Department of Orthopaedic Surgery

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General Summary

Basic Research

Our studies of bone metabolism and osteogenesis have been highly acclaimed both in Japan and abroad. The research on bone metabolism is focused on the relationship between osteoporosis and fracture risk. In basic research, we analyze hard tissue characteristics in a mouse model of mucopolysaccharidosis and, in cooperation with other specialty departments, are studying epigenetic modification in giant cell tumors. Our clinical research focuses on the relationship between systemic disorders, such as life-style related diseases and aging, and bone disease.

Clinical Research

Our clinical practice has been divided into 10 subspecialties to treat a wide range of musculoskeletal disorders and is managed by different specialist teams: shoulder joint, hand surgery, spine, hip joint, knee joint, foot surgery, trauma, osteoporosis, rheumatic diseases and sports. All teams maintain a high level of expertise and are actively involved in scientific activities.

The knee joint team has been performing total knee arthroplasty (TKA) with patient-matched instrumentation. They have analyzed effectiveness of cutting-edge technologies even more advanced than the surgical navigation system itself.

Research Activities

Results of arthroscopic Bankart repair for recurrent dislocation of the shoulder

Clinical results of arthroscopic Bankart repair for recurrent dislocation of the shoulder were reviewed. The subjects were 100 patients with a mean age of 30 years. The mean follow-up period was 4 years 10 months. Among all patients the postoperative recurrence rate was 13.6%. Risk factors for recurrence were sports activities involving collisions in teenagers, a large bony defect of the glenoid, and Hill-Sachs lesions. The arthroscopic Bankart procedure produced satisfactory mid-term results with almost the same rate of recurrence as in previous studies (8% to 19%). However, for patients with a high risk of recurrence, an additional procedure is necessary.

The current status of treatment provided by our hand-surgery team

Last year, an injectable clostridial collagenase (Xiaflex®, Dublin, Ireland) that digests

pathological palmar fascia was introduced in Japan for the treatment of Dupuytren's contracture and has also become available for patients at our institution. After this clostridial collagenase was introduced, fewer patients with Dupuytren's contracture have undergone operative pathological fascia resection. In addition to Dupuytren's contracture, hand diseases treated at our department include trauma cases, such as fractures, tendon ruptures, and neurovascular injuries; degenerative diseases; and tumors. We also use microsurgical techniques to repair nerves and tendons.

Reduction of spinal burst fractures with the monoaxial percutaneous pedicle screw system
Anterior or anterior-posterior fusion surgery has often been performed for spinal burst fractures and has achieved good outcomes. Recently, the monoaxial percutaneous pedicle screw system without fusion has been shown to be less invasive and to better correct spinal deformities. The percutaneous pedicle screw without fusion often results in inadequate reduction or loss of correction. However, surgery with monoaxial screws leads to correction that is more satisfactory and longer lasting than is correction by surgery with fusion. Therefore, we suggest that this system be used to correct posttraumatic kyphotic deformities. The less-invasive monoaxial percutaneous pedicle screw system may offer an effective surgical option, even in elderly patients, and would enable early mobilization.

Short-term radiographic results of cementless press-fit cup implants: A comparative study between new generation highly porous metal-coated cups and conventional plasma spray-coated cups
The purpose of the present study was to compare early radiographic results between press-fit cementless cups with either a new-generation titanium coating (Regenerex®, Zimmer Biomet) or a conventionally used plasma porous spray coating. A total of 103 hips implanted with titanium-coated cups and 103 hips implanted with plasma porous spray-coated cups were evaluated. The "initial gap" on postoperative radiographs was detected in 10 hips receiving titanium-coated cups and 4 hips receiving plasma porous spray-coated cups. Among these 14 cases, the initially observed gap was filled with newly formed bone in 8 cases with titanium-coated cups and 4 cases with plasma porous spray-coated cups.

Efficacy of patient-matched instruments and risk factors for postoperative delirium in TKA
The results of this study showed that patient-matched instruments were effective for performing TKA. In regard to early rehabilitation, postoperative delirium has been shown to interfere with active postoperative mobilization. In addition to using patient-matched instruments, we examined potential factors related to postoperative delirium in patients after TKA. We found that low preoperative hemoglobin levels and a history of hypnotic usage were associated with postoperative delirium. We concluded that management of these factors might lead to better long-term results in patients undergoing TKA.

Evaluation of first ray mobility in patients with hallux valgus using weight-bearing computed tomography and a 3-dimensional analysis system
We compared the 3-dimensional mobility of first ray joints examined with computed

tomography between patients with hallux valgus and those with healthy feet. At the first tarsometatarsal (TMT) joint, the patients with hallux valgus showed significantly greater dorsiflexion, inversion, and adduction of the first metatarsal relative to the medial cuneiform, but loading of the foot caused major displacement at both the TMT joint and other joints. The hypermobility of the TMT joint has received much attention as a major cause of hallux valgus, but our results suggest that hypermobility extends across the entire first ray.

Poor bone quality in chronic obstructive pulmonary disease

Bone collagen cross-linking plays important roles in preserving bone strength. The quantitative and qualitative deterioration of lysyl oxidase and nonenzymatic cross-links of collagen (advanced glycation endproducts, pentosidine) might be affected by increased oxidative stress and glycation in patients with osteoporotic femoral neck fractures, diabetes, and chronic obstructive pulmonary disease.

Publications

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