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【Poster Presentation by Students】

Electromyographical analysis during eggbeater kick

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Lower limb plays an important role in play water polo, when they swim, float, turn and jump. Stroke to use to help them float called the "eggbeater kick". I was considered that eggbeater-kick is related significantly to the performance of water polo. However, muscle activation pattern when the water polo players to eggbeater kick is not clear. So, it is a study intended to clear up the muscle activity of lower limb at the eggbeater kick. We were using the electromyograph (DL-5000, S&ME, Japan) that made the waterproof treatment for the measurement of muscle activity. Further, we have taken motion using a high speed camera can be

used underwater (HAS-200, DITECT, Japan). The subjects was one male water polo player with experience in more than 10 years. EMG data were collected at 1,000 Hz. After careful abrasion of the skin, the electrode pairs were placed longitudinally over the following muscles on the right side of the body with an interelectrode distance of 20mm: rectus femoris, medial vastus, adductor, biceps femoris, tibialis anterior, gastrocnemius and gluteus medius. Then the subject was asked to two tasks. The first task eggbeater kick in a state in which nothing holds. Second, the eggbeater kick in the state holding the plate 10kg.

Analysis of sprint ability in elementary school children

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The purpose of this study was to analyze sprint ability in elementary school children. We especially investigated the relationship between foot contact type and sprint abilities in school children from 6 to 12 years of age. 687 children (352 boys and 335 girls) who run 50m sprint during their school's fitness test were analyzed. Their mean foot contact time (T-c) and aerial time (T-a) during the interval 20-30m were calculated from video images captured by a high-speed video camera (300 frames/second). To control the effect of physical development, data were standardized with the mean value in each school year. In addition, their types of foot contact were classified into fore-foot,

mid-foot and rear-foot types. As a result of statistical analysis, sprint time was significantly and positively correlated to T-c (boys; $r = 0.75$, $P < 0.01$, girls; $r = 0.72$, $P < 0.01$) but not to T-a. The sprint time was negatively correlated with ratio of aerial time to foot contact time (T-c/T-a, boys; $r = -0.61$, $P < 0.01$ girls; $r = -0.54$, $P < 0.01$). 70% of boys and 87% of girls belonged to rear-foot type. They also have tendency of longer T-c compared with other two types ($P < 0.05$). From these results, T-c and T-a/T-c could be the key factors for sprint abilities of elementary school children, and also these factors could be influenced by their foot contact types.

Regular training of competitive cycling induces muscle-specific adaptation of synergistic muscles

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This study examined the influence of regular training of competitive cycling on the quantitative profiles of the quadriceps femoris and psoas major cross-sectionally and longitudinally. In the first experiment, T1-weighted magnetic resonance (MR) images of the trunk and thigh were obtained from 8 experienced (experience: > 4 years) varsity male cyclists and 8 untrained male students. In the second experiment, MR images of the trunk and thigh were obtained from 7 varsity male cyclists (experience: 0.5-13 years) twice (6 months in-between; cycling training: 16 hours per week on average). From the MR images, the volumes of each muscle of the quadriceps femoris and psoas major were determined. The muscle volumes of the vasti (vastus lateralis, vastus medialis, vastus intermedius) and psoas

major were significantly greater in the experienced cyclists than in the untrained students, whereas that of the rectus femoris was comparable for the two groups. In the second experiment, significant increases in the volumes of the vasti and psoas major were observed after 6 months training, although the rectus femoris volume did not change. Relative increases in the muscle volume of the vastus lateralis, vastus medialis, and psoas major were significantly greater than that of the rectus femoris. The current findings indicate that regular training of competitive cycling induces muscle-specific adaptation of the knee extensor and hip flexor muscles, leading to inferior muscularity of the rectus femoris compared to the vasti and psoas major in the experienced cyclists.

Differences in muscle activity between front crawl and head up crawl.

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The purpose of this study was to determine the differences in muscle activity between front crawl and head up crawl. Ten male surf lifesavers performed two 50m trials with 80% of their best performance velocity. Surface electromyogram (EMG) was collected from biceps brachii, triceps brachii, pectoralis major, and flexor carpi ulnaris muscles on right and left arms. Two underwater video cameras were used to capture the right and left hands at 200Hz. Four phases in one stroke were identified from the hand displacement (stretch, pull, push, recovery). The muscle activity was calculated by root mean square (RMS) values for each phase, and expressed in the percentage of EMG

during an isometric maximal voluntary contraction (%MVC).

