professor: Takatoshi Chujo
Assistant professor: Yoshihiko Akashi

Course objectives

1: To clarify the specificity of oral diseases in order to identify the disease state of oral diseases and to determine treatment plans.
2: To make dentistry successful, to clarify the wound healing mechanism of oral tissues and to discuss the reactions of biological tissues to biomaterials.
3: To publish our research in international conferences and journals, to search for papers related to domestic and international research and to explain the gist of these topics.

I. Main research content

1: The mechanism of invasion in oral cancer.
2: Pathogenesis-related factors in odontogenic tumors and salivary gland tumors.
3: Wound healing of teeth, tooth supporting tissues, and oral mucosa.
4: Biomaterials and tissue reactions.
5: Regeneration and reconstruction of teeth, tooth supporting tissues, and salivary glands by tissue engineering.

II. Features of the Department

The purpose of our Department is to investigate the pathophysiology of oral

diseases from a morphological point of view by incorporating molecular biology. These studies are extensive and wide-ranging, and are intended to enhance the ability of microstructural observations at the research level by performing diagnosis of pathological specimens from the Suidobashi Hospital, the Ciba Dental Center and so on. Discussions with academic advisors are held as needed. A weekly progress briefing will interpret and examine the study data and set goals for the next week.

III. Original curriculum of the Department

1st year: Learn all techniques required for pathological and molecular studies. Complete a paper on the contents (case reports, clinical reports, etc.) presented by academic advisors. In the meantime, identify your pathological research topic of interest and start preliminary experiments.

2nd year: After the experimental protocol is designed, begin the experiments and concentrate on data collection. The first report is presented at a conference.

3rd year: Produce needed research data and prepare for thesis review.

4th year: Take the thesis examination and submit the thesis. Do the research and clinic that you choose.

IV. Course objectives

1: To understand the pathological features of oral diseases.
2: To guide research methods, considerations, and conclusions in line with research objectives.

V. Strategy

1: Diagnosis of pathology specimens requested by oral surgery departments or other departments.
2: In vivo and in vitro experiments and research using pathology specimens are performed according to the research theme.

VI. Evaluation system and standard

A passing score of 6 or more is given for each method used to compile the experimental data, interpret the data, write the experimental notes, and comprehensively evaluate the results through discussion (10-point method).

VII. Goals for the future

1: You can aim to be a university researcher.
2: It is possible to aim at becoming an oral cytology specialist dentist and/or an oral pathology specialist.
3: You can aim to study abroad (our faculty members have studied at the University of Oranda Nijmegen, the University of British Columbia, Canada, and Harvard University).
4: You can become an evidence-based dental clinician.

Lesson content

1. Tooth and periodontal wound healing (regeneration and differentiation)
   1) Dental pulp cell kinetics and regeneration.
   2) Periodontal ligament cell kinetics and regeneration.
   3) Wound healing of oral mucosa.

2. Biomaterials and tissue reactions
   1) Control of surface shape, properties and cell kinetics of biomaterials

3. Regeneration and reconstruction of oral tissues
   1) 3D construction in vitro.
   2) Construction of artificial oral tissue by tissue engineering.
   3) Oral tissue regeneration by stem cell application.

4. Elucidation of the pathology of oral lesions
   1) Oral mucosal disease.
   2) Odontogenic disease.
   3) Salivary gland disease.

講座名	Department of Microbiology
特色	**Features of the course**
	Oral diseases such as periodontitis and dental caries are infectious disease caused by biofilm called dental plaque. To clarity the etiology of these diseases, investigation of the biodilm in oral cavity and immunoresponses againit the biofiom is essential. In this couse, investigation of the oral biofilm and immunoresponses against the oral biofilm are carried out.
一般目標	**General Instructional objective**
	This couse aimed to investigate the mechanisms of biofilm formation focusing on the inter bacterial communication by experiment using molecular biological technique and realize the pathogenicity of dental plaque by literture review.
行動目標	**Specific Behavioral Objectives**
	1) Investigate the virulence of periodontopathic bacteria by molecular microbiological technique. 2) Investigate the immunoresponse against periodontipathi bacteria. 3) Investigate the effedt of oral bacteria on systemic disease. 4) Investigate the interbacterial communication. 5) Investigate the stress responses against environmental stress in oral bacteria.
	Learning Strategy
	1) Experiment 2) Literature review
	Evaluation
	1) Monthly interview 2) Thesis paper
	Pre and Post study
	Read the papers associated with current experiments.

	Text and Reference Book
	Infection and Immunity Journal of Bacteriology Applied Environmental Microbiology Clinical Microbiology
	Office hour
	Monday 16:00-19:00 Shin-kan 6F Laboratory of Microbiology
講義内容	**Contents of lecture**
	1. Virulence factor of bacteria 2. Technique for molecula biology 3. Handling of bacteria 4. In silico analysis 5. Regulation in gene expression

Pharmacology

Lecture schedule for Major and Minor subjects (1st and 2nd semesters)

Course credit

Major subject 6 credits/year
Minor subject 1 credit /year

Instructors

Professor Masataka Kasahara
Assistant Professor Aki Takahashi
Assistant Professor Longqiang Yang
Assistant Professor Satoshi Yamamoto

1. Education Goals (Diploma Policy)

1) Learn lab skills for biomedical research in the fields of cell biology, molecular biology and biochemistry etc.
2) Learn how to ask scientific questions and develop problem-solving strategies.
3) Learn scientific information retrieval skills and literature review.
4) Develop the global and interdisciplinary vision, and gain knowledge.
5) Develop critical thinking skills.

2. Research Interests

1) Gene therapy of hypophosphatasia (Dr. Takahashi)
2) Development of biomaterials for dental tissue regeneration (Dr. Yang)
3) Analysis of exosomes from parotid gland saliva (Dr. Yamamoto)

3. Course Features

1) Lab skills and techniques for a wide range of studies, e.g., animal experiments, cell biology, molecular biology, chemical physics research, etc.
2) Studies focused on salivary glands, including the mechanism, therapy and drug development of drug-induced xerostomia (dry mouth), pathology of xerostomia, development of saliva diagnostics.
3) Joint research with domestic/oversea universities and institutions, e.g., Nippon Medical University, Nippon University Department of Pharmacology, Japan National Cancer Center, Sichuan University (China), etc.

4. Curriculum for PhD program

1st grade:

1) Decide the research project for doctoral thesis
2) Learn basic lab skills
3) Learn research article reading skills
4) Conduct literature review for the research project
5) Prepare research proposal, preliminary study and data interpretation

2nd grade:

1) The same program as the 1st grade
2) Research progress report and presentation skills training at the lab and conferences
3) Conduct experiments and data interpretation
4) Conclude the research

3rd grade:

1) Research article manuscript preparation

2) Manuscript submission

4th grade:

1) Manuscript revision
2) Doctoral thesis defense

5. Expected Outcome

1) Have critical thinking skills
2) Have problem-solving skills
3) Receive research training with global vision
4) Be able to apply pharmacological knowledge in clinical practice

6. Strategy

1) Learn critical thinking skills
   (1) Literature review and seminars
   (2) Research proposal preparation and presentation
   (3) Basic structure of research articles and academic writing
2) Learn problem-solving skills
   (1) Research proposal preparation, preliminary study and data interpretation.
   (2) Research information retrieval and strategies
   (3) Research information collection and review
3) Train researcher with global vision
   (1) Attend oversea or international conferences and give oral/poster presentations
   (2) Have seminars with oversea researchers on scientific research
4) Know how to apply pharmacological knowledge in clinical practice
   (1) Give lab course and lecture to undergraduate students, and presentation at journal club.

7. Evaluation

1) Comprehensive evaluation based on how to ask a scientific question, hypothesis development, research proposal preparation, experiments conduction, data interpretation and analysis, preparation for new scientific question and hypothesis.
2) Discussion of experiments data, progress report and presentation skills.

8. Prospects

Develop critical thinking and problem-solving skills. To continue study at oversea institutions, and become a research supervisor at a university and institution. To become a clinician with good knowledge and skills for systematic health management and related medicine.

9. Lectures

1. Function and roles of salivary glands
   1）Mechanism of saliva secretion
   2）Salivary glands and biological control system
   3）Mechanism of xerostomia (dry mouth)

2. Roles of free radicals in dental pulp tissue
   1）Mechanism of free radicals
   2）Free radicals and anti-inflammatory drugs
   3）Dental pulp cells and free radicals
   4）Dental pulp blood vessels and free radicals

3. Cancer cells and drug resistance

1） Molecular biology of cancer drug resistance

2） Studies to eliminate drug resistance

4. Clinical pharmacology

1） Drug interactions

2） Evaluation of anti-inflammatory drugs and antibiotics used in oral surgery and periodontal disease

3） Evaluation of drugs in dental anesthesia acting on the central nervous system and sympathetic nerves

4） Dental pulp and drugs

5） Therapeutic drug monitoring (TDM)

Dental Materials Science

First and second semester main subject and sub-subject lecture schedule

Single main subject: 6 credits per year
Sub-subject: 1 credit per year
Masayuki Hattori (Professor), Masaaki Kasahara (Lecturer), Tomoko Someya (Lecturer)

1. Educational goals

To understand the basic knowledge of materials used in dentistry and instruments, understand the connection with dentistry-specific technology in dental clinics, study the theory and application, and become a competent research instructor. (Diploma Policy: 1, 2, 3)

2. Main research contents

- Evaluation of mechanical, physical, chemical and biological properties of dental materials
- Basic examination for new dental material development
- Development of titanium alloy and examination of titanium for clinical dental application
- Evaluation of adhesiveness of tooth substance and restoration
- Evaluation of fiber reinforced composite resin
- Dental application of CAD/CAM
- Elucidation of mechanical function of human mandible mainly by bone quality analysis

3. Features of the course

We are conducting research and development and evaluation for materials and instruments used in dentistry, and along with improvement and development of materials and instruments actually used in clinical practice, future dentistry such as CAD/CAM and biomechanics.

4. Course-specific curriculum

1) Measurement method of mechanical properties of dental materials, qualitative analysis by EPMA, XRD, fatigue characteristic measurement method
2) Dental application of titanium
3) Dental application of high-strength ceramics
4) Dental application of fiber reinforced resin, construction of abutment by FRC post
5) Cohesion and adhesion in dentistry
6) CAD/CAM in dentistry

5. Attainment target

1) Measure the material properties with an universal tester and analyze the material with SEM, EPMA, and XRD.
2) Create dental titanium and titanium alloys.
3) Evaluate the physical properties of high-strength ceramics such as zirconia.
4) Evaluate the construction of abutments using fiber-reinforced resin and FRC posts.
5) Evaluate the adhesive resin cement and bonding material.
6) Create dental materials that can be applied to CAD/CAM.

6. Strategy

Lectures, exercises, abstract reading sessions

7. Evaluation method/criteria

Comprehensive evaluation will be made based on the attendance rate of lectures and abstract reading sessions, presentations at abstract reading sessions, and oral examinations.

8. Prospects after graduate school

After graduate school, there are many teachers who are active on the front lines of the dental world, such as practitioners, working doctors, university faculty and staff, and management of dental material manufacturers, making use of their specialized knowledge and skills in materials and instruments. Clinical reports are also published in dental magazines.

