

ORTHODONTICS (OR)

Department Chairperson

Heesoo Oh

Professor of Orthodontics

Program Director

Heesoo Oh

Professor of Orthodontics

Associate Director of the Craniofacial Research Instrumentation Laboratory (CRIL)

Heesoo Oh

Professor of Orthodontics

Director of the Cleft Lip and Palate Prevention Program

Marie M Tolarova

Professor of Orthodontics

Director of the Pre-doctoral Program

Thomas Mark Vaughan

Assistant Professor of Orthodontics

Faculty

Marta Baird, Assistant Professor, B.Sc., University of the Pacific, 2005 | D.D.S., University of the Pacific Arthur A. Dugoni School of Dentistry, 2008 | M.S., University of the Pacific Arthur A. Dugoni School of Dentistry, 2011

Jonas Bianchi, Assistant Professor, D.D.S., Sao Paulo State University (UNESP), School of Dentistry, 2013 | M.Sc., SÃ£o Paulo State University, SP, Brazil., 2016 | OR, Mozarteum School, 2016 | Ph.D., Sao Paulo State University, 2019

James Chen, Assistant Professor, B.S., University of California at Davis, 2000 | D.D.S., University of California at San Francisco, 2005 | MPH, University of California at Berkeley, 2018 | OR, University of California at San Francisco, 2011 | Ph.D., University of California at San Francisco, 2011

Katherine Kieu, Instructor, BS, University of California, Los Angeles, 2005 | DDS, University of California, San Francisco, 2009 | MSD, University of the Pacific, 2012

Kimberly Mahood, Assistant Professor, BS, University of Louisville, 2000 | Certificate, University of the Pacific, Arthur A. Dugoni School of Dentistry, 2007 | Certificate, University of Kentucky College of Dentistry, 2005 | DMD, University of Kentucky College of Dentistry, 2004 | MSD, University of the Pacific Arthur A. Dugoni School of Dentistry, 2010

Heesoo Oh, Professor, Certificate, University of the Pacific, School of Dentistry, 2001 | DDS, Chonnam National University School of Dentistry, Korea, 1989 | MS, Chonnam National University, School of Dentistry, Korea, 1992 | MSD, University of the Pacific, Arthur A. Dugoni, School of Dentistry, 2005 | PhD, Chonnam National University, School of Dentistry, Korea, 1999

Joorok Park, Clinic Director of Graduate OR Department, BA, University of California, Berkeley, 2001 | DMD, University of Pennsylvania, School of Dental Medicine, 2006 | MSD, University of the Pacific, Arthur A. Dugoni School of Dentistry, 2008

Heeyeon Suh, Assistant Professor, B.Sc., Seoul National University, 2004 | D.D.S., Seoul National University, 2009 | Ph.D., Seoul National University, 2015

Miroslav Tolar, Associate Professor, Certificate, University of California in San Francisco, 1993 | MD, Charles University School of Medicine, 1965 | PhD, Czechoslovak Academy of Sciences & Charles University School of Medicine, 1970

Marie Tolarova, Professor, Gymnasium, Tabor, Czechoslovakia, 1959 | Board Cert, Postgraduate Medical Institute, Prague, Czechoslovakia, 1985 | Board Cert, Postgraduate Medical Institute, Prague, Czechoslovakia, 1985 | DSc, Czechoslovak Academy of Sciences, Prague, Czechoslovakia, 1986 | MD, Charles University School of Medicine, 1965 | PhD, Czechoslovak Academy of Sciences & Charles University School of Medicine, Prague, Czechoslovakia, 1979

Thomas Vaughan, Assistant Professor, B.D.S, University of Wales College of Medicine, Cardiff Dental School, 1990 | M.Sc., University of London, 2000

Jennifer Yau, Instructor, BS, University of the Pacific, 2009 | DDS, University of California, Los Angeles, 2013 | MSD, University of the Pacific, Arthur A. Dugoni School of Dentistry, 2015

Audrey Yoon, Clinical Assistant Professor, D.D.S., University of California, Los Angeles | M.Sc., University of California, Los Angeles, 2008 | Cert. University of California, Los Angeles, 2008

Olivia Yue, Assistant Professor, B.S., University of California, Los Angeles, 2010 | D.D.S., University of California, Los Angeles, 2015 | Fellowship, New York University, Langone, 2019 | Residency, New York University, School of Dentistry, 2018

Adjunct Faculty

Christopher Anderson, Assistant Professor, B.Sc., Santa Clara University, 2001 | D.D.S., University of the Pacific, 2004 | M.S.D., University of the Pacific, 2006

