

Department of Orthopaedic Surgery

Division of Sports Medicine

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General Summary

Clinical Research

The ongoing research in our department concentrates on competitive athletes (including professionals), amateurs who include sports activities in their daily lives, and young athletes engaged in school sports clubs or dedicated to training within sports clubs. We focused on basic research in 2011.

Research Activities

The effect of the ankle-joint angle on training of peroneus muscles

The purpose of this study was to evaluate the effect of the ankle-joint angle on training of the peroneus muscles. During eversion of the ankle joint, the observed activity of the peroneus muscles on electromyography (EMG) was more predominant in plantar flexion than in the neutral position. In healthy adults, larger ankle-eversion strength was obtained after tube-muscle training with the ankle in plantar flexion than in the neutral position. In patients with ankle-inversion sprain, peroneus strength was significantly lower on the affected side than on the unaffected side. After 2 months of tube-muscle training, muscle strength became nearly equal on both sides. These findings suggest that training of the peroneus muscles is more effective when performed with the ankle in plantar flexion.

Three-dimensional gait analysis in patients with bilateral knee osteoarthritis before and after unilateral total knee arthroplasty

The purpose of this study was to compare the data of 3-dimensional gait analysis with a motion analysis system (Vicon Motion Systems, Oxford, UK) in 26 patients with bilateral knee osteoarthritis who had undergone unilateral total knee arthroplasty. Analyzed variables were: 1) step length, 2) walking speed, 3) percentage of single limb support phase, 4) ground force during the single limb support phase, 5) step width, and 6) range of motion of the hip, knee, and ankle joint. Step length, walking speed, percentage of single limb support phase, ground force during the single limb support phase, and range of motion were significantly improved in patients with a Japanese Orthopaedic Association score of 60 points or more for the side not operated on. On the other hand, these variables did not improve in patients with a score of less than 60 points. We conclude that the various gait variables improve after total knee arthroplasty, although patients with severe osteoarthritis (on the nonoperated side) show no improvement in walking ability.

The changes in the silent period before and after standing on a balance mat

The purpose of this study was to evaluate the changes in pre-motion time (PMT), pre-motion silent period (PMSP), and switching silent period (SSP) before and after training with a balance mat. Twenty healthy persons were randomly divided into 2 groups: a control group and a balance-mat group. Activities of the soleus and tibialis anterior muscles were recorded with EMG while the subjects tried to raise both heels quickly in response to a flashing light. Intervention consisted of 3 minutes of standing on the floor in the control group and of 3 minutes of standing on the balance-mat in the balance-mat group. Then, EMG was recorded in the same manner after the intervention in each group. We found no significant difference in the PMSP or SSP between the groups before intervention. On the other hand, after intervention the PMSP and SSP were significantly shorter in the balance-mat group than in the control group. In addition, in the balance-mat group, the PMSP and SSP were significantly shorter after intervention than before intervention. There was no statistical difference in the PMT between before and after intervention. These results suggest that balance-mat training is effective for shortening the SSP and PMSP, which lead to control of the posture function.

Femoral condyle irregularity in athletes during growth period

We reported on 3 young soccer players with femoral condyle irregularity of the knee. These cases were similar to osteochondritis dissecans regarding magnetic resonance findings, location, and age at onset. Careful attention should be paid to femoral condyle irregularity; if magnetic resonance is performed for young patients, an unnecessary interruption of sports activity can be avoided.

Treatment for the elderly golfers in our clinic

We evaluated 170 patients who were older than 40 years and had visited our clinic in the last 3 years. The majority of the patients had adhesive capsulitis of the shoulder or osteoarthritis of the lumbar spine or the knees. With conservative therapy, the majority of them resumed sports activities within 2 months. In addition, athletic rehabilitation, such as exercise to increase range of motion and balance training, were also performed and was useful for these patients. Rehabilitation should be continued even after patients resume their sports activities.

Publications

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