9. Lecture content items

For each item, check the latest technology using the Internet (30 minutes each time)

Physical characteristic test method for dental materials

1) Measurement method for mechanical properties
2) Qualitative analysis of dental restoration materials by EPMA and XRD
3) Fatigue characteristic measurement method using a dental material fatigue tester

Dental application of titanium

1) Titanium characteristics and processing
2) Titanium casting
3) Reaction between titanium casting and buried material

Dental application of high-strength ceramics

1) Characteristics of dental zirconia
2) Processing of dental zirconia

Fiber reinforced resin and FRC post

1) Types of fiber materials
2) Fiber reinforcement theory and fiber post

Bonding and bonding in dentistry

1) Types of bonding materials and adhesives, bonding and bonding mechanisms
2) Adhesion with tooth substance and various dental materials

CAD/CAM and dentistry

1) How to make a dental prosthesis device by CAD/CAM
2) Characteristics of CAD/CAM equipment

Department of Epidemiology and Public Health

前期・後期主科目および副科目講義計画表

単　位　主科目　年 6 単位
　　副科目　年 1 単位

担当者

杉原直樹　教授	石塚洋一　講師	佐藤涼一　講師	鈴木誠太郎　助教
Naoki Sugihara	Yoichi Ishizuka	Ryouichi Sato	Seitaro Suzuki

教育目標

Human resource development with the ability to contribute to the development of dental medicine and the ability to conduct research and teaching at an international level by presenting new knowledge to promote the maintenance and improvement of the health of the people, both individually (clinical) and in the community (community health).

Ⅰ. 主な研究内容

1) Epidemiological research on oral diseases (dental caries, root caries, periodontal disease, dental erosion) in adults and the elderly, and the development of prevention guidelines.
2) The relationship between oral diseases and lifestyle and oral environment in children and students.
3) Research on the percentile curve of present teeth
4) Oral health behavior in the life stages of Japanese people
5) Development and evaluation of preventive technologies for oral health (including clinical trials)
6) Prevention of dental erosion and root caries by fluoride
7) Development of fluoride sustained release devices
8) Analysis of clock gene expression in salivary glands

Ⅱ. 講座の特色

1) To be able to learn epidemiological surveys and evaluation of the results (including statistical analysis) necessary for community health activities.
2) To be able to conduct epidemiological research on dental diseases.
3) In clinical dentistry, preventive measures to maintain and improve individual oral functions by assessing individual dental disease risks are becoming more important. To be able to research methods of assessing individual risk of dental disease and preventive measures.
4) The department is a certified training institution of the Japanese Society for Oral Health and a specialist training institution of the Japanese Society of Gerodontology.

Ⅲ. 講座独自のカリキュラム

1) Journal club for English textbooks or literature on standard preventive dentistry (or oral hygiene)
2) Lectures and discussions on medical statistics for presentation at conferences and papers
3) Lecture and practice on medical statistical analysis using SAS and SPSS

Ⅳ. 到達目標

Dentists and researchers who have acquired the ability to promote the maintenance and improvement of individual (clinical) and population (community health) health, and who have high communication skills to work internationally.

Ⅴ. 方略

1) Lecture (oral hygiene and preventive dentistry)
2) Demonstration (practice of statistical analysis using data obtained from community health activities)

3) Epidemiological survey (learning survey methods by participating in an epidemiological survey)
4) Practical experiment
5) Discussion (discussion using research results)
6) Presentation at academic conferences
7) Writing papers

Ⅵ. 評価方法・基準

1) Survey or experimental method and validity of data
2) Summary of experimental results
3) Record of daily observations and oral examination
4) Report writing

Ⅶ. 大学院修了後の展望

1) General practitioner
2) Employed dentists
3) Government (national and local governments)
4) Training institutions for dentists and dental hygienists (universities, junior colleges), others

Forensic Odontology and Forensic Anthropology

Professor : Masatsugu Hashimoto, Associate Professor : Noboru Ishikawa
Lecturor: Yasutaka Nakamura

Education Goals

Forensic odontology is a division of social dentistry whose ultimate purpose is to apply the knowledge of dentistry, inspect the evidence of the field of dentistry necessary for the jurisdiction, and make a proper evaluation. Therefore, education goals of Forensic Odontology and Anthropology is to produce researchers who understand the purpose above described and can carry it out.

Ⅰ Main Research Fields:

Forensic Odontological Fields:

1) Developments of the computer system for personal identification by the comparison of ante- and postmortem dental records and the examination of its effectiveness
2) Establishment of the standard for age estimation of unknown body applicable to the modern Japanese
3) Studies on the analysis method of Bite mark evidence and its application to the actual cases
4) Establishment of the method for DNA extraction from very old teeth and bones

Forensic Anthropological Fields:

1) Consideration of the method for examination of the facial images observed on the photographs/video
2) Establishment of personal identification method by morphological features of the maxillofacial regions
3) Consideration of new methos for personal identification from skeletal remains
4) Research on the estimation of time after death from dental point of view

Ⅱ Features of Department of Forensic Odontology and Anthropology

Forensic odontology and forensic anthropology focus on who criminal and victim are to identify the body by utilizing dental and anatomical features. Other areas of activity include appraisal of the mechanism of action of bite marks and injury to the dental area.

Furthermore, by learning various cases of trials, students will acquire high ethical standards, humanity and cooperation as dentist.

Ⅲ Curriculum

Graduate students are able to conduct original research and participate in forensic examinations. Therefore, even if you are a graduate student, you need to maintain strict confidentiality. This course emphasizes the development of the ability to think for oneself and

progress things.

Ⅳ Attainment Target and Strategy

In the first year, in addition to acquiring basic knowledge and attending lectures, students will plan their own experiments. In the second and third years, it will be started original research and trained in report writing, presentation, and discussion of cases. In the final year, students will compile their research results and prepare to publish them in an article.

Ⅴ Evaluation method and Criteria

Validity of experimental methods and results, quality of reports, and quality of papers will be evaluated comprehensively.

Ⅵ Prospects after Graduate School

Priority will be given to the person's wishes.
The majority of graduates are active as clinicians. In some cases, the person will be hired as an educational staff member.

Contents of lectures:

Forensic Odontological Identification

Dental Identification

Bite Mark Examination and Personal Identification

Examination of Injures in Oral Region

Forensic Anthropological Identification

Facial Characteristics and Personal Identification

DNA polymorphysm and Personal Identification

Basic knowleges of General Genetics and DNA

DNA Polymorphysm and Data Analysis of Genetic Marker

Forensic Science and Law

Relationship between Forensic Science and Law

Forensic Science Examination and Law

講座名	Department of Social Dentistry
教育目標	**Instructional Objective**
	In order to provide safe, secure, and high-quality dental care to the people, to acquire knowled
1.主な研究内容	**Main Research Contents**
	1) Supply and demand of dental care 2) Medical fee system in the public health insurance system in Japan 3) The practice of thinking and judgment procedures of medical ethics 4) Development educational methods
2. 講座の特色	**Features of the Course**
	The range of education and research in social dentistry is extremely wide. From the beginning
3. 講座独自のカリキュラム	**Course-Specific Curriculum**
	We deal with the latest themes of society, such as responding to the latest current affairs and anticipating institutional reforms.
4. 到達目標	**Evaluation**
	The students will be able to 1) Explain the supply and demand of dentistry (Problem-solving) 2) Explain the medical fee system in the public health insurance system in Japan (Explanation) 3) Practice considering clinical ethics. 4) Develop educational methods (Problem-solving)
5. 方略	**Learning Strategy**
	Lecture and Discussion
6. 評価方法・基準	**Evaluation**
	Evaluate comprehensively through discussions and oral examinations
7. 大学院修了後の展望	**Prospects after Graduate School**
	Being able to make recommendations to society by presenting the problems related to current
講義内容	**Contents of lecture**

	1) Consideration of the supply and demand of dental care to the public requires an understanding and consideration of the legal system that regulates manpower. Demand is greatly influenced by social factors, not just the number of diseases. In the lecture, we will clarify these matters. 2) As a structural reform of the social security system, we will explain a new framework that combines specific medical examination / specific health guidance and long-term care prevention with medical care. 3) In the practice of dental treatment as a dentist, clinical ethics is always a problem to be taken into account. It is necessary to acquire a concrete methodology for judging it. Therefore, the students will conduct a case study using the "4 Box Method" in a small group, and also consider the professionalism of dentists. 4) We consider the application and development of educational methods suitable for each of the cognitive, emotional, and psychomotor areas in accordance with curriculum planning.

歯 内 療 法 学

Department of Endodontics

前期・後期主科目および副科目講義計画表

単　位　主科目　年 6 単位
　　副科目　年 1 単位

担当者

古澤成博　教授　　藤井理絵　講師　山田雅司　講師　佐古　亮　助教　　田宮資己　助教

Educational goals

To develop the ability to confirm and diagnose basic matters related to tooth hard tissue disease, pulp disease, and apical periodontal tissue disease. In addition,　to acquire new research means necessary for these treatments, improve the ability to gather information, and cultivate research guidance ability that is familiar with both clinical and basic aspects.

Ⅰ. Main research contents

At this department, we have conducted biological evaluation of endodontic-related materials, focusing on clinical pathological research.

As a future outlook, we wish to develop into new fields while making the best use of these assets. In particular, molecular biology techniques are used to identify and correlate gene expression associated with treatment. In addition, the latest clinical technology will be verified and its evaluation will be examined.

1)Pathology and diagnosis of pulpitis and apical periodontitis

2) Evaluation of periodontal ligament tissue protection and tooth transplantation / replantation

3) Cytokine therapy for bone defects in the endodontic area

4) Genetic diagnosis of bacteria in the root canal

5) Drug discovery, verification and development of new technologies

II.　Features of the course

Based on the fundamental policy that research results should be returned to clinical practice, many drugs and materials developed from the research results of this department are still favored by clinicians. In the future, especially in terms of research, we would like to expand joint research with basic laboratories rather than closed research on a course-by-course basis, and actively engage in research that is beneficial to dentistry in general. However, the ultimate goal is to establish a new treatment concept and method, and we would like to always keep in mind the return to clinical practice.

Ⅲ. Course-specific curriculum

Taking advantage of being a clinical course, it is possible for one to acquire various advanced clinical techniques in addition to research techniques. It is also possible to reflect research results and techniques in actual clinical practice. (1) Mechanical root canal enlargement method and various root canal filling methods, (2) Surgical endodontic treatment, (3) Treatment using a surgical microscope, etc. It is also possible to acquire more advanced endodontics knowledge and skills through seminars organized by the department.

Ⅳ. Attainment target

To acquire new research methods, improve the ability to gather　information, and cultivate research guidance ability familiar with basic and clinical aspects.

In addition, as a training facility accredited by the Japanese Society of Conservative of Dentistry and

Japan Endodontic Association, training will be conducted with its own curriculum, with the ultimate aim of acquiring certified doctor / instructor qualifications. Studying at graduate school gives you enough time to obtain these qualifications.