Maryam Arab, Assistant Professor, B.M.S., Kuwait University, 2013 | B.D.M., Kuwait University, 2016 | M.S.D., Boston University Henry M. Goldman, 2022 | Cert. Arthur A. Dugoni School of Dentistry, 2024

Thomas Bales, Assistant Professor, Certificate, UCLA, 1976 | DDS, University of the Pacific, School of Dentistry, 1974

Robert Boyd, Professor, CERT, University of Pennsylvania, 1974 | CERT, University of Pennsylvania, 1972 | DDS, Temple University, 1970 | Med, University of Florida, 1981

William Cole, Adjunct Associate Professor, B.S., Washington and Jefferson College, 1978 | Certificate in Orthodontics, University of California San Francisco, 1983 | D.M.D., New Jersey Dental School, 1981

Cory Costanzo, Clinical Assistant Professor

Kyle Cuenin, Assistant Professor, D.D.S., University of the Pacific, Arthur A. Dugoni School of Dentistry, 2022 | D.D.S., Ajman University, 2014

Bill Dischinger, Assistant Professor, BS, Oregon State University, 1994 | Certificate, Tufts University, 1999 | DMD, Oregon Health Sciences University, 1997

Steven Dugoni, Professor, B.Sc., University of Santa Clara, 1975 | CERT, University of the Pacific School of Dentistry, 1981 | D.M.D., Tufts University School of Dental Medicine, 1979 | M.S.D., University of the Pacific School of Dentistry, 1981

Bella Garnett, Clinical Assistant Professor, M.M.Sc., Harvard School of Dental Medicine, 2001 | D.M.D., Harvard School of Medicine, 2001

David Hatcher, Associate Professor, Certificate, University of Vermont Medical Center, 1976 | D.D.S., University of Washington, 1973 | M.Sc., University of Toronto, 1983

Hyeon-Shik Hwang, Associate Professor, DDS, Yonsei University, 1983 | MSD, Yonsei University, 1989 | Other, Yonsei University, 1979 | PhD, Yonsei University, 1992

Paul Kasrovi, Professor, BS, University of Southern Cal (USC), 1984 | DDS, UCSF, 1992 | MS, University of Pennsylvania, 1986 | MS, UCSF, 1995

Jetson Lee, Adjunct Clinical Associate Professor, AB, University of California, Berkeley, 1981 | Certificate, University of the Pacific, School of Dentistry, 1986 | DDS, University of the Pacific School of Dentistry, 1984 | M.S.D., University of the Pacific, School of Dentistry, 1986

Christopher Oviedo, Assistant Professor, B.Sc., University of California, San Diego, 2005 | Certificate, University of Southern California, 2015 | D.D.S., University of the Pacific Arthur A. Dugoni School of Dentistry, 2009 | M.Sc., University of Southern California, 2015

Michael Payne, Clinical Assistant Professor, D.D.S., University of the Pacific Arthur A. Dugoni, 1988 | Cert., United States Air Force, Davis Monthan Air Force base, 1989 | M.S.D., University of the Pacific Arthur A. Dugoni, 1998 | Cert., University of the Pacific Arthur A. Dugoni, 1998

Brian Payne, Assistant Professor, B.A., Univ. of California, Berkeley, 1983 | CERT, Univ. of California, San Francisco, 1988 | D.D.S., Univ. of Pacific, 1986

Jacqueline Payne, Assistant Professor, B.A., Georgetown University, 2016 | D.D.S. University of the Pacific Arthur A. Dugoni, 2019 | Certificate, University of the Pacific Arthur A. Dugoni, 2021

W. Ron Redmond, Associate Professor, BA, U C Riverside, 1962 | DDS, University of the Pacific, 1966 | MS, University of Southern California

Michael Ricupito, Associate Professor, BA, San Jose State University, 1980 | Certificate, University of California at Los Angeles School of Dentistry, 1987 | DDS, University of the Pacific School of Dentistry, 1983 | MS, University of California at Los Angeles School of Dentistry, 1987

L. William Schmohl, Assistant Professor, BS, University of California Berkeley, 1966 | Certificate, U.S. Naval Hospital, Oakland, CA | DDS, University of California, San Francisco, 1970 | MS, Case Western Reserve University, 1974

Robert Sheffield, Clinical Assistant Professor, B.A., UCLA, 1991 | Certificate, UCLA, 1998 | D.D.S., UCLA, 1995

Kenneth Shimizu, Associate Professor, BS, University of California, Berkeley, 1980 | DDS, University of the Pacific, 1985 | MSD, University of the Pacific, 1987

Kevin Shimizu, Assistant Professor, B.S., University of California, Davis | D.D.S., University of the Pacific Dugoni School of Dentistry, 2017 | M.S.D., University of the Pacific Dugoni School of Dentistry, 2019