Right triceps brachii showed different muscle activity between front crawl and head up crawl. During pull phase, right triceps brachii presented significantly higher RMS for head up crawl than front crawl ($p < 0.05$). This finding indicated that right triceps brachii on the head up crawl was used for extending elbow and making more powerful pulling movement than front crawl during the pull phase. There were no differences in other muscle activity between front crawl and head up crawl. This information provides a development of muscle conditioning program

**What causes inter-individual variability of rolling angular velocity
in baseball batting?-Case study-**

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Mechanically, the angular velocity of the bat around its long-axis, called rolling angular velocity, can be generated with two mechanisms: (1) The angular impulse exerted by the batter's hands around the long-axis of the bat generates the rolling: Mechanism 1 and (2) the change in the orientation of the long-axis of the bat with respect to the angular momentum vector of the bat generates the rolling: Mechanism 2. The purpose of this study was to determine which mechanism explains between-subjects different in the rolling angular velocity in baseball batting. An alley hitter (AH) and a long hitter (LH) performed eight-trials of free-batting. An electromagnetic tracking

device (240Hz) was used to recorded three-dimensional orientation data of the bat during the performance. The rolling angular velocity of each batter was $146 \pm 299^\circ/\text{s}$ (AH) and $1499 \pm 209^\circ/\text{s}$ (LH) in top-spin direction at ball impact (BI). The rolling angular velocity due to the Mechanism 2 were $1600 \pm 177^\circ/\text{s}$ (AH) and $1680 \pm 259^\circ/\text{s}$ (LH) in top-spin direction at BI ($p=0.51$). The rolling angular velocity due to the Mechanism 1 of each batter was $1454 \pm 297^\circ/\text{s}$ (AH) and $181 \pm 369^\circ/\text{s}$ (LH) in back-spin direction at BI ($p<0.01$). These results indicate that the long hitter attains high rolling angular velocity and the Mechanism 1 causes the different in the rolling angular velocity in baseball batting.

**Three-dimensional orientation of baseball bat at ball impact:
Probability of directing the batted ball toward the same and opposite fields**

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In baseball batting, the horizontal direction to which the batted ball will project is influenced by two factors; (a) the direction to which the impacting surface of the bat is facing at ball impact and (b) the interaction of the inclination angle of the bat in the vertical direction and the position of the ball impact along the short axis of the bat. The purpose of this study was to describe the three-dimensional orientation of baseball bat at ball impact for each direction (same, center, and opposite field) of batted ball. Forty-seven elite baseball players performed 7~36 trials of free-batting. Behavior of the ball impact was recorded with two high-speed cameras (2500 fps). All trials in which the bat collided

with the ball, including the foul balls, were used for the analysis. The orientation of bat at ball impact was described as the azimuth angle and the depression angle of the bat's long-axis. Frequency distribution maps were constructed to display the probability of hitting the ball toward the same, center and opposite fields for each combination of azimuth and depression angles of the bat at ball impact. The frequency distribution maps illustrate that a unique zone exists for each direction of the batted ball and that the zones overlap substantially. These results suggest that batters can hit the ball toward the three directions even if the orientation of bat at ball impact was same.

Comparison between young and older adults in the range of circumduction at the shoulder

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The purpose of this study was to compare the shoulder range of motion exhibited during arm circumduction between young and older adults. Healthy 51 young adults (20-31 yrs.) and 27 older adults (63-78 yrs.) participated in this study. While the subjects performed maximal circumduction with dominant arm, the range of shoulder joint motion was measured. The area enclosed by the trajectory of the distal end of the upper arm with respect to thorax was calculated as the reachable area of the upper arm motion. The scapulothoracic (ST) contribution to the reachable area of the upper arm motion, which was represented as the reachable area obtained by moving the scapula, was calculated from the scapular movements with respect to thorax during the circumduction.

The significant difference was found in the mean value for the reachable area of the upper arm motion ($p < 0.01$) between the young adults ($0.54 \pm 0.05 \text{ m}^2$) and older adults ($0.41 \pm 0.06 \text{ m}^2$). The reachable area was divided into four quadrants (upper-front, upper-back, lower-back, lower front) by the frontal plane and horizontal plane, and the reachable area in the upper-back quadrant was remarkably lower in the older adults than the young adults. Ninety-five percent of the difference in upper-back quadrant could be explained by the difference in ST contribution. These results indicate that the reduced scapular mobility is the major factor to explain the observation that the older adults exhibited smaller reachable area in the upper-back quadrant than young adults.