V. Strategy
Lectures, presentations, practical training

VI. Evaluation method / criteria
Comprehensive evaluation by oral examination and report writing regarding specialized areas.

Ⅶ. Prospects after graduate school
Those that have completed a course of graduate school not only lead the research side of the department, but also play a central role in the clinical and educational aspects. We would like to prepare a post, as much as possible, where one can continue to play an active role as a leader in the department.

Lecture contents
1. Diagnosis and pathology of pulp and apical periodontal disease
1) Pathology and diagnosis of pulpitis
2) Diagnosis of onset of apical periodontitis
3) Bone defect and X-ray diagnosis

2. The basics and clinical aspects of endodontic treatment materials
1) Pulp treatment materials and its reaction
2) Root canal filling materials and its reaction
3) Relationship between material composition and biological reaction

3. Acquiring basic research and techniques related to treatments related to the field of endodontics
1) Instruments for root canal treatment made of Ni-Ti
2) Imaging diagnosis using CBCT and establishing treatment policy
3) Endodontic treatment using a surgical microscope

4. Acquiring basic research and techniques related to surgical endodontic treatment
1) Protection of periodontal ligament tissue and tooth replantation / transplantation
2) Effect of barrier membrane on bone wound cavity
3) Retropreparation using retro-tip (ultrasonic tip)

大学院生臨床研修プログラム

講座名	歯内療法学講座
主任教授名	古澤成博
プログラム責任者名 （プログラムの管理・運営）	古澤成博
研修期間	３年間
受け入れ人数	８名まで
指導医	古澤成博

Program contents

1. Clinical cases necessary to obtain a certified doctor of the Japanese Society of Conservative Dentistry
2. Clinical cases necessary to obtain a certified doctor of Japan Endodontic Association
3. Clinical cases, basic academic skills, and clinical techniques necessary to obtain a certified doctor of Japanese Society of Oral Implantology

Specific application criteria to become academic society-certified doctors whose requirements will be met at the end of the program

1. To obtain a certified doctor of the Japanese Society of Conservative Dentistry, it is necessary to have a total of 6 years or more of academic membership history, submission of papers to academic journals, academic presentations at academic societies, acquisition of training credits, passing exams, etc. By finishing this program, with the subsequent training, the requirements will be fulfilled.

2. To obtain a certified doctor of the Japan Endodontic Association, it is necessary to have a membership history of 5 years or more, submission of papers to academic journals, academic presentations at academic conference, aquisition of training credits, presentations of clinical cases, and passing examinations. The requirements can be met in this program and subsequent training.

3. In this program, the requirements can be met in the initial and subsequent training.

Periodontology

Objective

To develop abilities for data collection and analysis necessary for research and practice in the field of periodontology. And to acquire abilities to conduct new research and implement novel clinical practice.

Learning "Periodontology" aims to achieve "1. Present novel findings in the field", "2. Possess ability to contribute to the development of dental science", and "3. Possess abilities to conduct and lead research in line with the international standard" in the Graduate School diploma policy.

I. Research topics

1) Periodontal regeneration and its mechanisms
2) Tissue responses to dental implant
3) Microbiological and immunological investigation of periodontal diseases
4) Periodontal medicine

II. Features of the department

1) Productive research group
2) Acquiring advanced clinical skill
3) Program for the certified periodontist

III. Special activities

1) Literature review session
2) Case review meeting
3) Research progress meeting
4) Lab meeting (in English)
5) Instructions by clinical professors and visiting instructors
6) Hands-on courses on periodontal surgery
7) Joint meeting with Keio University School of Medicine

IV. Specific objective

Complete PhD thesis within 4 years

V. Learning strategies

1st year: Selection of research topic. Acquiring the basic experimental technique.
2nd year: Implementing experiments according to the research plan.
3rd year: Implementing experiments and presenting results at academic conferences.
4th year: Writing thesis paper and submission to an international journal

VI. Evaluation

1. Attendance (40%), Practice (60%)
2. Evaluation of lab notebooks, presentations and discussions at lab meetings
3. Evaluations at the thesis defense.

VII. Prospects after completion of the graduate program

1. Certification for periodontal specialist
2. Job opportunities in the college and hospitals
3. Research activities abroad

Operative Dentistry
Lecture plan for major and minor subjects of the first and second semesters

Credit:
Major subject: 6 credits / year
Minor subject: 1 credit / year

Staff
Professor: Takashi Muramatsu
Associate professor: Hiroki Sugito
Senior Assistant professor: Akiko Haruyama
Senior Assistant professor: Hidenori Hamba
Assistant professor: Keiki Nakamura
Assistant professor: Keisuke Mitomo
Assistant professor: Sae Akehashi-Chikaraishi
Assistant professor: Hisako Ishizuka

Objectives
1. To understand the cause, diagnosis, and treatment of dental caries and non-cariogenic hard tissue diseases.
2. To master technique of operative dentistry treatment
3. To carry out research about material science, cariology and pulp biology

I. Main research contents
Considering "what is the restoration for?", The answer is "for the pulp." Therefore, in this course, we are working on research on the three themes of "dental materials," "dental caries," and "pulp." In the course, we are engaged in research on the three themes of "dental materials," "dental caries," and "pulp." Establishing conservative and restoration treatment by studying the progression and remineralization of caries, and based on the study of the dentin-pulp complex, which is a defense mechanism, and further researching adhesive materials to prevent secondary caries.

1）Development of new diagnostic methods and technologies for dental caries
2）Application of micro-CT for dental research
3）Mechanism of abfraction formation
4）Mechanism of suppressing demineralization and promoting remineralization of enamel
5）damage recovery system for dental treatment in dental pulp
6）Pulp stem cell differentiation, proliferation and potential for clinical application
7）Pathology and clinical application of pulp revascularization
8）Clinical application of dental laser device
9）Color of restoration materials and dentin
10）Adhesive mechanism of dentin / restoration material and its long-term stability
11）Verification and development of drugs and new technologies

II. Features of the Department

Caries treatment is not merely removed, filled, and repaired, but is diagnosed after scientific examination and analysis of the etiology and pathophysiology, and the treatment strategy is determined to be remineralization or filling and restorative treatment. After treatment, it is not the end, but the maintenance after that must be considered. Therefore, it is now called caries management instead of caries treatment. This program is designed so that these viewpoints can be grasped scientifically, and that training can provide feedback to clinical treatment.

III. Original curriculum of the Department

In this course, we understand basic caries treatment, cariology, dental material science, and pulp biology. In addition to conservative treatment certified doctors and conservative treatment specialists, there are staff that have certified doctors and specialists for oral and maxillofacial surgery, periodontal treatment and pathology. You can learn a wide range of specialized clinical practice.

IV. Course object

1. To learn cariology, material science and pulp biology scientifically
2. To be a certified doctor by Japanese Society of Conservative Dentistry

V. Strategy

Lecture
Presentation
Practice

VI. Evaluation system and standard

1st grade: oral examination, case presentation and report
2nd grade: clinical practice
3rd grade: examination of certified doctor

VII. Goals for the future

1. To be an independent doctor who directs research, education and clinical treatment.
2. To be an international doctor who collaborate about research, education and clinical treatment.

Lesson content

1. Caries examination
   1) Bacterial examination
   2) Laser examination
   3) X-ray-free image examination

2. Treatment of dental caries
   1) Remineralization therapy
   2) Operative dentistry treatment

3. Pulp biology and treatment
   1) Response of dental pulp for dental treatment
   2) Clinical application of dental pulp stem cell

4. Maintenance
   1) Long term remineralization therapy
   2) Prognosis of materials
   3) Esthetic treatment
   4) Repair

Pediatric Dentistry

The lecture plan for postgraduate students who choose pediatric dentistry as the main or minor subject.

The number of credits

As the main subject: six credits per year
As the minor subject: one credit per year

Teaching staffs

Seikou Shintani, Professor.
Keiichiro Tsujino, Senior assistant professor.
Hiroki Imai, Senior assistant professor.
Atsuo Sakurai, Senior assistant professor.
Hiromi Homma, Senior assistant professor.
Yuki Arai, Assistant professor.
Ayano Nakauchi, Assistant professor.

Educational objectives

To cultivate the ability for accomplishment of original research containing new research methods in the field of pediatric dentistry, we will teach the needed knowledge, philosophy, and skills.

Furthermore, for postgraduate students who choose pediatric dentistry as the main subject, they will acquire more advanced knowledge and skills as pediatric dentists, and will cultivate the ability to teach younger students and dentists as an instructor.

I. Contents of the research

1) Morphological and functional research on the development of dentition and dental occlusion
2) Molecular study concerning the evolution of genes involved in tooth formation
3) Molecular biological study concerning aetiological factors which influence on the onset of congenital abnormalities
   (1) Genetic analysis of aetiological factors associated with congenital abnormalities
   (2) The immuohistochemical study of factors associated with dental abnomalities
4) Epidemiological studies concerning oral diseases and oral health management in children
5) An observation study of behavior control for children with disabilities at a dental facility
6) Molecular study concerning oral bacteria associated with oral and systematic diseases.

II. Features of our department

Our department trains human resources who can carry out research on themes related to oral health management in childhood and trains clinicians who can practice oral health management for children.

Therefore, aims of our department are to acquire the knowledge and skills not only in pediatric dentistry but also in dentistry for children with disabilities through research activities and daily clinical practice.

III. The characteristical curriculum for postgraduate students

The first and second year

1) In order to acquire a specialist certified by the Japanese Society of Pediatric Dentistry, postgraduate students practice oral health management for children according to the training curriculum established by the society.
2) Postgraduate students practice oral health management for children with disabilities according to the training curriculum established by the Japanese Society for Disability and Oral Health..

The second, third, and fourth year

Postgraduate students create a research plan for the selected subject and conduct the research.

IV. The goals that should be accomplish are to

1) Acquire the knowledge and skills necessary for research in the fields of pediatric dentistry and dentistry for children with disabilities
2) Be able to carry out original research.
3) Be able to practice more advanced dentistry for children and persons with disabilities.
4) Obtain the qualifications of specialists certified by the Japanese Society of Pediatric Dentistry and certified doctors by the Japanese Society for Disability Dentistry.

V. Learning strategy

1) Lecture
2) Journal club
3) Academic meeting
4) Dental practice
5) Clinical conference
6) Clinical and basic research in the fields of pediatric dentistry
7) Regular meetings of research progress

VI. Evaluation items

1) Evaluation of the validity of research methods and interpretation of results by scrutinizing the notebook that records the research content
2) Regular case presentations and oral examinations of pediatric patients that treated by postgraduate students themselves
3) Contents and completeness of presentations regarding clinical or basic research on pediatric dentistry at academic meeting
4) Content and completeness of papers regarding clinical or basic research on pediatric dentistry

VII. After the completion of graduate school

1) Graduates are mainly engaged in pediatric dentistry as specialists.
2) Graduates are engaged in dental practice for children with disabilities as certified dentists.
3) Graduates are enrolled in our department and continue to study their own themes.
4) Graduates qualify themselves for dental clinical instructor and teach younger dentists and undergraduate students.