Sandra Tai, Assistant Professor, B.Sc., University Malaya, 1986 | M.Sc., University of Minnesota, 1990

M. Gabrielle Thodas, Assistant Professor, B.S., Oregon State University, 1972 | D.D.S., University of the Pacific, 1977 | M.S.D., University of the Pacific, 1995

Gregory Wadden, Clinical Assistant Professor, B.S., University of Maryland, 1971 | CERT, DeWitt Army Hospital, 1973 | Certificate, University of the Pacific, 1977 | D.D.S., Georgetown University, 1972

William Williams, Clinical Assistant Professor, B.A., University of North Carolina at Chapel Hill, 2000 | D.M.D., Harvard School of Dental Medicine, 2005 | M.D., Harvard Medical School, 2008

Course Descriptions

Predoctoral Courses

OR 244. Orthodontics. 2 Units.

An introduction to orthodontic diagnostic procedures, comprehensive treatment planning, and various treatment modalities as applied to a full range of malocclusions in a general dental practice. A strong emphasis is placed on the use of the Invisalign appliance and its application in general practice. Other orthodontic appliances covered will be the functional appliance as it relates to early orthodontic treatment and the edgewise appliance in full comprehensive cases. Orthognathic surgical cases and use of microimplants for anchorage will also be reviewed. (20 hours lecture. Quarters 4-5.)

OR 249. Preclinical Orthodontics. 1 Unit.

This preclinical course introduces students to various removable and fixed appliances with primary focus on their application for minor orthodontic movement. Laboratory instruction addresses such areas as fabrication of removable and fixed appliances, cementation of bands, bonding of brackets and placement of arch wires. Lateral head films are traced, measured, analyzed, and discussed with regard to norms and growth patterns. The course also introduces students to 3-D computer technology for the manufacturing of the Invisalign system appliance and the use of this appliance in general practice. Emphasis is placed on critical self-evaluation skills. (12 hours seminar. Quarter 8.)

OR 348. Applied Orthodontics. 1 Unit.

A study of standard orthodontic records and their application to diagnosis, treatment planning, and treatment evaluation in the mixed and permanent dentitions. Students will present cases incorporating digital records, cephalometric analysis, photographs, to explain diagnostic, treatment planning, and treatment procedures. (12 hours seminar, 6 hours graduate orthodontic clinic. Quarters 9-10.)

Graduate Courses

OR 401. Cephalometrics. 4 Units.

The purpose of the course is to introduce students to the use of cephalometric radiographs in clinical orthodontics. In addition to understanding basic principles and the historical significance of cephalometry, students will learn how to interpret various cephalometric analyses that are most commonly used in diagnosis and treatment planning. At the end of this course, students should also be able to perform various methods of superimposition in order to identify and understand changes that occurred during growth and treatment between different lateral cephalometric radiographs. (Quarters 1-2.)

OR 402. Facial Growth. 4 Units.

The purpose of the course is to provide students with scientific literature that supports current knowledge and understanding of basic biological principles on craniofacial growth and development. This course focuses on the basic mechanisms of postnatal growth of the cranium, nasomaxillary complex and mandible, and the clinical application of facial growth principles. (Quarters 3-4.)

OR 403. Critical Thinking - Research Design. 3 Units.

The purpose of the course is to provide students with foundational knowledge on scientific methods, while also honing an ability to critically evaluate the literature and to design a sound research project. (Quarters 2-4.)

OR 404. Research Practicum and Thesis I. 2 Units.

This is an independent research course. Under the guidance of research mentors, students develop research questions, formulate hypotheses and write a formal research proposal that includes a full literature review, statement of material and methods, execution of the research, and appropriate analysis and interpretation of data. This course is designed to enable successful completion of the MS thesis. (Quarters 1-4.)

OR 410. Biomechanics. 7 Units.

The purpose of the course is to introduce fundamental concepts for understanding the laws of mechanics and biological responses to force systems used in orthodontic appliances. This is a seminar-based course designed to teach first year residents the basic principles of biomechanics and theories related to planning and designing orthodontic force systems. Students will be expected to read and understand background material in assigned articles & textbooks for seminar discussions. (Quarters 1-4.)

OR 411. Genetics in Orthodontics. 2 Units.

