Orthopaedic and spinal surgery

1. Staffs and Students (April, 2009)

Professor	Kenichi SHINOMIYA	
Associate Professor	Atsushi OKAWA	
Junior Associate Professor	Tetsuya JINNO	
Assistant Professor	Yoshiaki WAKABAYASHI,	Shigenori KAWABATA,
	Keisuke AE,	Tsuyoshi KATO,
	Daisuke KOGA,	Shoji TOMIZAWA
Graduate Student	Hirotaka KOYANAGI,	Senichi ISHII,
	Hiroki YAMAUCHI,	Hiroyuki INOSE,
	Kazuo KUSANO,	Yumi SUGATA,
	Koji FUJITA,	Kyohei SAKAKI,
	Takashi HIRAI,	Masato YUASA,
	Tsuyoshi YAMADA	

Developmental Division of Advanced Orthopaedic Therapeutics

Associate Professor	Shinichi SOTOME	
Junior Associate Professor	Yoshinori ASO,	Mitsuhiro ENOMOTO

2. Activities

As a department of orthopaedic surgery, we execute medical treatment, research, and education in cooperation with section of Orthopaedic Joint Surgery. Orthopaedics treats with various disorders of musculoskeletal systems and nervous systems such as bone, cartilage, joint, tendon, muscle, spinal cord and peripheral nerves. And the disorders include not only trauma, but also degeneration, neoplasm, and systemic disease. Thus our research should be extended wide area of basic and clinical fields. Now our research projects include reconstruction of motor function, clinical application of regenerative medicine, development of biomaterials and artificial joints, and pain control.

(1) Research Subjects

1) Development and evaluation of a novel artificial bone – porous hydroxyapatite / collagen composite
2) Reconstruction of bone defects using bone marrow stromal cells and artificial bone substitutes
3) Reconstruction of bone defects using bone morphogenetic proteins and artificial bone substitutes
4) Analysis of the mechanisms of spontaneous resorption of herniated disc and clinical application
5) Determination of responsible genes for degenerated intervertebral disc
6) Clinical applications of spinal cord evoked potentials
7) Development of novel diagnostic method for spinal cord function
8) Development of cell therapy to repair injured spinal cord
9) Development of gene therapy and artificial nerve to repair injured peripheral nerve
10) Development of multidisciplinary therapy for musculoskeletal malignant neoplasm
11) Reconstruction of motor function after musculoskeletal tumor resection

(2) Clinical Services

By popularity of sports and aging society, the need for orthopaedic medicine is growing rapidly. We carry out not only treatment of the disease but also repair of functional disability for the improvement of QOL by advancing therapeutic strategy.

In spinal operation, instrumentation, microscopic or endoscopic surgery and spinal cord monitoring yield safety and secure decompression and fusion, resulting early postoperative ambulation and satisfactory outcome.

Hand and upper limb surgery unit has applied microsurgical technique for atraumatic operation and micro-vascular anastomosis. Today, microsurgery is indispensable for re-implantation, nerve repair and transfer, and vascularized tissue transfer. Arthroscopic surgery in upper limb is also available, and provides less-invasive operation.

In musculoskeletal tumor surgery, limb-salvaging surgery is the first choice based on the concept of safety surgical margin from the systematic evaluation of surgical specimens. And also functional reconstruction of the affected limb after tumor surgery is exerted by plastic and microsurgery technique and application of regenerative medicine.

Examples of advanced treatments for adult hip diseases are one-stage bilateral total hip arthroplasty, less-invasive technique for adult hip reconstruction, and accelerated rehabilitation after hip arthroplasty.

(3) Education

The faculty in the department is responsible for assisting graduate students to develop the professional research, teaching and skills for both clinical and basic science in the field of orthopaedic surgery. Morning conferences are held three times a week, and special guest lectures are sometimes provided to have up-to-date information. We are participating in center of excellence program, frontier research on molecular destruction and reconstruction of tooth and bone in Tokyo medical and dental university and providing leaning environment for the students.

For first year orthopaedic residents, the annual meeting is held to discuss clinical and basic research with the faculty outside of Tokyo. Furthermore, we provide several open meetings and many orthopeadic surgeons join educational lectures to study recent clinical application by special guest or oral presentation of case reports by the residents.

3. Publications

Original Article

1. Yoshii T, Jinno T, Morita S, Koga D, Matsubara M, Okawa A, Shinomiya K: Postoperative hip motion and functional recovery in simultaneous bilateral total hip arthroplasty for bilateral osteoarthritis. J Orthop Sci 2009 Mar;14(2):161-6
2. Koga D, Jinno T, Okawa A, Morita S, Shinomiya K: The effect of preoperative lateral flexibility of the lumbar spine on perceived leg length discrepancy after total hip arthroplasty. J Med Dent Sci. 2009 Mar;56(1):69-77.
3. Shimizu S, Okuda N,Kato N, Rittling SR, Shinomiya K, Muneta T, Okawa A, Denhardt DT,Noda M,Tsuji K, Asou Y: Osteopontin-Deficiency Impairs Wear Debris-Induced Osteolysis via the Regulation of Cytokine Secretion from Macrophage. Arthritis and Rheumatism 2010 in print.
4. Ochi H, Hara Y, Tagawa M, Shinomiya K, Asou Y: The roles of TNFR1 in lipopolysaccharide-induced bone loss: Dual effects of TNFR1 on bone metabolism via osteoclastogenesis and osteoblast survival. J Orthop Res. 2009.
5. Nakamura T, Iribe T, Asou Y, Miyairi H, Ikegami K, Takakuda K: Effects of compressive loading on biomechanical properties of disc and peripheral tissue in a rat tail model. Eur Spine J;18(11):1595-603. 2009.
6. Inose H, Ochi H, Kimura A, Fujita K, Xu R, Sato S, Iwasaki M, Sunamura S, Takeuchi Y, Fukumoto S, Saito K, Nakamura T, Siomi H, Ito H, Arai Y, Shinomiya K-i, Takeda S: A microRNA regulatory mechanism of osteoblast differentiation. Proceedings of the National Academy of Sciences 106(49): 20794-20799, 2009.
7. Toshitaka Yoshii, Shinichi Sotome, Ichiro Torigoe, Akio Tsuchiya, Hidetsugu Maehara, Shizuko Ichinose, Kenichi Shinomiya. Fresh Bone Marrow Introduction into Porous Scaffolds Using a Simple Low-Pressure Loading Method for Effective Osteogenesis in a Rabbit Model. JOURNAL OF ORTHOPAEDIC RESEARCH . 27:1–7, 2009
8. Torigoe I, Sotome S, Tsuchiya A, Yoshii T, Maehara H, Sugata Y, Ichinose S, Shinomiya K, Okawa A. Bone Regeneration with Autologous Plasma, Bone Marrow Stromal Cells, and Porous beta-Tricalcium Phosphate in Nonhuman Primates.. Tissue Eng Part A. 15(7): 1489-1499, 2009