Contents of lectures

1) The development of cranium, maxillofacial area, dentition, and dental occlusion in children
   (1) Methods of morphological and functional research on normal growth
   (2) Developmental abnormalities and their clinical evaluation methods

2) The development of teeth and developmental abnormalities
   (1) Clinical evaluation methods for tooth formation and dysplasia
   (2) Clinical evaluation methods for tooth eruption and abnormal eruption

3) Oral health management in children
   (1) Clinical evaluation methods for oral diseases and abnormalities in children
   (2) Prevention and treatment methods for dental caries and periodontal disease
   (3) Treatments methods for dental trauma and oral soft tissue diseases

(4) Evaluation methods for the effectiveness of equipments used in pediatric dental practice

4) Occlusal guidance
(1) Examination and evaluation methods of dentition and dental occlusion
(2) Various occlusal guidance methods
(3) Evaluation methods for the effectiveness of equipments used for occulusal guidance

5) Dental treatment for children with disabilities
(1) Evaluation methods of oral health status and oral health management
(2) Characteristic oral findings and dental treatment methods for each type of disability

6) Diseases of infants and younger children
(1) Oral findings and treatment methods

Department of Oral and Maxillofacial Surgery

Main and Sub-subject lecture schedule

Main-subject : 6 unit / year

Sub-subject : 1 unit / year

Staff

Professor : Masayuki Takano

Senior Assistant Professor : Akira Watanabe, Takeshi Onda, Masato Narita, Takamichi Morikawa

Assistant Professor : Shuji Yoshida, Keisuke Ohno, Hiroshi Kato, Ken-ichiro Shigeno, Naoyuki Kogou, Takaharu Ariizumi

Educational objectives

We raise Surgion-scientist who have necessary **Technology**, **Technique** , **Information gathering ability**, **Information analysis ability** for research and clinical practice on oral surgery, and have experienced both clinical medicine and basic research.

Ⅰ. Main research contents

- Basic and clinical environment on the treatment of malignant tumors in the maxillofacial and oral region
- Molecular biological analysis of oral cancer
- Regenerative medicine with iPS
- Research on wound healing and regenerative medicine
- Research on jaw deformities
- Research on reconstruction method after malignant tumor resection
- Research on congenital anomalies such as cleft lip and palate
- Research on maxillofacial deformity, temporomandibular joint disease, oral maxillofacial implants
- Basic and clinical environment on speech language

Ⅱ. Features of our department

Department of Oral and Maxillofacial surgery is responsible for the three primary axes of clinical environment, research, and education. However, in graduate school, as a matter of course, research is the most important item, but we think that it is indispensable to learn the diagnosis, management, and treatment of basic oral surgery diseases as a

clinical course. In addition, learning the basics of oral surgery clinical environment raises questions through patients about what is lacking in the current clinical practice and how to save patients' suffering, and it will also be a great motivation for research. And we are working hard to return cutting-edge research and clinical environment for patients every day.

Ⅲ. Our department curriculum

As an original curriculum, in the 1st year of graduate school, mainly outpatient training what you'll learn the basics of oral surgery including tooth extraction. In the 2nd and 3rd year, in hospital ward training what you'll acquire basic matters as the major surgical assistant for systemic management for pre- and post-operative patients. At the same time, you'll acquire skills that can apply the basic matters learned in the first year in outpatient clinics.

Ⅳ. Achievement object for each year

(including clinical requirements, acquired techniques or qualifications)

1st : The minor surgery
2nd : Management of patients
3rd : The application of minor oral surgery and general management
4th : The preparation of Thesis

Ⅴ. Strategy

Model training, clinical practice, training at other facilities

Ⅵ. Evaluation method / criteria

Oral presentations, journal presentations, and formative assessment

- Comprehensively evaluate the validity of experimental data, how to summarize experimental results, report creation, etc., and daily observation records and oral examinations.
- Post-test, oral examination, report: 6 points or more are passed.

Ⅶ. Prospects after graduate school

Resident of our department, dispatch to related hospitals

Ⅷ. Lecture contents

1. 1. Basic and clinical of oral cancer
1) Anatomy and metabolism of the oral mucosa
2) Mechanism of oral cancer
3) Histopathology of oral cancer
4) Treatment method for oral cancer and its evaluation

2. 2. Maxillofacial reconstructive surgery
1) Clinical anatomy and surgery necessary for maxillofacial reconstruction
2) Microvascular surgery
3) Mandibular reconstructive surgery
4) Nerve reconstructive surgery
5) Functional evaluation after reconstructive surgery

3. 3. Clinical application of biomaterials
1) Wound healing / regenerative medicine
2) Biomaterials in maxillofacial prosthesis
3) Histopathology of artificial tooth roots
4) Biochemistry and histopathology of bone-forming proteins

4. Analysis, evaluation and treatment of maxillofacial morphology and dysfunction
1) Image diagnosis of jaw deformity
2) Treatment plan / treatment method for jaw deformity
3) Functional evaluation after jaw orthodontic surgery (temporomandibular joint, masticatory ability, nerve function)

5. Morphology / embryology of maxillofacial / oral region
1) Elucidation and prevention of congenital anomalies, especially analysis of candidate genes
2) Mechanical analysis of mandibular morphology and mandibular defects
3) Analysis of maxillofacial morphology in jaw developmental abnormalities
4) Relationship with temporomandibular joint development, especially apoptosis

6. Exercise physiology of stomatognathic function
1) Functional evaluation for temporomandibular joint abnormalities
2) Functions before and after jaw orthodontic surgery
3) Evaluation method for cleft palate language

4) Functional evaluation after reconstruction of the mandible
5) Study of speech by magnetoencephalogram

7. Clinical application of biomaterials
1) Biomaterials for recovery of stomatognathic function
2) Mechanics related to biomaterial application in the stomatognathic functional area

8. Congenital anomalies such as cleft lip and palate
1) Cause
2) Diagnosis and treatment
3) Gene analysis

Department of Removable Prosthodontics and Gerodontology

Main subject and sub-subject lecture schedule in first and second semester

Credits Main subject 6 credits per year
Sub-subject 1 credit per year

Lecturers

Takayuki UEDA; Chief Professor, Masahiro RYU; Senior Assistant Professor, Tomofumi TAKANO; Senior Assistant Professor, Midori OHTA; Assistant Professor, Yasuhiro HORIBE; Assistant Professor, Akihiro ISHIDA; Assistant Professor, Takeshi SAITO; Assistant Professor

1. Educational goals
   (1) To acquire information gathering / organizing ability and logical thinking ability through clinical research activities.
   (2) To acquire evidence-based knowledge and techniques centered on prosthodontics and gerodontology.
   (3) To be a specialist with a research mind and a global perspective.

2. Main research contents
   (1) Evaluation of materials for artificial teeth and denture bases, development of new technologies
   (2) Removable prosthesis treatment applying digital technology
   (3) Management and evaluation of removable prosthesis treatment
   (4) Evaluation of oral function and management of oral function in the elderly people
   (5) Evaluation of oral hygiene and oral hygiene management for the elderly people
   (6) Maxillofacial prosthetics/ prosthesis
   (7) Nutrition and oral function of the elderly people
   (8) Cognitive decline and oral function

3. Features of the course
   (1) We have a clinical training program linked to the required cases of application for certified specialist of the Japan Prosthodontic Society and Japanese Society of Gerodontology. If you complete the three-year course, you will be awarded a certificate of completion, and you will be able to meet the application qualifications of a specialist certified by the Japan Prosthodontic Society and a specialist certified by the Japanese Society of Gerodontology. After that, if you study for two years, you can obtain the specialists from each academic society.
   (2) You can join the lecturers of this course and conduct out-of-hospital training where you can experience dental care in various external environments different from the university hospital.
   (3) You can join the daily morning meetings and the weekly journal club, which is reading sessions to experience various research and clinical evidence.

4. Course-specific curriculum

   In the research, we provide a journal club, small group discussions, and individual advice for the goals.

   In clinical practice, we provide lectures, case studies, small group discussions, and individual advice for clinical practice.

5. Attainment target

In order to play an active role in society, the ability to understand and evaluate domestic and foreign research related to the prosthodontics and gerodontology, the ability to guide and educate students, and future prosthodontics and gerodontology, etc. Gain the ability to become a specialist.

First year: Acquire the ability to understand and present original articles in Japan and overseas. Acquire the research planning method. Present the removable and fixed prosthetic cases with the POMR method.

Second year: Make a research plan and conduct experiments. Learn statistical methods. Presented at the Japan Prosthodontic Society and the Japanese Society of Gerodontology. You will be able to plan highly specialized prosthetic treatments and home visits.

Third year: Analyze the research results and make presentations at the Japan Prosthodontic Society and the Japanese Society of Gerodontology.

Fourth year: Complete an original article in English. Submit to a highly acclaimed English journal and make a final presentation at an international conference.

6. Strategy

In the research, abstracts and group discussions will be conducted under the supervision of the chief professor. In individual guidance, in addition to the chief professor, one or more academic advisors are in charge of each student. In clinical practice, lectures, case studies, small group discussions, and clinical practice are conducted. In clinical practice, an instructor is decided for each case, and guidance is given according to the clinical training program.

7. Evaluation method / criteria

General goals, action goals, and evaluation criteria are prepared according to each curriculum. The instructor uses it to evaluate it as an observation record.

8. Prospects after graduate school

One year after graduating from graduate school, you can try to apply for specialists such as the Japan Prosthodontic Society and the Japanese Society of Gerodontology.

9. Lecture contents

1) Examination of the oral functions in elderly patients and edentulous patients.

(1) Examination of edentulous patients.

(2) Diagnosis and examination of masticatory disorders, pronunciation disorders and aesthetic disorders

(3) Treatment planning for removable dentures and implant overdentures.

2) Rehabilitation with removable dentures

(1) Removable denture and functional rehabilitations

(2) Postoperative management of denture wearers

(3) Evaluation of patient satisfaction

3) Diagnosis of functional disorders

(1) Diagnosis of eating, swallowing and masticatory disorders

(2) Diagnosis of pronunciation disorder

(3) Diagnosis of aesthetic disorders

(4) Diagnosis of jaw dysfunction

4) Evaluation method of oral functions

(1) Recording the EMG

(2) Recording the mandibular movement
(3) Recording the occlusal contact state
(4) Inspection of occlusal force distribution
(5) Test of saliva production
(6) Tongue function evaluation

5) Making an experimental plan
(1) Searching literature and using the literature database
(2) Hypothesis planning and protocol creation
(3) Data analysis method and statistical processing
(4) Presentation technique and conference presentation method
(5) Writing a scientific article in Japanese and English

6) Accumulation method of case presentations
(1) Case photography method
(2) Digital data management method
(3) Personal information protection

Graduate Student Clinical Training Program

Course name	Department of Removable Prosthodontics and Gerodontology
Chief Professor Name	Prof. Takayuki UEDA
Program manager name (management/operation)	Prof. Takayuki UEDA
Training period	4 years from the 1st year
Number of people accepted	16
Instructors	Prof. Takayuki UEDA (Instructor of Japan Prosthodontic Society, Instructor of Japanese Society of Gerodontology) Dr. Masahiro RYU (Instructor of Japan Prosthodontic Society, Instructor of Japanese Society of Gerodontology, Certified Instructor of Sarcopenia and Frailty of Japanese Association on Sarcopenia and Frailty, JSDR-Certified Clinician of the Japanese Society of Dysphagia Rehabilitation) Dr. Tomofumi TAKANO (Specialist of Japan Prosthodontic Society, Certified Doctor of Japanese Society of Gerodontology) Dr. Midori OHTA Dr. Yasuhiro HORIBE (Certified Doctor of Japanese Society of Gerodontology, Certified Instructor of Sarcopenia and Frailty of Japanese Association on Sarcopenia and Frailty) Dr. Takeshi SAITO (Certified Doctor of the Japanese Society of Gerodontology) Dr. Akihiro ISHIDA (Certified Doctor of the Japanese Society of Gerodontology)
Program contents	

Our course is aimed to become a specialist who can provide advanced medical care centered on prosthodontics and gerodontology to the public, and can educate junior dentists, dental technicians, and dental hygienists. This course is an accredited training facility of the Japan Prosthodontic Society and the Japanese Society of Gerodontology, and after completing this program, it will be possible to acquire accredited doctors according to the regulations of each society. After deciding on a doctor for each case, we will provide guidance according to the clinical training program created by linking with the required cases of application for a specialist certified by the Japan Prosthodontic Society and a specialist certified by the Japanese Society of Gerodontology.
After you complete the course, you will receive a certificate of completion.