Belly breathing maneuver reduces the passive drag acting on gliding swimmer

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The purpose of this study was to test the hypothesis that the passive drag acting on a gliding swimmer is reduced if the swimmer adopts belly breathing maneuver (expanding the belly wall component) rather than chest breathing maneuver (expanding the rib cage component). Eleven male subjects participated in this study. A specialized towing machine was used to tow each subject with the tension set at various magnitudes and to record time-series data of towing velocity. The subject was asked to inhale air by expanding the belly wall or the rib cage expanded and to maintain the body configuration throughout gliding. The steady-state velocity was measured and the coefficient of drag was calculated for each

towing trial to compare between the breathing maneuvers. The results showed that the steady-state velocity was significantly higher with belly breathing maneuver (1.13 ± 0.09 m/s \sim 1.95 ± 0.10 m/s) than with the chest breathing maneuver (1.11 ± 0.08 m/s \sim 1.90 ± 0.08 m/s) ($p < 0.05$). The coefficient of drag was significantly lower with the belly breathing maneuver ($0.030 \pm 0.003 \sim 0.031 \pm 0.003$) than chest breathing maneuver ($0.028 \pm 0.002 \sim 0.030 \pm 0.004$). These results indicate clearly that adopting the belly breathing maneuver during gliding reduces the passive drag and the hypothesis was supported.

**Acceleration mechanism of the tip of a bat in baseball batting:
“Same-field hitting” vs. “Opposite-field hitting”**

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The purpose of this study was to determine acceleration mechanism of the tip of a bat (the bat-head) for the same-field (SF) hitting & the opposite-field (OF) hitting. Four male collegiate baseball players were asked to perform the so-called free-batting with maximal effort aiming at SF or OF. The motions of the bat and ball were recorded with two high-speed cameras (500 Hz). The inverse dynamics analysis procedure was applied to determine the force-couple system exerted on the bat by the batter's hands and presented it in a local coordinate system. The contribution of each element of the force-couple system to the bat-head speed was calculated by integrating the bat-head

acceleration attributable to the elements. The bat speed was 34.0 ± 1.4 ms⁻¹ for SF hitting and 33.0 ± 1.5 ms⁻¹ for OF hitting. The contribution of the force in the bat-head to the knob was $73 \pm 3\%$ for the both of the hitting. Also, the contributions of the couple and the moment of force were $31 \pm 6\%$ and $2 \pm 7\%$ in SF, and $40 \pm 3\%$ and $-5 \pm 4\%$ in OF, respectively. These results indicate (a) that the bat-head was accelerated mainly by batter's pulling action of the bat along the long axis toward the knob and (b) that the turning effects contributing to the acceleration of the bat changed by the direction of the batted ball.

**Knowledge and attitude about concussion, and usefulness of the lecture
for them in Junior high school teachers and coaches**

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Sport-medicine researchers recognize sports-related concussions as one of the most important subjects to resolve in athletic activities. Recent studies suggested that it is significant for all individuals who are related to student-athletes' activity to understand the concussions. Therefore, the purposes of the study are: (1) to clarify the knowledge and awareness of a concussion among teachers and coaches of public junior high schools; and (2) to assess the effectiveness of lectures on a concussion for the teachers and coaches.

The result showed thirty-four percent of the participants reported the concussions of the students in their activities. However, they might have misconceptions on the

concussions; thus there were potentially more participants whose students experienced the concussions.

In the lecture, the CDC's "Heads Up: Concussion in Youth Sports" were translated to Japanese and used, and "Pocket SCAT2" was distributed as a reference. There were high satisfaction levels with items that the participants wanted to know in the lecture. However, it was necessary to consider the time when to start the lecture and length of the lecture. Furthermore, the questionnaire taken after the lecture showed lack of the knowledge on the concussion; thus the lecture could have great effectiveness to the individuals related to student-athletes' activity.

**Automated coaching system using portable sensor :
Development of the system for inline-skating**

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This paper proposes an automated coaching system that can analyze kinematics and provide analyzed results. The system has two advantages. One is that the system makes it easier to analyze kinematics than the conventional method of image analysis, because it uses a small portable acceleration and orientation sensor (LPMS-B). The other is that it can work anywhere, even if a coach can not see a player, because it uses a smartphone for coaching. The smartphone uses sound and is connected to the sensor by the analyzing server.