In about sixty percent of dental conditions and diseases, genetics plays an important – and sometimes the major – role in etiology. As orthodontics is focusing on treatment of malocclusions and dentofacial deformities, in etiology of which genetics is almost always in the background, it is important for an orthodontist to understand why or how a malocclusion occurs, how it reacts to a treatment plan, to what extent it may be expressed in the next generation, and - last but not least - if it can be prevented. The concepts of heredity and genetics in orthodontics are covered in this course starting with historical Orthodontia Era (1900-1930), through Hereditary vs Environment Era (1930-1970) and Heritability Era (1970-2000) to the present time Orthodontic Genomic Era. Nowadays, genetics is a backbone of personalized medicine and also of personalized orthodontics. Patient's treatment outcome may be affected by combinations of specific gene mutations not only in orofacial clefts, craniofacial anomalies and malocclusions, but also in external apical root resorption, mandibular morphology, tooth size, hypodontia, and other conditions. Understanding of basic genetic and translational research concepts is needed for precision orthodontics and for utilization of modern genomic information for improved treatment of malocclusions and dentofacial deformities. (Quarters 2-3.)

OR 412. Orofacial Clefts and Abnormal Craniofacial Development. 2 Units.

This course provides information needed for understanding of concepts related to disturbed and compromised craniofacial growth. It forms a necessary background that makes possible to distinguish and diagnose craniofacial abnormalities. Principles of developmental craniofacial biology and craniofacial embryology are reviewed and continuously updated with new findings and discoveries. Particular emphasis is given to molecular regulation of craniofacial morphogenesis, abnormal neural crest formation (leading to Treacher Collins syndrome, Pierre Robin sequence, DiGeorge sequence, and Hemifacial Microsomia), and molecular regulation of skeletal morphogenesis and disorders comprising the FGFR-related craniosynostosis spectrum (Apert, Crouzon, Pfeiffer, Muenke, Jackson-Weiss, and Beare-Stevenson syndromes). In order to build a solid foundation for the clinical dental treatment and, specifically, for orthodontic treatment of orofacial clefts (cleft lip, cleft and palate and cleft palate only) – complex etiology of these anomalies, that is influenced by a genetic background and environmental factors, is explained. Points of origin and importance of precise diagnosis of nonsyndromic and syndromic cases are emphasized. (Quarter 4.)

OR 414. Introduction to Contemporary Orthodontics. 4 Units.

The purpose of the course is to introduce basic artistic skills in contemporary orthodontics. This is a seminar-based course designed for first year residents to review the basic concepts of photography, direct bonding of fixed appliances, 3D imaging, 3D cephalometric analysis, and digital imaging software (2D and 3D). Students will be expected to read and understand background material in assigned articles for seminar discussions. They are also expected to complete assignments. This course will consist of 17 seminar sessions throughout the first year of residency. (Quarters 1-3.)

OR 420. Bone Biology and Microimplant. 4 Units.

The purpose of this course is for students to gain an understanding of the general biological activities of bone. This is a seminar-based course designed for first year residents to review basic concepts and theories of bone biology, orthodontic tooth movement, and osseointegration of orthodontic microimplants. Students will be expected to read and understand background material in assigned articles & textbooks for seminar discussions. This course will consist of 10 seminar sessions throughout the first year of residency.

OR 421. Current Literature Seminar I. 4 Units.

A review of articles appearing in orthodontic and related journals is presented using a seminar format. (Quarters 1-4.)

OR 422. Anatomy. 1 Unit.

This course provides a detailed review of anatomic structures of the craniofacial region. Lecture topics include osteology of the skull, innervation and blood supply of the face, muscles of facial expression and mastication, and anatomy of the oral cavity. (Quarter 1.)

OR 423. Comprehensive Case Analysis Seminar I. 4 Units.

The seminar highlights the clinical application of various diagnostic procedures and treatment philosophies and the presentation of practical procedures in the management of unusual problems that can arise during the course of treatment. Basic and applied principles of photography and advances in computer technology are integral to this course. During each session, a Comprehensive Case Analysis is presented by the second year residents. All students then participate in discussion about the case. (Quarters 1-4.)

OR 424. Treatment Planning Seminar I. 8 Units.

A case presentation is prepared by the first-year residents to share initial diagnostic records in order to diagnose and treatment plan orthodontic cases. All students then participate in free-format discussion. (Quarters 1-4.)

OR 426. Principles of Orthodontic Technique. 5 Units.

This course is designed to provide basic principles on orthodontic tooth movement and fixed appliances by working on typodonts. (Quarters 1-2).

OR 430. Surgical-Orthodontic Treatment. 4 Units.

The purpose of this course is to provide the student with fundamental knowledge in orthognathic surgery and its role in the orthodontic treatment of skeletal malocclusions. This seminar-based course covers basic concepts involved in surgical orthodontics, which include: diagnosis and treatment planning, pre-surgical orthodontics, surgical procedures utilized by oral surgeons, and post-surgical orthodontics. In addition, topics such as TMJ disorders, Distraction Osteogenesis, and Obstructive Sleep Apnea are discussed. The goal is for the student to understand these surgical concepts and implement them in the clinical treatment of orthognathic surgery patients. (Quarters 1-3).