Specific application criteria for academic society-certified doctors who meet the qualification requirements at the end of the program

The clinical training program of this course is characterized by being linked to the required cases of applications for certified doctors of the Japan Prosthodontic Society and the Japanese Society of Gerodontology. After completing the 3-year clinical training course and submitting a case report, a certificate of completion will be awarded. Furthermore, the prepared case report can be submitted as it is as application documents for the Japan Prosthodontic Society certified specialist and the Japanese Society of Gerodontology certified specialist.

For specialists of the Japan Prosthodontic Society and specialists of the Japanese Society of Gerodontology, it is necessary to have continuous membership history and training at a training institution for at least 5 years. Therefore, in order to acquire a specialist of the Japan Prosthodontic Society and a specialist of the Japanese Society of Gerodontology, it is necessary to carry out one year of training as a clinical specialist course student or aresident after graduate school.

Fixed Prosthodontics

Credit:

Major subject, 6 credits/ year

Minor subject, 1 credit/ year

Person in charge

Professor: Hideshi Sekine

Associate Professor: Shuntaro Nomoto

Lecturer: Ryuichi Hisanaga

Lecturer: Mamoru Yotsuya

Assistant Professor: Takanori Sakai

Assistant Professor: Yu Tsuyuki

Assistant Professor: Takahiro Kawasaki

Assistant Professor: Shota Kuroda

Course objectives

1. To consider the solutions to disorders caused by tooth defect and tooth loss.
2. To clarify the characteristics of materials used for prosthetic treatment.
3. To present related research contents to domestic and international research conferences and write research paper.

I. Main research contents

1. Prosthetic approach to the physiological function of the stomatognathic system
2. Harmony with the human body in the Fixed prosthesis
3. Response to stomatognathic dysfunction
4. Required properties of biomaterials in the fixed prosthodontics

II. Features of the Department

The purpose of this course is to investigate how to use a fixed prosthesis to eliminate aesthetic and dysfunction associated with dental diseases and maintain a recovered state for a long period of time. These studies are extensive and use a clinical approach to patients and volunteers and an experimental approach using materials, models, animals, etc. If necessary, we will cooperate with basic and clinical researchers.

III. Original curriculum of the Department

1st year: Learn how to find research themes in prosthodontics. Complete the tasks (clinical report, basic research, research review) presented by the instructor. In the meantime, identify the prosthetic topics of interest and start a preliminary experiment.

2nd year: Complete the research protocol based on the results of preliminary experiments. We will consider the data processing of experimental results.
3rd year: Create the necessary research data and start writing a treatise.
4th year: Complete the treatise, undergo the treatise review, and submit the treatise.

IV. Course purpose

Understand prosthetic methods to resolve oral dysfunction. The purpose of the activity is to solve unknown questions. Learn how to find and solve research themes.

V. Strategy

Participate in the graduate school study group, collect information on research, and report on progress.

Participate in the abstract reading session to learn research methods, understand the current situation of prosthetic questions, and understand related papers.

Participate in related academic societies and seminars to improve your knowledge and insight.

The experimental method is decided according to the research theme, and the experimental results are derived.

The experimental results will be summarized in the paper and will pass the examination.

VI. Evaluation system and standard

A passing score of 6 or more is given for each method used to compile the experimental data, interpret the data, write the experimental notes, and comprehensively evaluate the results through discussion (10-point method).

VII. Goals for the future

You can aim to become a university researcher.

It is possible to aim to become a specialist in dental prosthodontics in accordance with the system accredited by a specialized society.

You can aim to study abroad (our faculty members studied at Boston University and the University of Illinois in the United States).

You can be an evidence-based dentist.

Lecture content items (core subjects): Fixed Prosthodontics

1. Prosthodontic approach to physiology of the stomatognathic system

1) Physiological mobility of natural teeth
2) Chewing function, pronunciation function
3) Occlusal contact / translation
4) Three-dimensional analysis of mandibular movement

2. Harmony with the human body in the Fixed Prosthodontics

1) Research on mandibular movement control function
2) Color studies in Fixed Prosthesis
3) Changes in dentition and occlusal relationship with aging
4) Research related fitness of fixed prosthesis

3. Digital Dentistry in Fixed Prosthodontics

1) Application of digital technology in prosthetic diagnosis
2) Clinical application of optical impression method
3) Manufacture of prosthesis with digital machining method

4. Responding of temporomandibular disorders (TDM)

1) Pathophysiology and etiology of temporomandibular disorders
2) Diagnosis and treatment of temporomandibular disorders

5. Research on biomaterial materials

1) Development of adhesive system in prosthetic area
2) Prosthetic supra structure of implant treatment
3) Intraoral adaptation of ceramic prosthesis
4) Application of hard resin to molars
5) Adsorption of oral bacteria to prosthetic materials
6) Basic research on clinical application of ceramic implant body

Department of Removable Partial Prosthodontics

Shuichiro Yamashita (Chair Professor), Akinori Tasaka (Associate professor), Mariko Ohira (Assistant professor), Akihiro Tanaka (Assistant professor), Kazuhiro Ikeda (Assistant professor), Yoshimitsu Kato (Assistant professor)

Educational Objectives

To acquire the ability to carry out research in the field of prosthodontics and related fields, as well as the ability to provide guidance to future generations, students will acquire the ability to gather information, analyze, and present necessary for basic and clinical research. In addition, we respect the acquisition of basic skills necessary for active self-study attitude, logical thinking, and problem finding and solving.

Ⅰ. Main Research Activities

1) Research on the role of occlusion in stomatognathic functions
2) Accuracy of removable partial denture framework fabricated by CAD/CAM technology.
3) Applying intraoral scanner to partially edentulous dentition
4) Study of an eating dysfunctions in the dependent elderly
5) Relationship between inclination of occlusal plane and jaw movements
6) Study on fatigue of removable partial denture

Ⅱ. Features of the Department

In order to be able to respond appropriately to various disorders caused by occlusal collapse, it is necessary to objectively evaluate and understand the process leading up to the disorder. In the case of partial tooth loss, many problems are intertwined in a complex manner over time to cause the disorder. From this perspective, we are conducting research on the various topics mentioned above.

Ⅲ. Department-specific Curriculum

This department's training program is designed to provide the training necessary to obtain medical specialties from various academic societies, and the qualification requirements for medical specialties from each academic society can be fulfilled in this program.

Ⅳ. Achievement of Goals

In order to acquire the ability to conduct research in the field of prosthodontics and related fields and the ability to provide guidance to future generations, students will acquire the ability to gather and analyze information necessary for basic and clinical research. In the end, students will complete a doctoral research paper, which will be published in an international journal.

Ⅴ. Learning Strategy

Conferences, Seminars, Self-study, Clinical study

Ⅵ. Evaluation Method and Criteria

Comprehensive evaluation will be made based on the validity of experimental data, summary of experimental results, presentation techniques, daily observation records, and oral examinations. A score of 6.7 or higher in each section will be considered passing. If the level of achievement in the oral examination is not sufficient, feedback will be given through a report.

Ⅶ. Prospects after Completing Graduate School

Students will have the opportunity to further develop their research results in graduate school, while at the same time improving their clinical and educational skills to comprehensively diagnose and treat prosthetic cases.

Lecture contents

１. Methods for evaluating stomatognathic functions associated with missing teeth will be discussed.

２. Evaluate the accuracy of removable partial denture framework fabricated by CAD/CAM technology will be discussed.

３. Methods to improve the accuracy of intraoral scanning for partially edentulous dentition will be discussed.

４. The diagnostic accuracy of the assessment method for dysphagia screening new system and the actual survey of the eating and swallowing function of the dependent elderly in the facility of the health care service will be discussed.

５. In determining the new the vertical dimension in occlusal and occlusal plane, the importance to consider the most appropriate method for the patient's unique jaw and oral system, rather than using average values will be discussed.

６. The discrepancies between clinical and academic practice in removable partial denture design and the influence of using new materials and techniques in the fabrication of clasp retainers will be discussed.

Graduate Student Clinical Training Program

Department	emovable Partial Prosthodontics
Chair Professor	Shuichiro Yamashita
Program Director	Shuichiro Yamashita
Training period	Three years
Number of students accepted	Up to 8 students
Medical advisor	Shuichiro Yamashita, Akinori Tasaka

Program Contents
The purpose of this program is to provide the training necessary to obtain medical specialties from each professional society.
Specific application criteria for academic medical specialists who meet the eligibility requirements upon completion of the program
This program can fulfill the qualification requirements for medical specialists of each specialty society.

Orthodontics

Curriculum

Unit　Main subject　6unit/y
　　Sub-subject　1unit/y

Person in charge

Professor and chair Yasushi Nishii

Sinor assistant professor Haruyo Miyazaki, Kunihiko Nojima, Teruo Sakamoto, Hinorori Katada, Takanobu Ishii, Chie Tachiki

Assistant professor Taiki Morikawa, Tomohiro Ebisawa, Yuki Iijima

教育目標

In accordance with the Graduate School Diploma Policy, discover new findings in orthodontics, acquire the knowledge, skills, and attitudes that contribute to the development of orthodontics, and enable research guidance through research.

Ⅰ. Main research

・Integration of 3D morphological analysis of maxillofacial morphology and orthodontic diagnosis
・Masticatory muscle analysis of jaw deformity
・Evaluation of periodontal ligament response to orthodontic force
・Analysis of the reaction of osteoblasts and osteoclasts to orthodontic force
・Incidence analysis to mandibular condyle resorption
・Maxillofacial morphology analysis with AI
・Genetic analysis of jaw deformities

Ⅱ. Feature of Department

Ⅰ. Through extensive research, medical care, and educational practices, we will develop research on the morphology and function of the stomatognathic cavity from a highly specialized standpoint from a biological basis. From general malocclusion to occlusal abnormalities, jaw deformities, and congenital anomalies, the research results are returned to clinical practice, leading to the provision of high-quality medical care.