First, we collected and analyzed the inline-skating movement data measured by

LPMS-B. We get some important information for skating: the length of time a stroke, the angle of the upper body, the angle of the upper body direction transition. Furthermore, we recorded that the parameters tend to change by skill or tiredness. Then, we did three experiments to assess the automated coaching system developed by the analyzed result. By comparing a user who had not used the system, the same user who was using the system and the same user who already had used the system, we assessed the system. As a result, we confirm that the system could make user's skating a significant change as it had expected.

The effect of physical rotation on soccer instep kicking

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It has been demonstrated that the kicking foot speed highly correlate with the trunk twisting by Takahashi and Kawamoto (2013). According to them, it was defined that shoulder and pelvis rotation were included in trunk twisting. The purpose of this study was to examine whether pelvis and shoulder rotation angles influence on soccer instep kicking by different kick directions. Sixteen male and female soccer players (8 males and 8 females) required to perform maximum instep kick towards three angled directions (0, 45 and 90 degrees) based on their approach-run pathway. The motions were captured using 8 high-speed video cameras at 250Hz. The selected kinematic parameters concerning the ball, kicking ankle, shoulder and pelvis were calculated. The absolute

velocity between ball and kicking ankle was significantly lower in 90 degrees condition than in the other conditions. That result was induced by a significantly reduced foot velocity component towards the target direction while the kicking directions had no significant effects on the absolute foot velocity. The rotation angles of the pelvis and shoulder in male and female increased systematically as the kicking angles changed. There were significant differences between the sexes in rotation angle of shoulder. On the other hand, the rotation angles of pelvis were no significant differences between the sexes. This can be explained that the shoulder rotation has some dominant role for movements of a kicking foot beginning with pelvis rotation.

The risk factor of low back pain by running.

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Running is basic exercise on sports activity. However, there are many runners with low back pain compared to any other sports. So, the purpose of this study is to clarify the risk factor of low back pain from trunk muscle activity and lumbo-pelvic motion.

Study 1: Analysis of trunk muscle activity and lumbo-pelvic motion during running.

Method: The activity of 8 muscle types are measured, including rectus abdominal, external oblique, internal oblique / transversus abdominal, erector spine, rectus femoris, biceps femoris, adductor, and iliopsoas muscle. These muscles activity is measured by wireless surface electromyography (EMG) telemeter (Harada electric Co.). At the same time, motion capture system (Qualysis Co.) is used to

analyze lumbo-pelvic motion. The data is calculated as lumbar angle and pelvis tilting angle. Moreover, subjects are directed to run until distress, and we compare the muscle activity and the lumbo-pelvic motion between non-fatigue state and fatigue state.

Study 2: Effects of intervention of trunk stabilization exercise during running.

Method: We compare the trunk muscle EMG and lumbo-pelvic motion during running between before and after intervention of trunk muscle stabilization exercises. The method is same to Study 1. Intervention exercises are prone bridge, hand-knee, elbow-toe, back bridge. These exercises are adapted subjects level, and make graduate transition.

Distribution characteristics of position data of players in soccer game

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In football, group sport skills have been only analyzed by an expert's visual confirmation method until now. Therefore, the development of quantitative evaluation criteria of group sport skills is a subject should be settled as soon as possible. Also, it has been considered that there is an important relationship group sport skills and player's spatial arrangement, also, various references have been made to the spatial arrangement in order to strengthen the team in the coaching field. Based on these backgrounds, each attack scene is classified in two models the attack was fulfilled and the attack was failed, also, the changes of feature

value consisting of the position of the player is symbolized in each model. In this study, the feature value was considered to be data-series generated by the change in position of the ball, machine learning by Hidden Markov Models (HMMs) that position of the ball was assumed as the initial value of the state variable was made. As a result, it became clear that each model can be identified from the feature value and there is a difference between models with respect to the distribution of feature value in the each state. From these results, validity to develop evaluation criteria on the position of the player are suggested.