OR 431. Orthognathic Surgery Seminar I. 4 Units.

This course is a joint seminar for the orthodontic and oral surgery residents that is held once a month during the first and second years of the residency program. The Orthognathic Surgery Seminar consists of case presentations by the Orthodontic and Oral and Maxillofacial Surgery faculty and residents. Emphasis is placed on diagnosis, treatment planning, management of pre- & post surgical orthodontic treatment, and understanding of treatment outcome and stability. (Quarters 1-4).

OR 432. Multidisciplinary Seminar I. 2 Units.

The treatment of patients with complex dental and skeletal orthodontic, periodontal, and restorative problems that requires input from a variety of dental specialties is considered. The teaching format includes case presentations by the residents and open discussions of interdisciplinary topics. (Quarters 1-4).

OR 433. Retention Seminar I. 1 Unit.

Long-term post-active treatment records provide invaluable material for studying stability of orthodontic treatment outcome. Each of the second year residents is required to present the long-term post retention patient whose active orthodontic treatment was completed at least ten years prior to the resident's year of graduation from the program. Faculty and the first year residents are participated in the discussion after the presentation. (Quarter 4).

OR 440. Imaging in Orthodontics, TMJ & Airway Consideration. 2 Units.

Orthodontists have a fundamental interest in facial form, facial growth patterns, occlusion and any pathologic conditions that may alter them. Current three dimensional (3D) imaging techniques available for routine imaging provide the opportunity to utilize a "systems approach" in order to visualize and evaluate the functional and developmental relationships between proximal craniofacial regions. This course will discuss the use of 3D imaging to evaluate the developmental and functional inter-relationships between TMJ, occlusions, airway, and facial growth.

OR 441. Orthodontic Treatment of Craniofacial Anomalies. 2 Units.

Understand and relate embryology, abnormal growth and development and sequelae of surgical repair of craniofacial anomalies to the orthodontic treatment of craniofacial anomalies.

OR 442. Clear Aligner Technique I. 4 Units.

The purpose of this course is to introduce basic knowledge on clinical applications of clear aligner therapy. The residents will learn the latest innovation, biomechanics, and treatment protocols in treating complex malocclusions using clear aligners.

OR 443. Dental Sleep Medicine I. 2 Units.

There is increasing interest in the role of the orthodontist both in screening for obstructive sleep apnea (OSA) and as a practitioner who may be valuable in the multidisciplinary management of OSA in both children and adults. As experts in the science of facial growth and development, combined with our knowledge of oral devices, orthodontists are well suited to collaborate with physicians and other allied health providers in the treatment of OSA. This course will cover both the medical and dental aspects of sleep disorders, the pediatric and adult risk factors for Obstructive Sleep Apnea (OSA), and treatment alternatives, particularly, orthodontic treatment application including maxillary skeletal expansion and oral appliance.

OR 444. Periodontic-Orthodontic Relations. 4 Units.

This course includes the Orthodontic-Restorative-Periodontal Interface: Esthetic & Functional Considerations, Periodontal and Other Benefits of Two Phase vs. Single Phase Orthodontic Treatment, Clinical Considerations of Orthodontic Root Resorption, Periodontal Considerations in the Orthodontic Treatment of Impacted Teeth, Invisalign treatment Part II-Invisalign Treatment: What are the Latest Innovations from Invisalign and Do They make Possible Now the Successful Treatment of Complex Class, I, II, and III Malocclusions?

OR 456. Clinical Orthodontics I. 30 Units.

Clinical orthodontics includes various appliance systems: edgewise appliance (.018 & .022" slot), TAD, self-ligating brackets, fixed-functional appliance (Herbst, Forsus), and Invisalign for adolescent and adult patients. Clinical experience in treating orthodontic patients with a variety of problems is provided. In addition, various orthopedic appliances, including the headgear, face mask, rapid maxillary expander and other fixed auxiliary appliances (LLA, TPA, Wilson distalizer) may be incorporated into specific treatment protocols. Patients are treated in the Graduate Orthodontic Clinic every afternoon Monday-Friday, as well as Thursday nights. (Quarters 1-4).

OR 457. Mixed Dentition Orthodontics I. 8 Units.