Ⅲ. Original curriculum

Ⅱ. The three-year system, which is implemented as specialized clinical training after graduation, requires graduate students to take the course in parallel with research, and will acquire the basics and clinical skills of orthodontics. After graduating from graduate school, it can be used as part of the qualification to obtain a certified doctor of the Japanese Orthodontic Society.

Ⅳ. Learning Attainment Targets

Freshman: Acquisition of basic knowledge and skills of orthodontics and extraction of research subjects
Sophomore: Establishment of research method. Development of orthodontic clinical theory and clinical skills
Junior: Conducting research, integrating correctional knowledge and technology
Senior: Summary of research results, presentation at academic conferences, submission of

papers

Ⅴ. Strategy

・Lectures, practical training, clinical guidance (knowledge and skills of orthodontics) by class teachers and all academic advisors

・Individual guidance by tutorials with your academic advisor

・Research progress presentation at graduate school debriefing session, group discussion on its contents, and guidance by all academic advisors

Ⅵ. Evaluation method / criteria

・Paper test and submission of clinical trials (knowledge and skills of orthodontics)

・Evaluation of validity of experimental data, how to summarize experimental results, report creation, etc.

する。

・Thesis evaluation

Ⅶ. Career after graduate school

Recommendations for residents and assistant professors

Lecture contents

1. Quantitative analysis of stomatognathic function

Muscle activity analysis by masticatory EMG and jaw movement analysis by nasohexagraph

Relationship between occlusal abnormalities and dysfunction

Relationship between measurement of expression pressure of perioral muscles in the dentition and malocclusion due to habit

2. Computer-assisted orthodontics Morphological analysis / diagnostic skills

Dental morphology measurement with a three-dimensional dentition model

Surgical orthodontic treatment diagnosis support by 3D maxillofacial dentition morphology model

Orthodontic evaluation of 3D soft tissue facial model

3. Application of 3D finite element method to orthodontic treatment

3D FEM analysis for the orthopedic treatment

3D FEM analysis of tooth movement dynamics by TAD

4. Aging of maxillofacial and dentition

Effects of orthodontic treatment and oral growth on oral health

3D morphological analysis of dentition stability

5. Congenital diseases / jaw deformities and orthodontic treatment

Classification and diagnosis / treatment of maxillofacial malformations / deformities

Diagnosis and treatment of occlusal abnormalities in bone system diseases and metabolic diseases

6. Cell biological analysis of tissue response to corrective and external force loads

Cell biological of tooth movement

Cell biological of bone response to external force

大学院生臨床研修プログラム

講座名	歯科矯正学講座
主任教授名	西井康
プログラム責任者名 （プログラムの管理・運営）	西井康
研修期間	４年間
受け入れ人数	3 名／年まで
指導医	西井　康、野嶋邦彦、坂本輝雄、立木千恵 宮崎晴代、片田英憲、石井武展
プログラムの内容	
日本矯正歯科学会認定医研修機関（基本研修、臨床研修）としての研修を行う。3 年間の基本研修修了にあたっては、治験例 4 症例、保定観察症例 1 症例、論文 1 編を提出し、筆記試験と合わせ、合格の水準に達する事が必要である.	
プログラム修了時に資格要件を満たす学会認定医等の具体的申請基準	
認定条件は学会在籍期間が５年以上であること。学会の認めた研修機関で年間 1320 時間以上の修練を２年間、その後の研修期間または指導医常勤の医療機関における修練期間をあわせて５年以上が必要である。また、その間に 150 症例程度の臨床経験と論文が必要となる。 本プログラムは４年間の研修機関における修練実績として認定される。	

Oral and Maxillofacial Radiology

Staff

Dr. Tazuko K. Goto, Professor and Chair
Dr. Mamoru Wakoh, Associate Professor
Dr. Mika Otonari-Yamamoto, Lecturer
Dr. Kento Odaka, Assistant Professor

Educational Curriculum

The core philosophy of the Graduate School here at Tokyo Dental College is one that focuses on the development of fully rounded individuals. Therefore, our most fundamental aim is to support and nurture young professionals, encouraging them to develop as broad a mind as possible so that they will be able to play a role on both the domestic and international stage. Every student will be expected to acquire a comprehensive knowledge of their field, not just that of the oral cavity. Therefore, they will learn how oral medicine relates to the entire body, brain function, and pathology in general. Using the latest that technology and artificial intelligence has to offer, they will also develop their ability to empathize with their patients. In this way, our Graduate School programs aim to produce young dental professionals capable of serving the wider community.

1. Main Scope of Research

1) Oral Cavity and Brain Function
   a) Relationship among the sense of taste, the brain, and the body as a whole (hypertension, diabetes, and so on). Imaging modality: Functional MRI.
   b) Relationship between brain function and the oral and maxillofacial region (sense of taste, sense of smell, occlusion, pain, sports, psychology). Imaging modality: Functional MRI.
   c) Relationship between tooth loss and development of Alzheimer's disease. Imaging modality: PET.

2) Groundbreaking Developments in Diagnostic Imaging

3) 3-Dimensional Morphology
   a) Research into diseases of the jaw using 3-D printing. Imaging modality: CT and micro-CT.
   b) Diagnosis based on 3-dimensional morphology. Imaging modality: MRI and CT.

4) Clinical Case Studies
   a) Relationship among diagnostic imaging and clinical and pathological findings. Imaging modality: MRI, US, CT, plain radiography, etc.

2. Global and Liberal Arts: Special features of this department

All our staff are dedicated to fostering the widest possible outlook in our Graduate School students. Each and every one has a rich background of experience in dental medicine on both the domestic and international stage. One of our aims is to bring our experience as human

beings, not just medical professionals, to bear in our work here. Therefore, all our students are encouraged to select the direction that best suits their needs as an individual in terms of research content, level, and future ambitions. We provide a welcoming research environment, with a male-to-female ratio of one-to-one. It is in this setting that each student will be given free rein to develop and pursue their own goals.

1) This department provides the kind of work environment that might be found at a general university overseas. We collaborate with specialists from a wide range of backgrounds encompassing, science, engineering, the liberal arts, and more. We also enjoy a strong relationship with the world of business.
2) Each student will also be enthusiastically encouraged to grow as a clinician. As such, they will be expected to hone not only their skills in diagnostic imaging, but also in the various practical aspects of dentistry in a clinical setting.

3. Unique Aspects of Departmental Curricula

1) Research

a) Students will have access to individual instruction at any time.
b) Students will be able to attend weekly research meetings. They will be encouraged to freely discuss their work, particularly with regard to how it is progressing, and share information.
c) Students will also be able to attend monthly departmental meetings to discuss their work, at which they will be given feedback and assessment on how they are progressing.

2) Clinical Practice

a) Students will be able to discuss cases encountered the previous day at morning conferences.
b) Students will master the fundamentals of clinical medicine in weekly conferences, clinical practice sessions, and clinical study meetings.
c) Students will acquire a high level of diagnostic ability through attending weekly conferences on cases of particular interest.
d) Students will acquire certification as oral and maxillofacial radiologist from the Japanese Society for Oral and Maxillofacial Radiology.

4. Yearly Goals

1st year: Submit ethical clearance applications for research; gathering of information by reading the relevant literature; development of a research plan; commencement of research project.

2nd year: Continuance of research work; giving presentations at domestic academic conferences.

3rd year: Continuance of research work: preparation of paper, presentation at international

academic conferences; taking of examination for certification as oral and maxillofacial radiologist.

4th year: Submittance of paper for publication in academic journal; taking of examination for Doctor of Philosophy; preparation for study overseas.

5. Teaching Methods

Research meetings, conferences, seminars, lectures, etc.

6. Assessment and Standards

Assessment will be based on the results obtained in relation to each educational goal to be achieved. A minimum of 70% will be required to obtain a pass.

7. Post-Graduation Support

1) After graduating on completion of the 4-year course, the students will be able to receive support in attaining their career goals, whatever their chosen path, whether it be as a university-level educator, diagnostic clinician, public servant, dental practitioner, or other.
2) On completion of the course, the students will also be able to aim for further qualifications, including as a Certified Specialist/Senior Specialist (supervisory doctor) for Oral and Maxillofacial Radiology, Certified Specialist/Senior Specialist (supervisory doctor for the Temporomandibular Joint, Specialist in PET, and Specialist in Malignant Tumors in the Oral Cavity.
   *Qualification as a Specialist of Oral and Maxillofacial Radiology indicates eligibility to advertise under the regulations of the Ministry of Health, Labor and Welfare.

Lecture Contents

Diagnostic Imaging, Anatomy, Neurophysiology, Statistics, General Dentistry, etc.

Dental Anesthesiology

Curriculum for main major and sub-major during first and second semesters

Units　Main major　6 units per year
　　Sub-major　1 unit per year

Faculty members

Professor: Tatsuya Ichinohe

Senior Assistant Professor: Toshiyuki Handa, Kyotarou Koshika

Assistant Professor: Jun Kawaguchi, Hirokazu Kukidome, Kaori Yoshida, Ayano Hagiwara, Kaori Takahashi

Learning objectives

To learn fundamental ability to promote and lead scientific researches through obtaining research competencies on ideas, skills and information collection and analysis, and to achieve new knowledge in the field of dental anesthesiology.

Ⅰ. Main research subjects

1) Local anesthesia
   (1) Respiratory and hemodynamic effects of vasoconstrictors contained in local anesthetic solution
   (2) Effects of vasoconstrictors contained in local anesthetic solution on dental pulp
   (3) Evaluation of local anesthetic effect
2) Systemic management of dental patients
   (1) Hemodynamic stability during general anesthesia
   (2) General anesthesia and tissue blood flow/tissue oxygenation
   (3) Intravenous sedation
   (4) Monitoring equipment
   (5) Geriatric, medially compromised and disabled patients
3) Pain clinic
   (1) Treatment of chronic pain
   (2) Management of postoperative pain

Ⅱ. Characteristics of the department

1) Graduate students select research subjects required for practicing “safe, comfortable and pain-free dentistry”. Thus, research products will be available for near-future clinical activities.
2) Graduate students receive clinical training till the first semester of second grade and then they go into research life in third and fourth grade.

Ⅲ. Unique curriculum of the department

1) Medical anesthesia training during first or second grade
2) Case report on the Journal of Japanese Dental Society of Anesthesiology
3) Qualification of the Japanese Board of Dental Anesthesiology during graduate student

Ⅳ. Learning objectives

1) First and second grade: To learn basic knowledge and clinical skills on dental anesthesiology and publication of a case report
2) Third and fourth grade: To conduct research and complete thesis, and be qualified as the Japanese Board of Dental Anesthesiology

Ⅴ. Learning strategies

1) Knowledge: Lectures, presentation at the department meeting, participation in academic

meetings, and publication of scientific articles
2) Skills: Clinical training and practices using simulators
3) Research: Experiment, presentation at academic meetings and publication of scientific articles

Ⅵ. Evaluation

1) Knowledge: Oral examination and report submission
2) Skills: Clinical experiences and skill check
3) Research: Research ethics, level of understanding, presentation ability and writing talent
4) Activeness as a graduate student
Comprehensively evaluated as follows;
A: Excellent, B: Good, C: Satisfactory, D: Unsatisfactory

Ⅶ. Carrier path after graduation

They can receive medical anesthesia training for 1 – 2 years and be qualified as a Board Certified Dental Anesthesiology Specialist. After that, they will be;

1) Faculty member of a dental anesthesiology department
2) Dental anesthesiologist in a general hospital
3) Dental anesthesiologist in a local dental center for disabled patients

Lecture contents

Each item requires 1 - 2 hours review and self-study on relative issues after lecture.

