

海外短期研修概要

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【出張期間】平成15年6月5日（木）から平成15年6月13日（金）まで

【学会名】第14回世界理学療法連盟（WCPT）学会

【発表者名】Kawaguchi T, Tobimatsu Y, Iwaya T, Mori M, Omachi K, Kami S,  
Kurogo H, Suzuki T; Department of Physical Therapy, Aomori University of Health and Welfare, Aomori, Japan

【発表論文名】THE RELATIONSHIP BETWEEN THE CENTER OF FOOT PRESSURE IN STANDING AND 10M MAXIMUM WALKING SPEED IN HEMIPARETIC STROKE PATIENTS.

【趣旨】PURPOSE: The purpose of this study was to confirm the relationship between the center of foot pressure on standing, gait ability, other physical characteristics in hemiparetic stroke patients. Therefore, we studied the relation between the center of foot pressure in the upright posture, maximum walking speed, maximal isokinetic quadriceps femoris muscle torque during extension of the knee, and demographic data in hemiparetic stroke patients. METHODS: Fifteen hemiparetic stroke patients (5 female, 10 male) whose mean age was 62.2 participated in this study. Participants were able to keep upright posture unaided and their Brunnstrom stage were within from II to IV. The center of foot pressure was measured by forth plate (Kistler Winterthur, Switzland). Gait ability was adopted 10m maximal walking speed. Maximal isokinetic quadriceps femoris muscle torque was made with isokinetic torque machine (Cybex770Norm, Lumex, New York). RESULTS: Maximum walking speed, isokinetic quadriceps femoris muscle torque and recovery stage from stroke in the subjects whose the center of foot pressure in coronal plane shifted to the non-affected side were significantly lower than those in the subjects whose the center of foot pressure did not shift. The multiple regression model demonstrated that maximal walking speed was significantly related to the center of foot pressure in coronal plane. CONCLUSION: In hemiparetic stroke patients, the center of foot pressure in coronal plane shifted to the non-affected side more, gait ability was lower.

【出張期間】平成15年6月5日～6月13日

【学会名】14th International Congress of The World Confederation for Physical

Therapy (Barcelona, Spanish)

【発表者名】 Masashi MIURA, Tohru Kawaguchi, Toshitada Yoshioka

【発表論文名】 THE RELATIONSHIP BETWEEN MUSCLE MASS MEASURED BY MULTIFREQUENCY BIOELECTRICAL IMPEDANCE ANALYSIS AND MUSCLE STRENGTH IN HIGH-SCHOOL ATHLETES.

【趣 旨】 PURPOSE: In providing physical therapy, understanding the body composition of the patient is considered to be one of the most important evaluation. Above all, for an athlete who is aiming to return to competitive activity, the percent body fat is an important that reflects his/her physical condition. In particular, athletes who need weight loss provide the best example. The purpose of this study was to clarify the relationship between muscle mass by adding thorough verification with multifrequency bioelectrical impedance analysis and muscle strength, and the relationship between physical measurements including height, body weight and muscle strength. METHODS: The subjects were 95 high-school athletes (39 baseball players, 38 handball players and 18 judoists). All of them were male. We measured height, body weight and body mass index (BMI) as physical measurements, and lean body mass (LBM) and muscle mass of the upper and lower extremities as a body composition. The measuring device used was a multifrequency bioelectrical impedance analyzer (InBody 2.0, Biospace Co. Ltd., Seoul, Korea). Grip strength was measured as muscle strength of the upper extremity, and the peak torque of knee extensors as muscle strength of the lower extremity. Correlation between each data obtained from physical measurements and body composition, and grip strength and the peak torque of knee extensors, were studied. RESULTS: The mean height was  $171.1 \pm 5.4$  cm (mean  $\pm$  S. D.), body weight  $66.1 \pm 8.7$  kg, BMI  $22.7 \pm 2.9$  and LBM  $57.0 \pm 5.5$  kg. The mean muscle mass of the right upper extremity was  $2.4 \pm 0.3$  liters (L), that of the left upper extremity  $2.4 \pm 0.3$  L, that of the right lower extremity  $6.5 \pm 0.7$  L and that of the left lower extremity  $6.5 \pm 0.7$  L. The results showed that body weight and LBM have strong correlation with muscle strength and that muscle mass of the upper extremity has a significant correlation with grip strength. A significant correlation between muscle mass of the lower extremity and the peak torque of knee extensors was also observed, but not very strong. CONCLUSION: It was confirmed that high-school athletes are characterized by the strong correlation between the body weight or LBM and the muscle strength, and that the muscle mass does not al-