In addition to a didactic portion that focuses on the review of mixed dentition articles and comprehensive case analyses, this course also includes clinical sessions that provide residents with basic knowledge and experience in treating various malocclusions in the mixed dentition stage. This course provides an understanding of facial growth and occlusal development in the mixed dentition, an ability to diagnosis and treatment plan mixed dentition cases, and an ability to evaluate growth changes and treatment outcomes. (Quarters 1-4).

OR 458. Surgical Orthodontics I. 2 Units.

This course provides clinical experience in analyzing diagnostic records and formulating surgical orthodontic treatment plans for patients with major skeletal and dental disharmonies that require integration of surgical and orthodontic treatment, communication with surgeons, pre- and post-surgical orthodontic treatment, and evaluation of treatment outcomes. (Quarters 1-4).

OR 459. Clinical Orthodontics in Craniofacial Anomalies I. 2 Units.

This course combines the orthodontic treatment of patients with craniofacial anomalies in the graduate clinic and attending panels provided by comprehensive Oakland Children's Hospital Craniofacial Anomalies Teams. (Quarters 1-4).

OR 501. Principles of Orthodontics. 8 Units.

Principles of Orthodontics is a literature-based seminar. Each resident will participate in discussion with emphasis on the critical analysis and evaluation of the scientific methodology in the literature reviewed. Topics include Principles of Orthodontics Introduction, Biomechanics, Facial growth, Retention & Relapse, Functional appliances, Intraoral forces, Mandibular motion & Tooth contact, Maxillo-Mandibular references, and Occlusal treatment objectives. Each seminar will focus on the clinical application of the material. (Quarters 5-8.).

OR 502. Microimplant I. 1 Unit.

The objective of the course is to comprehensively review the factors related to safety and stability of orthodontic microimplants and their clinical application in orthodontic treatment. Students will be expected to read and understand background material in assigned articles for seminar discussions. They will also present their own clinical cases that utilized microimplants.

OR 503. Research Design I. 2 Units.

An advanced course for orthodontic graduate students in which the nature of hypothesis testing, the process of clinical decision making, and the statistical methodology to be employed in each student's thesis project is discussed. (Quarters 5-8.).

OR 504. Research Practicum and Thesis II. 5 Units.

This is an independent research course. Under the guidance of research mentors, students develop research questions, formulate hypotheses and write a formal research proposal that includes a full literature review, statement of material and methods, execution of the research, and appropriate analysis and interpretation of data. This course is designed to enable successful completion of the MS thesis. (Quarters 5-8.).

OR 511. Practice Management I. 2 Units.

The goal of the Practice Management Course is to introduce and familiarize the orthodontic residents with a multitude of basic concepts that include human resource management, management systems, marketing, legal aspects of orthodontics, associateships/practice ownership, and customer service. The course includes: 1) guest lectures by orthodontists, orthodontic consultants, and other professionals connected to the specialty of orthodontics, and 2) private practice office visits both in the San Francisco Bay area and out-of-state. (Quarters 7-8.).

OR 512. Preparation for Specialty Examination. 2 Units.

This course will prepare the 2nd year residents for the American Board of Orthodontics Written Exam. This provides a comprehensive review of basic sciences and clinical concepts in orthodontics. This course will consist of 10 seminar sessions during the Winter and Spring quarters of the 2nd year of residency. (Quarter 7.).

OR 514. Temporomandibular Joint Disorders. 1 Unit.

This course provides an overview of clinical anatomy and mechanics of the TMJ, pathogenesis of degenerative TMD disorders, and various approaches on the management of TMD. (Quarter 7.).

OR 521. Current Literature Seminar II. 4 Units.

A review of articles appearing in orthodontic and related journals is presented using a seminar format. (Quarters 5-8.).

OR 523. Comprehensive Case Analysis Seminar II. 4 Units.

The seminar highlights the clinical application of various diagnostic procedures and treatment philosophies and the presentation of practical procedures in the management of unusual problems that can arise during the course of treatment. Basic and applied principles of photography and advances in computer technology are integral to this course. During each session, a Comprehensive Case Analysis is presented by the second year residents. All students then participate in discussion about the case. (Quarters 5-8.).

OR 524. Treatment Planning Seminar II. 8 Units.

A case presentation is prepared by the second-year residents to share initial diagnostic records in order to diagnose and treatment plan orthodontic cases. All students then participate in free-format discussion.

OR 531. Orthognathic Surgery Seminar II. 4 Units.

This course is a joint seminar for the orthodontic and oral surgery residents that is held once a month during the first and second years of the residency program. The Orthognathic Surgery Seminar consists of case presentations by the Orthodontic and Oral and Maxillofacial Surgery faculty and residents. Emphasis is placed on diagnosis, treatment planning, management of pre- & post surgical orthodontic treatment, and understanding of treatment outcome and stability. (Quarters 5-8.).