1) Local anesthesia
   (1) Respiratory and hemodynamic effects of vasoconstrictors contained in local anesthetic solution
   (2) Effects of vasoconstrictors contained in local anesthetic solution on dental pulp
   (3) Evaluation of local anesthetic effect
2) Systemic management of dental patients
   (1) Hemodynamic stability during general anesthesia
   (2) General anesthesia and tissue blood flow/tissue oxygenation
   (3) Intravenous sedation
   (4) Monitoring equipment
   (5) Geriatric, medially compromised and disabled patients
3) Pain clinic
   (1) Treatment of chronic pain
   (2) Management of postoperative pain
4) Medical statistics
   (1) Medical statistics

Clinical training program

Department	Dental Anesthesiology
Chair	Professor Tatsuya Ichinohe
Person in charge	Professor Tatsuya Ichinohe
Training length	4 years
Maximum students	16
Instructors	Tatsuya Ichinohe, Toshiyuki Handa, Kyotarou Koshika, Jun Kawaguchi, Hirokazu Kukidome, Kaori Yoshida, Ayano Hagiwara, Kaori Takahashi

Contents

Clinical training for qualification of the Japanese Board of Dental Anesthesiology and Board of Japanese Society for Disability and Oral Health.

A total of 1000 general anesthesia cases, 7000 of intravenous sedation cases and 1500 pain clinic cases are given in Suidobashi Hospital and Chiba Dental Center.

Medical anesthesia training during first or second grade.

Requirements for qualification

Japanese Board of Dental Anesthesiology
1) 2 years membership or more
2) 200 general anesthesia cases
3) 50 intravenous sedation cases
4) 1 publication on the Journal of Japanese Board of Dental Anesthesiology

Japanese Board of Dental Anesthesiology
1) 3 years membership or more
2) 60 systemic management cases for 20 patients
3) 1 presentation in an annual meeting of Japanese Board of Dental Anesthesiology

Oral Health and Clinical Science

Unit) Main subject six units/year
Sub-subject one unit/year

Instructor)

- Prof. Ken-ichi Fukuda, Associate Prof. Yumi Otawa
  Assistant Prof. Atsushi Hanzawa, Assistant Prof. Tomoyasu Noguchi
- Prof. Ryo Ichida , Associate Prof. Mai Okubo
- Prof. Tomotaka Takeda, Associate Prof. Kazunori Nakajima

Educational goals)
Accumulate and practice as a clinician.
Acquire information gathering ability and analytical ability necessary for basic and clinical research in each field.
Acquire the ability to carry out research and the ability to teach younger students.

Ⅰ. Contents

【Division of Special needs dentistry and Orofacial Pain】

1) Analysis of oxygen supply and demand and heart rate variability of the masticatory muscles during bruxism and physical therapy
2) Pain-related gene polymorphism analysis related to orofacial pain onset vulnerability
3) Nerve MRI image analysis for local pathophysiology of orofacial neurosensory damage
4) Orofacial region Imaging of central nervous system function of chronic pain
5) Relationship between glossodynia onset factors and potential developmental disorders
6) Analysis of pathological conditions of dental patients with special needs and devising behavior therapy

【Division of Dysphagia Rehabilitation】

1)Determination of the Relationships Tongue Hardness, Thickness, and Pressure Using Ultrasonic Elastography
2)Development of a method to visualize and evaluate changes in eating motivation
3)Development of a new eating and swallowing function questionnaire including self-awareness and coping ability
4)Search for the relationship between swallowing function and oxidative stress in the elderly
5)Sensory Processing Issues with Feeding Problems
6)Investigation of the swallowing function and chlorpromazine equivalent dose of antipsychotic drugs in patients with psychiatric disorders
7)Effect of Neuromuscular Electrical Stimulation on Masseter Muscle Thickness and Maximal Bite Force among Healthy Persons
8)Exploring the relationship between knowledge about oral function and oral functional status

【Division of Sports dentistry】

1) Effect of stomatognathic condition on systemic athletic performance
2) Effect of stomatognathic condition on equilibrium function
3) Effect of stomatognathic condition on brain activity
4) Research on the expression of masticatory muscle activity during sports and physical exercise
5) Effect of sports clenching and mouthguard on stomatognathic trauma
6) Effect of sports clenching and mouthguard on concussion

7) New development of mouthguard material
8) Effect of gum chewing on brain activity
9) Effects of gum chewing on stress reduction
10) Epidemiological study on stomatognathic sports trauma
11) Study on the effect of oral device for sleep apnea treatment

Ⅱ. Features

This course was established in April 2015 by integrating three laboratories: Special needs dentistry and Orofacial Pain, Dysphagia Rehabilitation, and Sports Dentistry. Based on the abundant clinical cases of Suidobashi Hospital, this clinical course focuses on research activities aimed at improving the oral quality of life of patients. This is a new type of complex course that conducts clinical, research, and educational activities in units of one oral cavity, rather than specializing in a specific field.

Ⅲ. Curriculum

The clinical training program of this course aims to provide training necessary for acquiring certified (specialized) doctors of academic societies in each field, and this program must satisfy the qualification requirements of certified (specialized) doctors of each specialized academic society.

Ⅳ. Attainment target

By studying as a clinician, students will acquire the information gathering ability and analytical ability necessary for basic and clinical research in each field, which will eventually lead to the completion of their dissertation. The treatise at the time of completion will be published in the international journal.

Ⅴ. Strategy

Conference, English journal reading session, clinical training

Ⅵ. Evaluation method / criteria

Comprehensive evaluation will be made based on the validity of experimental data, how to summarize experimental results, presentation techniques, daily observation records, and oral examinations. Each pass is 6.7 points or more.

Ⅶ. Prospects after graduate school

It is possible to have the ability to comprehensively diagnose, formulate a treatment policy, and treat while making use of clinical research in each field as one oral unit, not by dental disease.

Lecture content items

1. Orofacial Pain Relief and related pathophysiology
2. Behavior therapy for patients with special needs and related pathology
3. Dysphagia rehabilitation and related pathophysiology
4. Prevention of sports injuries and related occlusal studies

Oral Implantology

First and second semester, main subject and sub-subject lecture schedule

Credits: Main subject 6 credits/year
Sub-subject 1 credit/year

In charges:

Prof. Yasutomo Yajima, Assoc. Prof. Taichi Ito, Lecturer. Yoshitaka Furuya, Lecturer. Hodaka Sasaki, Assis. Prof. Tomoki Hirano, and Assis. Prof. Yukari Oda

Educational goals

To understand the importance of basic research by learning implantology, a comprehensive multidisciplinary field, in order to become a dentist who can practice evidence-based clinical dentistry.

To become aware of ethical issues as a scientist; develop presentation skills (oral presentation and writing ability); and develop an understanding of how to gather data, perform research, and analyze the data correctly.

Ⅰ. Main goals of a research program

1. Improve the success rate of implants (development of new materials, implant systems, and implant designs, along with elucidation of mechanical mechanisms).
2. Expansion of indications for implants (mechanisms and prognoses of various bone augmentation methods as well as management of soft tissues).
3. Shorten the healing period (immediate loading, early loading, and immediate implant placement after tooth extraction; healing mechanisms with immediate loading).
4. Pursuit of aesthetics (changes in peri-implant tissue, relationship between implants and periodontal bacteria).
5. Medical safety (development of navigation systems; development of educational programs).

Ⅱ. Features of the department

The Department of Oral and Maxillofacial Implantology is the newest department in Tokyo Dental College, which was established in 2009. New departments have great advantages, such as a new research system with a novel viewpoint not bound by old customs. In addition, as few universities have a department of implantology, our department will be at the forefront of implantology research. We would like to feature this department as a “base for disseminating information on implantology to the world”.

Ⅲ. Specific goals of the curriculum

1st year: To learn clinical practice methods and understand the logical thinking and procedure of initiating a paper and completing a paper (case report, medical statistics), which will be guided by the instructor. Additionally, clinical practice will help develop problem solving skills using one's own information gathering and analytical ability.

2nd year: To discuss the research you are interested in with your instructor, you will need to create a protocol, and conduct a pilot experiment. To collect data for the final experiment, additional experiments will be performed and the protocol will be modified accordingly.

3rd year: To give a presentation on your own experiment at an academic conference and complete a paper for publication after finalizing data analysis.

4th year: To submit a paper and instruct undergraduate students on experiments that they will

perform with the instructor. In addition, you will perform clinical practice similar to that of scientists and perform research on new themes.

Ⅳ. Archiving goals

1. To acquire evidence on implant treatments and develop a successful treatment plan.
2. To receive credits for certification as a doctor recognized by the Japanese Society of Oral Implantology and Japanese Academy of Maxillofacial Implants.

Ⅴ. Strategy

・Write a clinical paper ・Give a presentation at an academic conference ・Give a presentation at a clinical meeting ・Attend a seminar ・Attend journal club

Ⅵ. Evaluation and Standards

・Evaluation of clinical observation records ・Evaluation of a step-up test in accordance with implant guidelines ・Comprehensive evaluation by reviewing a paper that you wrote.

Ⅶ. Possibilities after the graduate course

It is possible to be an assistant professor or resident in the department of oral and maxillofacial implantology. In addition, it is possible to study abroad (Federal Republic of Germany: Göttingen University, Friedrich-Alexander University Erlangen-Nürnberg, Hannover Medical School).

Lecture Content

1. General outline in oral implantology
   1) Specificity in dental implant treatment
   2) Flow of dental implant treatment and future implantology
   3) Biological reactions of implants to tissue interfaces
   4) Surface chemistry and surface topography of implant materials

2. Special topics in dental implantology
   1) Treatment planning and indications
   2) Implant placement surgery
   3) Complications
   4) Superstructure
   5) Maintenance

3. The relation between implantology and basic dentistry

4. The relation between implantology and clinical dentistry

5. Current status and future prospects of regenerative medicine in implantology

6. Practicum
   1) Anatomy for implant treatment
   2) Implant placement for a dental model

Clinical Training Program for Graduate Students

Department name	Department of Oral and Maxillofacial Implantology
Chief professor name	Yasutomo Yajima
Person in charge of the program	Yasutomo Yajima
Training period	4 years
Accepted number of students	Up to 20 students
Instructors	Yasutomo Yajima, Todshikazu Iijima, Tatsuo Shiigai, and Takayuki Takeda

Contents of program

Chiba Dental Center: training on implant treatment in the Implant Department of the college and completion of a clinical paper.
Private clinic of clinical professors: training on implant treatment in the private clinic.