Effect of injury prevention training on knee mechanics in female adolescents during puberty

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Female adolescents change their landing mechanics during puberty. It is unknown whether implementation of anterior cruciate ligament (ACL) injury prevention training reduces the loss of knee control in female athletes during puberty. We therefore evaluated the effect of injury prevention training on knee mechanics in female athletes during puberty. Sixty female junior high school basketball players participated and were divided into 2 groups: training group (n = 32) and control group (n = 28). The training group underwent an injury prevention program for 6 months, whereas the control group maintained a regular training routine. The knee valgus motion and knee flexion range of motion during a drop vertical jump were measured before and after

the training period. The probability of a high knee abduction moment (pKAM) was also evaluated using an ACL injury prediction algorithm. The knee valgus motion was significantly increased in the control group ($p < 0.001$), whereas it did not change in the training group ($p = 0.64$). Similarly, the knee flexion range of motion was significantly decreased in the control group ($p < 0.001$), whereas it was not changed in the training group ($p = 0.55$). The pKAM was significantly increased in the control group ($p < 0.001$), but not in the training group ($p = 0.06$). Implementation of injury prevention training was effective in limiting the loss of knee control in female athletes during puberty. Lowering the risk of ACL injury might be possible in this population.

Landing mechanics in subjects with anterior cruciate ligament reconstruction during single- and double-leg drop jumps

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The purpose of this study was to examine landing patterns during single- and double-leg drop jumps and to observe landing characteristics of subjects following anterior cruciate ligament (ACL) reconstruction.

Eight subjects (5 men and 3 women) with ACL reconstruction performed two jump tasks: single- and double-leg drop jumps. In drop jumps, they were instructed to drop off the box and land stable on the ground. An eight-camera motion analysis system and two force plates were used to record the landing mechanics during the jump tasks.

The following variables were extracted from the time-series data (0, 50, 100, 150ms after landing), the values of hip flexion angle, hip abd/adduction angle, knee ext/flexion angle, knee abd/adduction angle. Each parameter between single- and double-leg

trials were compared in terms of reconstructed and contralateral limb using paired t test (statistical significance set at $p < 0.05$).

Landing mechanics in the reconstructed and contralateral limbs between single- and double-leg drop jumps were significantly different for sagittal plane movements ($p < 0.05$). Although no difference was observed for hip abd/adduction and knee abd/adduction angles in the reconstructed limb, hip abd/adduction angle in the contralateral limb was statistically different ($p < 0.05$).

Our results show that we should not only focus on the reconstructed limb; the relation to the contralateral limb also needs to be taken into account at the same time in terms of landing mechanics.

**A new method for measuring swimming techniques
with an electromagnetic tracking device**

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Data collection with an electromagnetic tracking device (ETD) requires all sensors to be located within the small electromagnetic field generated by the transmitter of the device. This requirement causes a severe limitation for the measurement of swimming techniques, as the swimmer needs to be constrained to stay within the field while performing the strokes. Although this requirement may be fulfilled by using “resisted-swimming,” the exhibited swimming techniques may not represent the “real” swimming techniques. To overcome this limitation, we developed a new method for measuring swimming techniques with the ETD. We laid 25m railway on the pool deck and a cart was constructed to carry the ETD on the railway. A one-meter-high aluminum

structure was built on the cart, on top of which one end of a 2.5-meter-long wooden pole was fixed horizontally. The transmitter was attached to the other end of this wooden pole so that the transmitter could be placed at 0.5m above the water surface and 2.0m from the pool side. The control unit of the ETD and the computer for operating the device were placed on the cart and an operator pushed the cart along pool side, keeping the transmitter near the swimmer throughout the stroke cycles. The validity of this method for measuring swimming techniques was tested. During two trials of swimming with sub-maximum velocity of a collegiate swimmer, the error in measuring the orientation of sensors was less than 3° and the RMSE was 1° for 96% of the stroke time.

**The relationship muscle hardness and subjective evaluations
of the condition before and after sleep**

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It is often known that muscle hardness increases after exercise, it could be used as the method to evaluate muscle fatigue. However there is no report about the relationship muscle hardness and subjective evaluation of the condition. The aim of this study is to examine the relationship muscle hardness and subjective evaluation of the condition. Eight male college soccer players participated in this study for five weeks. Two different methods were used for the hardness measurement. One was with ultrasonography (EUB-7500, Hatachi Medical, Japan). The other was with push-hit hardness meter (NEUTONE, Try-all, Japan). The measurement sites were vastus medialis (VM), rectus abdominis (RA), and erector spinae muscles (ES). POMS and SF-8 were used as subjective evaluations of the

condition. POMS was calculated the difference before bedtime on Tuesday and after wake-up on Wednesday as the first half of the week, on Saturday and on Sunday as the second half of the week. SF-8 was calculated the difference after wake-up on Tuesday and Sunday. Muscle hardness was calculated the difference corresponding span of POMS and SF-8. We calculated Pearson's correlation coefficient between the difference of each muscle hardness and that of POMS or SF-8. The score of fatigue in POMS correlated with VM in the second half of the week. The score of item about physical function correlated with VM. We concluded that there is the relationship between the difference of muscle hardness on VM and the item about physical function concerned with subjective evaluation of the condition.