ways exhibit strong correlation

【出張期間】平成15年6月7日～15日

【学会名】第14回世界理学療法連盟学会での研究発表（スペイン・バルセロナ）

【発表者名】Sangun L, Iwatsuki H

【発表論文名】THE PHYSICAL THERAPY STUDENT ATTITUDES TOWARD THE ELDERLY -CROSS CULTURAL STUDY IN SOUTH KOREA AND JAPAN-

【趣 旨】PURPOSE: South Korea and Japan belong to Confucianism culture, the political economies of two countries seem remarkably similar. But, the cumulative effects of Korea's accelerated economic growth have recently had a considerable impact of Korean attitudes. Koreans have become increasingly reluctant to work for economic development at the expense of their individual well-being. Therefore, some reports indicated that health care professionals do not regard geriatrics as a particularly interesting or rewarding clinical experience. The purpose of this study was to investigate what kind of image for elderly students in two countries have and to identify these formative factors which contribute the image.

METHODS: The subjects were 174 Korean physical therapy students and 153 Japanese physical therapy students. The questionnaire survey was given to them. The questionnaire included 15 questions using the semantic differential (SD) technique aimed ascertaining student's impression of elderly. The survey was conducted by the detention method.

RESULTS: As a result of factor analysis, the three factors in two countries- "Assessment" , "Activity" and "Maturity" . In the "active and self-supportiveness" sphere, Korean students tend to have negative images. "Usefulness" was singled out as a special semantic sphere for Japan. Students in two countries had positive image toward their own grandparents, however they had negative image toward the elderly as their neighbor. Students had positive image for the elderly, when their parents had positive attitude toward their grandparents. When impressions about elderly people were compared between the students living with elderly people and the students who did not live with elderly people, significant differences were seen in their responses to four items.

CONCLUSION: These results suggested that physical therapy students' impressions about elderly were significant between the stu-

dents living with elderly people and the students who did not live with elderly people. Therefore, making contact with a variety of elderly will be effective for the physical therapy students in enhancing their understanding of the geriatric population.

【出張期間】 2003年9月13日～9月20日

【学会名】 第15回国際神経病理学会議、イタリア、トリノ市

【発表者名】 Yoshimura N, Kiryuu K, Yoshimura I, Shinozaki K, Sakai T, Kudo H, Kaneko S

【発表論文名】 Frontotemporal presenile dementia with motor neuron disease and extramotor inclusions

【趣 旨】 Frontotemporal dementia with MND and extramotor inclusions(I) is being recognized as a distinctive form of ALS (ALS with dementia) or a distinctive form of dementia (dementia with ALS). These inclusions have been a subject of recent studies, because of their possible relationship with neurodegeneration and dementia of the patients.

A 50-year-old man developed dementia about a year before motor weakness of the upper limbs. His MRI showed frontal lobe atrophy. Despite slight muscle weakness of the lower limbs, he had severe dysphagia and died of aspiration pneumonia. The total clinical course was about 2.5 years. The brain weighing 1180g showed frontotemporal atrophy and no atrophy of the motor cortex. Neuronal loss, spongiosis, and presence of many small neurons bearing ubiquitin-positive I (UPI) were seen in the superficial layers (II-III) of the atrophied cortex. Some of Betz cells showed chromatolysis. In the subcortical white matter and internal capsule, there were a number of UPI-bearing glia cells with conspicuous gliosis. The pyramidal tracts, Goll's fasciculi and anterior horn cells were degenerated. Bunina bodies, UP skein and/or spherical I were observed. The presence of UPI indicates degeneration of neurons and glia cells that bear UPI. Thus, the atrophied gray matter and gliotic white matter should be the primary sites of degeneration, and UPI substance may play an important role in the pathogenesis of this disease.