Specific application criteria that meet eligibility requirements at the end of the program (e.g., certified doctors by an academic society)

The application criteria for a certification as a doctor by the Japanese Society of Oral Implantology are as follows: enrollment in a training facility for a total of 5 years or more, completion of training, a presentation at an academic conference, and a publication in a journal. At the end of this program, most criteria will be met other than years of enrollment.

It is also possible to carry out a curriculum that matches being a certified doctor of the Japanese Society of Maxillofacial Implants.

Department of Oral Oncology, Oral and Maxillofacial Surgery

Adquisition Unit Requirements

Major subject (Oral aObjec Maxillofacial Surgery): 6 credits per year (minimum 24 Credits to graduate) or more
Sub-subjects (Optional): 1 credit per year (minimum 4 Credits to graduate)
Specialized Lectures: 2 credits per year (minimum 4 Credits to graduate)
Seminars: 1 credit per year (tminimum 3 Credits to graduate)

Academic stuff/ Instructor's Information
Takeshi Nomura (Chief Professor/Academic advisor/Mentor)
Hirokazu Saito (Assistant Professor)
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I. Graduate Program Objectives and Student Learning Outcomes

Based on the diploma policy of the Graduate School of Dentistry at Tokyo Dental College, our department offers research oriented educational program in the field of oral and maxillofacial surgery and oral oncology that fosters expertise and enhances critical thinking in students by developing comprehensive and multiple points of view; cherishes international diversity; and promotes for students' career paths.

II. Research Subjects
1. Oral cancer
1) Development of diagnostic study for the Oral potentially malignant disorders (OPMDs)
2) Exosome analysis in saliva will be taken from patients with oral squamous cell carcinoma
3) Characterization of O-glycans of mucins extracted from mucoepidermoid carcinoma
4) Elucidation of the mechanism of epithelial mesenchymal transition (EMT) in oral squamous cell carcinoma
2. Oral complications resulting from systemic disease
1) Diagnosis and treatment of autoimmune blistering disease in oral mucosa
2) Effect of bacterial infection on bone quality and structure in medication related osteonecrosis of the jaw
3) Gene panel testing for Gorlin syndrome
4) Oral microbiota in the patients of palmoplantar pustulosis

III. Characteristics of our department
The work place is located at Ichikawa General Hospital, Tokyo Dental College in Chiba prefecture. Our department involves the division of Oral Medicine, Oral and Maxillofacial Surgery. Through medical and dental collaboration, the department also provide specialized medical care for diseases related to oral cavity. Additionally, oral cancer center was established in 2006 and have agreements in various hospitals. Furthermore, we provide advanced oral cancer treatment in cooperation with each of the concerned department which consists of oral and maxillofacial surgeon, plastic surgery, head and neck radiology, maxillofacial prosthetics and oral rehabilitation team. We provide diagnostic procedures and treatment techniques for oral cancer to undergraduate dental students, as well as practical surgical techniques for oral cancer to graduate dental students. Furthermore, we boost the surgical treatment not only oral cancer but also oral and maxillofacial disease such as jaw deformity,

cleft lip and palate as physician scientists. Through highly advanced medical treatment, our team challenge the innovative translational research.

IV. Curriculum overview:

First-Year: The student participation in the treatment of outpatient and inpatient medical care will be done at Ichikawa General Hospital. Especially, learning about clinical practice in the treatment of oral cancer patients will be done at oral cancer center. In order to increase individual chances of success, the candidate will be assigned the specific professors in the area of research such as physician scientists through clinical practice.

From 2nd – 4th Year: Each candidates decides on a research theme and start the life in academia. Our department is held monthly meeting and whole students taken an active part in the discussion for each research. Furthermore, we hold monthly journal clubs and participate in academic activities. The students (candidates) will be able to participate in several annual meetings abroad such as the Oral and Maxillofacial Surgery Congress. The article should be completed in four years and the students have a degree once be done thesis defense.

Case Material

An adequate volume and diversity of clinical exposure is available to provide a complete and effective educational experience. This includes an appropriate number of cases in the following areas: Facial trauma surgery, Orthognathic surgery, Temporomadibular joint surgery, Dental implant surgery, Head and neck pathology, Complex maxillofacial reconstructive surgery, Outpatient anesthesia, Aesthetic surgery, Sleep apnea surgery, Advanced presprosthetic surgery, Dentoalveolar surgery, Cleft lip/palate and craniofacial surgery, Oral cancer surgery.

V. Achievement goal

The post-graduate students will have got the way of learning about how to structured scientific evidence upon completion of this program. And also it will be able to play a role as a medical scientist on the basis of scientific skill. In addition, the candidate could be advance in the field of research and lead the most advanced dental science. The possibility of becoming the next leaders and human resources that contribute to the improvement of dentistry as an oral and maxillofacial surgeon is proposed.

VI. Strategy (Conferred a degree equivalent to a bachelor's degree)

1. Training course of oral and maxillofacial surgery: Year1
2. Basic research for producing quality theses: Year 2, 3, and 4
3. Undergraduate student lecture: 1 credit per year or more
4. Oral Oncology, Oral and Maxillofacial surgery lecture: 10 credit per year or more
5. Meeting: 1 credit per month
6. Journal club: 1 credit per month
7. Case conference: every day
8. Present research results at a conference: as needed
9. Join external workshops: as needed

VII. Formative evaluation (Conferred a degree equivalent to a bachelor's degree)

Achieve a passing score: Oral examination, Report, Portfolio

VIII Prospects after completion of graduate school

1. Senior resident or associate professor (Department of Oral Oncology, Oral and Maxillofacial surgery)
2. Clinical staff in affiliated hospital
3. Staff in formal or international laboratory (post-doctoral fellow)

IX. Oral Oncology, Oral and Maxillofacial surgery lecture

1. Oral and Maxillofacial Surgery (1.5h)
2. Oral Medicine (1.5h)
3. Oral Oncology (1.5h)
4. Dental anesthesiology (1.5h)
5. Surgical Pathology (1.5h)
6. Surgical anatomy (1.5h)
7. Emergency medicine (1.5h)
8. Team medicine (Nutrition Support Team) (1.5h)
9. Supportive care (oral management, dysphagia rehabilitation, oral and maxillofacial prosthesis and implant) (1.5h)
10. Palliative medicine (1.5h)

Department of Oral Medicine and Hospital Dentistry

Ⅰ. Instructional objectives

Oral Medicine and Hospital Dentistry is an academic discipline primarily concerned with attending to healthcare in cooperation with medicine, dentistry, and many other disciplines based not only on a surgical approach, but on a multifaceted view and knowledge of the diagnosis and treatment of oral diseases that considers their systemic and genetic background. In this course, students aim to obtain a doctorate (in dentistry) by acquiring the international-level information-gathering and analysis capabilities necessary for basic and clinical research, and preparing a dissertation that compiles research on oral medicine and hospital dentistry that can contribute to the progress of dental medicine.

Ⅱ. Primary areas of research

- The effects of psychiatric sedatives on biological functions
- The pathology of dysphagia and oral management in patients with acute stroke
- The relationship between caries-causing bacteria and the risk of stroke
- Perioperative management of oral function: effects and standard techniques
- Dental approaches to feeding and dysphagia
- Sarcopenia and oral dysfunction
- Diagnosis and treatment of dysphagia in patients following tongue cancer surgery
- Diagnosis and treatment of dysfunction in patients with maxillofacial defects
- Sleep apnea

Ⅲ. Features of the course

The course is set up at Tokyo Dental College Ichikawa General Hospital. The hospital's flagship department is the Department of Dentistry and Oral Surgery, which covers oral medicine, dentistry for medically compromised patients and disabled patients, perioperative management of oral function, dysphagia rehabilitation, maxillofacial prosthetics, and oral surgery. The department is staffed with certified physicians and clinical instructors specializing in all fields, allowing students to obtain certifications from various academic societies while enrolled in graduate school. Thus, a defining feature of this course is that it provides many opportunities for students to engage proactively not only in research but also in clinical practice. The research involved is distinctively collaborative, as it includes not only basic research on medical and clinical dentistry, but also a wide variety of diseases for which students can engage in diagnosis and treatment in coordination with adjacent medical departments.

Ⅳ. A unique course curriculum

・A program in which students participate in medical training in adjacent medical departments (with the possibility of choosing from Internal Medicine, Surgery, Anesthesia, and other departments) at Ichikawa General Hospital to acquire knowledge and clinical skills related to medical diseases and systemic management

・Mastering diagnosis/treatment regimen planning and patient management through clinical experience beginning in year 1

・Meeting with instructors once a month and making intra-office research progress reports

・Participating in journal clubs, group discussions, and clinical conferences

・Presenting a report on a case or simple research results at an academic conference and publishing a paper in a professional journal in year 2

・Medical office-led exam prep courses for obtaining certification from various academic societies

Ⅴ. Achievement objectives

・Acquire knowledge of basic medical diseases and learn systemic management of diseases in medical training.

・Acquire the information-gathering and analysis capabilities necessary for basic and clinical research.

・Present dissertation research results at an academic conference (domestic or international) and complete a dissertation.

・Acquire the research capability, capacity for providing educational guidance, and basic clinical skills to be a leader in next-generation dentistry settings.

・Obtain certification from academic societies while enrolled in, or shortly after completing, graduate school.

Ⅵ. Learning strategy

・Medical office-led lectures（5 times/year）

・Graduate school seminars（8 times/year）

・Research for dissertation preparation（2nd grade - 4th grade）

・medical training（6 months during the 1st grade）

・Journal clubs（monthly）

・Progress report meetings（monthly）

・clinical conferences（as needed）

・Participation in/presentation at academic conferences（as needed）

・Participation in workshops（as needed）

Ⅶ. Assessment methods/criteria

・In regard to the validity of experiment data, summary of experimental results, and manuscript preparation, progress is confirmed at monthly graduate school meetings, where general assessment is conducted via oral examination, reports, and portfolios.

・For oral examinations, reports, and portfolios, a passing score is 6 points or higher for each.

Ⅷ. Prospects after graduate school

・Oral Medicine and Hospital Dentistry course resident or assistant professor

・Working in a clinical setting as a dentist capable of systemic management in the department of dentistry and oral surgery at an affiliated hospital

・Working in a clinical setting as a dentist capable of systemic management in regional dental associations and dental centers

・Studying at an affiliated research institution outside Japan

Ⅸ. Lecture contents

・Oral Medicine（1.5h×3）

・Adjacent Medicine（1.5h×6）

（Internal Medicine, Surgery, Anesthesia etc.）

・Dental anesthesiology（1.5h×3）

・Oral and Maxillofacial Surgery（1.5h×3）

・Dentistry for medically compromised patients and disabled patients（1.5h×3）

・Dysphagia rehabilitation（1.5h×2）

・Oral and maxillofacial prosthesis（1.5h×2）

・Oral pathology（1.5h×2）

・Emergency medicine, Basic life support（1.5h×2）

・Team medicine（1.5h×2）

（Multidisciplinary cooperation：NST, RST, Home visiting nursing）

・Perioperative management of oral function（1.5h）

・Oral implantology（1.5h×2）