

Orthodontic Science

1. Staffs and Students

Professor	Takashi ONO	
Associate Professor		
Junior Associate Professor	Yoshiro MATSUMOTO, Zuisei KANNO	Eiji FUKUYAMA(-Dec),
Assistant Professor	Sawa KANEKO, Jun HOSOMICHI, Kazuo SHIMAZAKI(Oct-),	Mariko HORIUCHI, Tadachika YABUSHITA(-Mar), Ippei WATARI
Graduate Students	Rina KATAYAMA(-Mar), Mai SHIBATA(-Mar), Koji HONDA, Satomi NAITOU, Ikuko HATTORI, Chiho KATOU, Risa USUMI, Takako KANESHIMA, Sachiko KOMORI, Chisa SHITANO, Ayako KAWABE(Apr-), Hidemasa OKIHARA(Apr-), Jutiporn PRIVATANANUPUNT(Apr-), Emina WAKASUGI(Apr-)	Emi SAKOU(-Mar), Mona Aly Abd-Ellatif ABBASSY(-Sep), Yukiko KURODA, Yasuhiro SHIMIZU, Maya HIRANUMA, Mariko MIZUMACHI, Haruki IMAI, Sarina KOIKE, Takeru KYURAGI, Yukiha FUNAKI(Apr-), Arisa KOBAYASHI(Apr-), Rieko ONO(Apr-),

2. Purpose of Education

Orthodontics is one of the dental sciences which propose to control the craniofacial growth and development in equilibrium with the whole body, and also deals with the prevention and/or treatment of malocclusion and related disorders, by which the alteration of maxillofacial function with aging could be kept to the most suitable condition.

Subjects of Education:

Orthodontic Science

- 1) To explain the unhealthy physiological condition of malocclusion and deepen the scientific basis for orthodontic treatment.
- 2) To understand the biological reaction and adaptation of occlusal tissues to mechanical stresses such as occlusal force or orthodontic force, and also the changes with aging.
- 3) To explain the art for controlling the morphologic and functional problems of occlusion in orthodontic treatment, from the view points of biomaterials and biomechanics.
- 4) To enlighten the social dentistry for the needs and demands of orthodontic treatment.

Pathophysiology for Malocclusion

To understand the alteration of occlusal function and morphology with aging, and to explain the pathological condition of malocclusion from the viewpoint of physiology, biomechanics, biology and sociology.

Biology for Functional Adaptation

To understand the procedure of biological reaction and adaptation of occlusal system to the orthodontic stimuli, including the influence of aging, and to provide the control of the surroundings of the occlusal system.

3. Research Subjects

- 1) Biomechanical study of occlusion
- 2) Studies on biological response and functional adaptation followed by orthodontic and occlusal stimulation
- 3) Clinical application of autotransplantation in orthodontic treatment
- 4) Studies on interrelation between malocclusion and temporomandibular joint
- 5) Studies on occlusion and age-related changes in cranio-maxillofacial morphology and function
- 6) Studies on interrelation between cranio-maxillofacial complex and whole body
- 7) Development of mechanics and materials for orthodontic treatment

4. Clinical Service

In the field of practical orthodontics, with the development of materials and treatment techniques, we have taken initiatives in two big turning points at all time. Namely, one is the *Direct Bonding System* which has made it possible to attach brackets directly to the teeth surface without orthodontic metal bands. Another is the development of *Super-Elastic Ti-Ni Alloy Wire*, and following *Improved Super-Elastic Ti-Ni Alloy Wire*. With these new wires, we have provided an epoch-making orthodontic technique, where teeth could be moved more efficiently and safely with light continuous forces, and in consequences, the limits for teeth movement are expanded and the treatment outcomes are also improved. On the other hand, in order to determine the scientific basis for the needs of orthodontic treatment, we are engaging in the study of pathophysiology of malocclusion, and these research results are getting feedback to the orthodontic practices as soon as possible to stimulate the development of new treatment protocols.

Students in the graduate course not only pursue their scientific researches but also being educated in accordance with our curriculum for the post-graduated clinical program. In this program, we aim to bring up the leading persons of next generation who have highly specialized knowledge and skills of orthodontics as well as prominent minds of clinical researches.

With the cooperation of related field, we also provide comprehensive treatments for those patients with cleft lips and palates and other congenital anomalies, jaw deformities, maxillofacial functional disorders, periodontal diseases, impacted teeth, autotransplantation combined cases, and usages of implant anchorages.

5. Publications

Original Articles

1. Ono T, Okuma M, Hamada T, Motohashi N, Moriyama K. A case of ring chromosome 18 syndrome treated with a combined orthodontic-prosthetic approach. *Cleft Palate Craniofacial Journal* 47: 201-210, 2010.
2. Tamura R, Ono T, Sato M, Hasegawa M, Moriyama K, Araki K. Association between positional changes in laboratory values and severity in subjects with obstructive sleep apnea syndrome. *Journal of Medical and Dental Sciences* 57: 147-154, 2010.
3. Abbassy MA, Watari I, Soma K. The effect of diabetes mellitus on rat mandibular bone formation and microarchitecture. *European Journal of Oral Science* 118(4): 364-369, 2010.
4. Jung H, Horiuchi M, Soma K. Changes in the distribution of nerve fibers immunoreactive to calcitonin gene-related peptide according to growth and aging in rat molar periodontal ligament. *The Angle Orthodontist* 80(2): 309-315, 2010.
5. Shibutani N, Hosomichi J, Ishida Y, Soma K. Influence of occlusal stimuli on the microvasculature in rat dental pulp. *The Angle Orthodontist* 80(2): 316-321, 2010.
6. Oie E, Horiuchi M, Soma K. Effects of occlusal contact and its area on gravity fluctuation. *The Angle Orthodontist* 80(3): 540-546, 2010.
7. Sako E, Hosomichi J. Alteration of bFGF expression with growth and age in rat molar periodontal ligament. *The Angle Orthodontist* 80(5): 904-911, 2010.
8. Katayama R, Yamane A, Fukui T. Changes in the expression of myosins during postnatal development of masseter muscle in the microphthalmic mouse. *The Open Dentistry Journal* 4: 1-7, 2010.