【出張期間】 2003年9月29日～10月3日

【学会名】 第54回国際航空会議 ライフサイエンス部門 ドイツ・ブレーメン  
The 54th International Astronautical Congress

【発表者名】 吉岡利忠、小林哲士、植原健二、明間立雄、杉浦崇夫、後藤勝正  
Toshitada Yoshioka, Tetsuo Kobayashi, Kenji Uehara,

Tatsuo Akema, Takao Sugiura, and Katsumasa Goto,

【発表論文名】 HEAT STRESS INDUCES MUSCULAR HYPERTROPHY IN RAT SOLEUS MUSCLES

熱ストレスはラットひらめ筋の筋肥大を引き起こす

【趣 旨】 The purpose of this study is to investigate whether a heat stress could induce hypertrophy and/or hyperplasia of skeletal muscles. Male Wistar rats ( 7 weeks old ) were divided into two groups: control ( n=15 ) and heat stress ( n=15 ). Rats of heat group were placed in an environmentally controlled heat chamber for 60 min ( 41℃ ). Soleus, extensor digitorum longus, and plantaris muscles were dissected and removed at the periods of one, 7 and 14 days after heat exposure. Following heat exposure, the positively-stained nuclei for BromodeoxyUridine (BrdU) and the content of Proliferating Cell Nuclear Antigen (PCNA) were significantly increased. Heat stress could activate the Akt/mTOR (Akt/mammalian target of rapamycin) pathways. Therefore, a heat stress could promote cell proliferating and induce muscular hypertrophy. These observations strongly suggest that a heat stress would be an effective countermeasure for muscular atrophy induced by weightlessness condition which were often appeared during space flight and living in space, and also physical inactivity even in one gravity environment .

【出張期間】 2003年11月18日（火）～23日（土）

【学会名】 第14回国際脳電磁図トポグラフィー研究会議 ISBET2003  
(International Society for Brain Electromagnetic Topography)

【発表者名】 ① Ozaki I, Jin CY, Suzuki Y, Baba M, Matsunaga M, Hashimoto I.

【発表論文名】 ① Rapid change of tonotopic maps in the human auditory cortex during pitch discrimination.

【趣 旨】 ① To study early cognitive processes and hemispheric differences in the primary auditory cortex during selective attention, we measured auditory evoked magnetic fields (AEFs) to 400 Hz and 4000 Hz tone pips that were randomly presented at right or left ear. Subjects paid attention to target stimuli during pitch (high or low) or laterality (left or right) discrimination tasks. In control session, 400 Hz or 4000 Hz tone alone was presented at left or right ear. We calculated location and strength of N100m dipole for 400 Hz and 4000 Hz tones, based on the AEFs obtained from the hemisphere contralateral to the stimulated ear. N100m amplitude increased in both hemispheres in pitch or laterality discrimi-

nating conditions. N100m latency shortened in the right auditory cortex during selective attention. The N100m dipole distance between 400 Hz and 4000 Hz tones was enlarged in the right auditory cortex during pitch discrimination task but was unchanged during laterality discrimination task. We conclude that these dynamic changes in the N100m dipole reflect short-term plastic changes in the primary auditory cortex and right hemisphere dominance of attention, supporting early selection models.

【発表者名】② Ozaki I, Jin CY, Suzuki Y, Baba M, Matsunaga M, Hashimoto I.

【発表論文名】② Change in visual brain responses during of the differences in color or shape of colored letters.