OR 532. Multidisciplinary Seminar II. 2 Units.

The treatment of patients with complex dental and skeletal orthodontic, periodontal, and restorative problems that requires input from a variety of dental specialties is considered. The teaching format includes case presentations by the residents and open discussions of interdisciplinary topics. (Quarters 5-8.).

OR 533. Retention Seminar II. 1 Unit.

Long-term post-active treatment records provide invaluable material for studying stability of orthodontic treatment outcome. Each of the second year residents is required to present the long-term post retention patient whose active orthodontic treatment was completed at least ten years prior to the resident's year of graduation from the program. Faculty and the first year residents are participated in the discussion after the presentation. (Quarter 8.).

OR 541. Orthodontic Treatment of Craniofacial Anomalies II. 4 Units.

Understand and relate embryology, abnormal growth and development and sequelae of surgical repair of craniofacial anomalies to the orthodontic treatment of craniofacial anomalies.

OR 542. Clear Aligner Technique II. 4 Units.

The purpose of this course is to introduce basic knowledge on clinical applications of clear aligner therapy. The residents will learn the latest innovation, biomechanics, and treatment protocols in treating complex Malocclusions using clear aligners.

OR 543. Dental Sleep Medicine II. 2 Units.

There is increasing interest in the role of the orthodontist both in screening for obstructive sleep apnea (OSA) and as a practitioner who may be valuable in the multidisciplinary management of OSA in both children and adults. As experts in the science of facial growth and development, combined with our knowledge of oral devices, orthodontists are well suited to collaborate with physicians and other allied health providers in the treatment of OSA. This course will cover both the medical and dental aspects of sleep disorders, the pediatric and adult risk factors for Obstructive Sleep Apnea (OSA), and treatment alternatives, particularly, orthodontic treatment application including maxillary skeletal expansion and oral appliance.

OR 544. Multidisciplinary Course. 2 Units.

The collaboration between orthodontists and other specialties is essential for multidisciplinary treatment approach. This course include preventive dentistry, periodontics, restorative dentistry, implantology, endodontics, pedodontics, esthetic dentistry.

OR 556. Clinical Orthodontics II. 38 Units.

Clinical orthodontics includes various appliance systems: edgewise appliance (.018 & .022" slot), TAD, self-ligating brackets, fixed-functional appliance (Herbst, Forsus), and Invisalign for adolescent and adult patients. Clinical experience in treating orthodontic patients with a variety of problems is provided. In addition, various orthopedic appliances, including the headgear, face mask, rapid maxillary expander and other fixed auxiliary appliances (LLA, TPA, Wilson distalizer) may be incorporated into specific treatment protocols. Patients are treated in the Graduate Orthodontic Clinic every afternoon Monday-Friday, as well as Thursday nights. (Quarters 5-8).

OR 557. Mixed Dentition Orthodontics II. 8 Units.

In addition to a didactic portion that focuses on the review of mixed dentition articles and comprehensive case analyses, this course also includes clinical sessions that provide residents with basic knowledge and experience in treating various malocclusions in the mixed dentition stage. This course provides an understanding of facial growth and occlusal development in the mixed dentition, an ability to diagnosis and treatment plan mixed dentition cases, and an ability to evaluate growth changes and treatment outcomes. (Quarters 5-8).

OR 558. Surgical Orthodontics II. 3 Units.

This course provides clinical experience in analyzing diagnostic records and formulating surgical orthodontic treatment plans for patients with major skeletal and dental disharmonies that require integration of surgical and orthodontic treatment, communication with surgeons, pre- and post- surgical orthodontic treatment, and evaluation of treatment outcomes. (Quarters 5-8).

OR 559. Clinical Orthodontics in Craniofacial Anomalies II. 3 Units.

This course combines the orthodontic treatment of patients with craniofacial anomalies in the graduate clinic and attending panels provided by comprehensive KAISER and Oakland Children's Hospital Craniofacial Anomalies Teams. (Quarters 5-8).

OR 602. Microimplant II. 1 Unit.

The objective of the course is to comprehensively review the factors related to safety and stability of orthodontic microimplants and their clinical application in orthodontic treatment. Students will be expected to read and understand background material in assigned articles for seminar discussions. They will also present their own clinical cases that utilized microimplants. This course will consist of 16 seminar sessions throughout the second and third year of residency. (Quarter 9).

OR 603. Research Design II. 1 Unit.

An advanced course for orthodontic graduate students in which the nature of hypothesis testing, the process of clinical decision making, and the statistical methodology to be employed in each student's thesis project is discussed. (Quarter 9).