【趣旨】② To study early cognitive processes in the visual cortex during selective attention, we measured visual evoked magnetic fields (VEFs) to 4 colored letters (C+G or G+C in green or red letters) that were randomly presented on the screen at 2 sec interval (0.2 sec presentation). Subjects paid attention to target stimuli during color (red or green) or shape (G or C on the left side) discrimination tasks. Total number of the stimuli was 300: 30×2 for target and 120×2 for non-target. In control session, each colored letter alone was presented. The mean reaction time for color discrimination task was 322-333 msec and that for shape discrimination task, 392-411 msec. We calculated location and strength of the dipoles that were identified at 70-500 msec for each colored letter as control and non-target responses, based on the VEFs obtained from the occipital and/or temporal area. For color discrimination, following V1/2 activation, activation of V4 area (the fusiform gyrus) was identified. For shape discrimination, following V1/2 activation, the lateral occipital complex (the occipito-temporal area) was activated. On the other hand, in control session, the V4 area or the lateral occipital complex was rarely activated. In addition, the strength of the dipoles at the V4 area or the lateral occipital complex was much larger in selective attention than in control. We conclude that, even when subjects look at the same colored letter, selective attention to color or shape modifies the information processing pathways in the visual brain as the top-down mechanism, supporting early selection models.

【発表者名】③ Suzuki Y, Ozaki I, Jin CY, Baba M, Matsunaga M, Hashimoto I

【発表論文名】③ Dynamic movement of N100m dipoles in evoked magnetic field re-

flects sequential activation of isofrequency bands in human auditory cortex.

**【趣 旨】** ③ To investigate spatiotemporal features of the isofrequency bands for 400 Hz and 4000 Hz tones in human auditory cortex and on the hemispheric differences in the arrangement of the isofrequency bands, we recorded auditory evoked magnetic fields (AEFs) to 400 Hz or 4000 Hz tone pips presented at right or left ear from 31 normal subjects. The dipole location for the N100m sources was successively calculated from the AEFs obtained from the hemisphere contralateral to the stimulated ear. In the right hemisphere, the current sources for 400 Hz and 4000 Hz moved toward anterolateral direction before the N100m peak, showing parallel arrangement of the isofrequency bands (4000 Hz in medial location). In the left hemisphere, the movement direction of 400 Hz dipoles was anterolateral, while that of 4000 Hz dipoles was lateral. This difference in the organization of isofrequency bands between right and left auditory cortices reflects distinct functional roles in auditory information processing such as pitch vs. language discrimination.

**【発表者名】** ④ Ozaki I, Jin CY, Baba M, Matsunaga M, Hashimoto I.

**【発表論文名】** ④ Somatosensory evoked fields (SEFs) following finger stimulation are changed by tongue movement or tactile interference to cheek

**【趣 旨】** ④ Phantom fingers following arm amputation are known to be frequently represented on the cheek ipsilateral to the amputated arm, suggesting close neural connections in cortical areas between the fingers and cheek. To test the hypothesis above, we analyzed somatosensory evoked magnetic fields (SEFs) to finger stimulation with or without tactile interference to the cheek ipsilateral to finger stimulation or the tongue movement. To elicit SEFs, electrical stimulation at three times of the threshold was applied at the rate of about 1 Hz to the fingers I, II, III and V independently. SEFs were markedly modified by tactile interference to the cheek or the tongue movement. For the interference conditions, SEF power was significantly reduced at around 100 msec where the posterior parietal cortex or SII was activated in control condition. Especially, the response of SII that was identified in control condition diminished in the interference conditions. Furthermore, the reduction in SEF power was of the same magnitude among the stimulated fingers or between tactile interference to the cheek and the tongue movement. On the other hand, the response of SI (<50 msec) was sometimes unaltered

in the interference conditions. We conclude that both tactile interference to the cheek and the tongue movement modify the response of SII or the posterior parietal cortex more than that of SI. We therefore speculate that phantom fingers following arm amputation may be the results of altered neural network activities at SII region where activation of a cheek representing area spreads horizontally to the adjacent, formerly hand representing area.

【出張期間】平成16年2月17日～23日

【学会名】Winter cities 2004 in Anchorage

【発表者名】Hiroyasu Iwatsuki and Chikako Fujita

【発表論文名】The role of telerehabilitation using videophones for in-home stroke patients in winter

【趣 旨】 We developed videophone systems using a public digital telephone network (Integrated Services Digital Network [ISDN] 64, with a capacity of 64 bits per second) to use the limited number of co-medical staffs in rehabilitation services better during winter. The study was conducted after the videophone system was implemented for six months on two in-home stroke patients. Clinical effectiveness and providers' and in-home stroke patients' satisfaction were studied. Satisfaction questionnaires were administered to patients and referring physical therapists after 1, 3 and 6 months, respectively. The results were as follows. The referring physical therapists were satisfied with telerehabilitation using videophones. This system improved the patients' feeling of satisfaction and reduced those of anxiety. The patients were "very satisfied" with telerehabilitation consultations. The patients' difficulty in seeing the telerehabilitation consultation was addressed through larger screens and a camera with a remote control system to provide easier viewing for the patients and providers. These results suggested that in a cold area with a heavy snowfall like this prefecture, this videophone system is very useful because it enables us not only to lighten the burden imposed on in-home stroke patients and their family but also to efficiently use the resources of public health.

【出張期間】2004年5月27日～2004年6月1日（6日間）

【学会名】International Wheat Quality Conference, 2004, China

【発表者名】○ Shuzo FUJITA, Chikako KIRIBUCHI (OTOBE)\*, Atsuo ITO\*\* and Makoto YAMAMORI\*\*\*

Aomori university of health and welfare,

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\*\* Marutoh Co., Ltd in Japan,

\*\*\* National agricultural research center for the Tohoku region (NARCT), Japan

**【発表論文名】** The retrogradation of waxy wheat starch and the development of the processed food with waxy wheat

**【趣 旨】** The discovery of wheat cultivars that have one or two null waxy alleles enabled the production of new waxy wheat starch by combining three null alleles that do not produce the gene products, the Wx-A1, -B1 and -D1 proteins or granule bound starch synthase (GBSS). This study is focused the retrogradation of the waxy wheat starch and the development of the processed food containing the wheat. Waxy starch in general gives a peculiar viscosity by gelatinization and the retrogradation of the starch is more slowly than that of normal starch. The whole wheat flour contains lots of functional ingredients such tocopherol, glucan and phytic acid. We therefore estimated the effect of the whole waxy wheat flour on the texture and the retrogradation of the processed food. A noodle containing the flour was prepared, boiled at 100°C and stored at 3°C.

The recrystallinity of the food was measured by X-ray diffractometer. The addition of the whole waxy wheat flour tended to suppress the retrogradation of the food. It was considered that both of waxy starch and lipid in the whole wheat were suppressed the progress of the retrogradation of noodle. The waxy wheat flour is useful food stuff to give sticky and waxy functions to processed food. The food stuff is also able to have such as boiled rice. The some typical developed foods are shown in this presentation.

**【出張期間】** 平成16年7月20日より25日まで

**【学会名】** 4th International conference on successes and failures in telehealth

**【発表者名】** Hiroyasu Iwatsuki, Chikako Fujita, Ryutaro Maeno and Ayako Matsuya

**【発表論文名】** Development of a telerehabilitation system for training physiotherapists in rural areas

**【趣 旨】** The purpose of this study was to assess the effectiveness of transmitting moving pictures through the Internet using a three-dimensional motion analyzer. The movements of two patients were filmed by a video

camera and transmitted to the university. After advanced analysis using a three-dimensional motion analyzer, physiotherapists prepared a therapy plan. The transmitted moving pictures were clear enough for satisfactory analysis. The physiotherapists in the hospital were satisfied with the results of the motion analysis, and found the guidance from an expert physiotherapist very valuable. In the future, a large number of video pictures could be transmitted during the night, stored at the university, and then analysed later by an expert physiotherapist.