OR 604. Research Practicum and Thesis III. 6 Units.

This is an independent research course. Under the guidance of research mentors, students develop research questions, formulate hypotheses and write a formal research proposal that includes a full literature review, statement of material and methods, execution of the research, and appropriate analysis and interpretation of data. This course is designed to enable successful completion of the MS thesis. (Quarter 9).

OR 611. Practice Management II. 2 Units.

The goal of the Practice Management Course is to introduce and familiarize the orthodontic residents with a multitude of basic concepts that include human resource management, management systems, marketing, legal aspects of orthodontics, associateships/practice ownership, and customer service. The course includes: 1) guest lectures by orthodontists, orthodontic consultants, and other professionals connected to the specialty of orthodontics, and 2) private practice office visits both in the San Francisco Bay area and out-of-state. (Quarter 9).

OR 612. Ethics. 1 Unit.

This is an intermediate-advanced course that builds on undergraduate ethics instruction and focuses on issues unique to orthodontic practice. Typical or expectable ethical problems in orthodontics are studied. Reflection and student participation is emphasized in discussions of real-life cases. (Quarter 9).

OR 613. Orthodontics Speaker Series. 1 Unit.

This course includes various topics in orthodontics. (Quarter 9).

OR 621. Current Literature Seminar III. 1 Unit.

A review of articles appearing in orthodontic and related journals is presented using a seminar format. (Quarter 9).

OR 623. Comprehensive Case Analysis Seminar III. 1 Unit.

The seminar highlights the clinical application of various diagnostic procedures and treatment philosophies and the presentation of practical procedures in the management of unusual problems that can arise during the course of treatment. Basic and applied principles of photography and advances in computer technology are integral to this course. During each session, a Comprehensive Case Analysis is presented by the second year residents. All students then participate in discussion about the case. (Quarter 9).

OR 624. Treatment Planning Seminar III. 2 Units.

A case presentation is prepared by the third-year residents to share initial diagnostic records in order to diagnose and treatment plan orthodontic cases. All students then participate in free-format discussion.

OR 631. Orthognathic Surgery Seminar III. 1 Unit.

This course is a joint seminar for the orthodontic and oral surgery residents that is held once a month during the first and second years of the residency program. The Orthognathic Surgery Seminar consists of case presentations by the Orthodontic and Oral and Maxillofacial Surgery faculty and residents. Emphasis is placed on diagnosis, treatment planning, management of pre- & post surgical orthodontic treatment, and understanding of treatment outcome and stability. (Quarter 9).

OR 632. Multidisciplinary Seminar III. 1 Unit.

The treatment of patients with complex dental and skeletal orthodontic, periodontal, and restorative problems that requires input from a variety of dental specialties is considered. The teaching format includes case presentations by the residents and open discussions of interdisciplinary topics. (Quarter 9).

OR 656. Clinical Orthodontics III. 9 Units.

Clinical orthodontics includes various appliance systems: edgewise appliance (.018 & .022" slot), TAD, self-ligating brackets, fixed-functional appliance (Herbst, Forsus), and Invisalign for adolescent and adult patients. Clinical experience in treating orthodontic patients with a variety of problems is provided. In addition, various orthopedic appliances, including the headgear, face mask, rapid maxillary expander and other fixed auxiliary appliances (LLA, TPA, Wilson distalizer) may be incorporated into specific treatment protocols. Patients are treated in the Graduate Orthodontic Clinic every afternoon Monday-Friday, as well as Thursday nights. (Quarter 9).

OR 657. Mixed Dentition Orthodontics III. 2 Units.

In addition to a didactic portion that focuses on the review of mixed dentition articles and comprehensive case analyses, this course also includes clinical sessions that provide residents with basic knowledge and experience in treating various malocclusions in the mixed dentition stage. This course provides an understanding of facial growth and occlusal development in the mixed dentition, an ability to diagnosis and treatment plan mixed dentition cases, and an ability to evaluate growth changes and treatment outcomes. (Quarter 9).

OR 658. Surgical Orthodontics III. 1 Unit.

This course provides clinical experience in analyzing diagnostic records and formulating surgical orthodontic treatment plans for patients with major skeletal and dental disharmonies that require integration of surgical and orthodontic treatment , communication with surgeons, pre- and post- surgical orthodontic treatment, and evaluation of treatment outcomes. (Quarter 9).

OR 659. Clinical Orthodontics in Craniofacial Anomalies III. 1 Unit.

This course combines the orthodontic treatment of patients with craniofacial anomalies in the graduate clinic and attending panels provided by comprehensive KAISER and Oakland Children's Hospital Craniofacial Anomalies Teams. (Quarter 9).