【出張期間】 2004年7月20～25日

【学会名】 4th International Conference on Successes and Failures in Telehealth

【発表者名】 Chikako Fujita, Ryutaro Maeno and Hiroyasu Iwatsuki

Department of Physiotherapy, Aomori University of Health and Welfare

【発表論文名】 A pilot study of the use of videoconferencing for teaching assistance techniques in activities of daily living

【趣 旨】 Summary

We have investigated the possibility of instructing assistance techniques in activities of daily living with videoconferencing. A videoconference system was installed in two places in our university to represent a connection between a home and an institution. The videoconference link used the local area network. Subjects were first year students of our university with no previous experience of acting as assistants. First they watched a videotape showing some general assistance procedures on sitting-up, standing-up and walking with a cane. Then they assisted a simulated patient (right hemiplegia following a stroke), receiving instructions from a physiotherapist in another room using the videoconference system.

The pictures on the television monitor were relatively clear and smooth. Because only one camera was used, there were some dead angles. Therefore, it was necessary to consider carefully in advance the position of the camera, the starting place of any motion and the direction of any movement.

The videotape showing assistance procedures was found to be very useful. The invisible elements such as the amount of assistance and the direction were a little difficult to understand. In future we will need to analyse the motion, arrange the order of procedures, and explain more briefly and clearly with simple words, emphasising important points using subtitles or signs like arrows.

【出張期間】 2004年7月20日～2004年7月24日

【学会名】 4th International Conference on Success and Failures in Telehealth

【発表者名】 前野竜太郎、岩月 宏泰、藤田智香子

【発表論文名】 The Accomplishment of Caring Performance in the Physiotherapeutic Education for First year students Using Video Conferencing Equipment

【趣 旨】 PURPOSE: The purpose of this study was to investigate the possibility of instructing assistant techniques on activities of daily living for beginners with a videoconference system. METHOD: A videoconference system was installed in two places in our university supposing a connection between a home and an institution. Subjects were first year students of our university with no assistant experience. At first they saw the videotape of some general assistant procedures on sitting-up, standing-up and walking with a cane, and then they actually assisted with some part of motions for a simulated patient, right hemiplegia due to a stroke, by receiving instructions from a physiotherapist in another room using the videoconference system. We used five grades to evaluate each assistant technique on activities. RESULT and DISCUSSION: It was the most difficult to get precise assistance on activities of standing from long sitting on † tatami ‡ room. They were puzzled with how they could support a simulated patient † s activity and where they should support her low back. They were also at a loss as to how much power they needed to exert on the patients. We not only explained by recorded voice on tape and video recorded assistant techniques but also by making appropriate oral guidance to the freshmen.

【出張期間】 平成16年8月22日（日）～9月30日（月）

【学会名】 XXII INTERNATIONAL CONFERENCE ON POLYPHENOLS 2004

【発表者名】 Kunihisa Iwai, Mi-Yeon Kim, and Hajime Matsue

【発表論文名】 Polyphenol constituents and antioxidant properties of the fruits of *Viburnum dilatatum* Thunb, and its usefulness for health benefits

【趣 旨】 The physiological activities, polyphenol constituents and identification of active ingredients of *Viburnum dilatatum* Thunb fruit, called gamazumi in Japan, were investigated in order to elucidate the usefulness of the fruit for healthy benefits. The crude extract of gamazumi (GCE) had strong radical scavenging activity. In the rats, which were subjected to water immersion restraint stress (WIRS) after ingestion of GCE for 2 weeks, gastric ulcer formation was reduced, and lipid peroxidation in

plasma and organs also lowered. Moreover, GCE inhibited the increase of lipid peroxidation in plasma and erythrocytes in the streptozotocin (STZ)-induced diabetic rats. These effects of GCE were suggested to be dependent on the ingredients in the fruit, because the antioxidant enzymes were not induced in rats ingested GCE. On the other hand, five phenolic compounds were identified, and their total concentration was equal to 46% of polyphenol contents in the fruit. Especially, cyanidin 3-sambubioside showed the strong radical scavenging activity *in vitro*, and was suggested to play an important role as an active ingredient contributing to the physiological effects. These results suggest that *V. dilatatum* fruit has the benefits for health as a functional food material having preventive effects on oxidative stress.