Landing mechanics in a single-leg drop landing after anterior cruciate ligament reconstruction

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The purpose of this study was to determine whether athletes who return to sports participation after anterior cruciate ligament (ACL) reconstruction exhibit altered lower limb mechanics during a functional task. The kinematic and kinetic performance of 12 healthy and 12 ACL reconstructed collegiate athletes were compared during a 30-cm single-leg drop landing. The mean time from surgical stabilization to the study was 10.9 months (9-12 months) when subject return to competitive sports activities. Peak and time-averaged angular displacements, peak vertical ground reaction force (VGRF) were analyzed. In the ACL group, the operated limb demonstrated significantly more hip flexion, and less ankle dorsiflexion, knee flexion than the normal limb ($p < 0.05$). In addition, the peak VGRF was significantly lower in the

operated limb compared with the normal limb ($p < 0.05$). No significant differences were found in most of kinematic and kinetic variables between dominant leg and non-dominant leg in healthy subjects.

The results indicated the operated limb had a reduced contribution of ankle and knee flexion and increased contribution from the hip flexion in the sagittal plane motion. It is unclear why the operated limb limited flexion of their lower extremity joints. It is inferred from reduction of VGRF that this may be a protective mechanism to limit landing forces and knee joint loading. In conclusion, our findings demonstrate that kinematics and kinetics alterations during single-leg drop landing persist 9-12 months after ACL reconstruction.

A study of No-go N2 on partial error trials

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Recent studies have elucidated the neural basis of performance monitoring in human brain. Performance monitoring is responsible for the remedial function including error detection, behavioral inhibition, and adjustment. It has been suggested that the anterior cingulate cortex (ACC) is associated with performance monitoring and may modulate the error-related negativity (ERN). The ERN is elicited by partial errors as well as overt errors. Although partial error trials are behaviorally classified as correct trials, wrong muscular activities preceding correct responses are observed. In this study, we will examine partial errors in a Go/No-go task. Participants are asked to respond to a Go stimulus as fast as possible, but to withhold response to a No-go stimulus.

When they succeed in withholding response to the No-go stimulus, the No-go N2 that is

time-locked to the No-go stimulus should be observed over frontocentral regions. The No-go N2 is thought to reflect behavioral inhibition. On the other hand, when participants fail to withhold response to the No-go stimulus, ERN that is time-locked to erroneous response should emerge. Therefore, it is plausible that ERN may be superimposed on the No-go N2 on partial error trials. According to our previous study, the No-go N2 was not modulated by avoidance motivation (i.e., monetary punishment). However, it remains unclear if the No-go N2 is modulated by monetary reward. Thus, we are motivated to examine if the partial-error ERN is superimposed on the No-go N2 and whether or not the No-go N2 is modulated by affective-motivational aspects, manipulating monetary reward.

Study on the training of multi-limb coordination (preliminary experiment)

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Sensorimotor synchronization (SMS) is an important factor of human movements, which means coordination of rhythmic movements with an external rhythm. It is an essential ability of our body and shows a strong preference for certain kinematic combinations, but the mechanism is still unclear. Therefore, it is meaningful to try to understand the mechanism of it, which will benefit not only athletes but also ordinary people.

10 Amateur drummers and 10 naïve people will be chosen as the subjects. Subjects will be demanded to finish the finger-tapping test with several different rhythms. In the experiment, subjects used only their index fingers of their hands to the sound of a metronome (250ms interval), the rhythms of two fingers are in-phase rhythms. Movement

of limbs and EMGs from muscoli flexor indicis and inicator were fed into a PC, LabChart will be used for further analysis.

I am currently doing preliminary experiment. Therefore, 1 amateur drummer and 1 naïve person was chosen to be subjects and 1 rhythm was used in this pre-experiment. A difference can be found between amateur drummer and naïve person. Although both of them tapped before the sound of metronome appeared, naïve person tapped much earlier than amateur drummer (70ms and 20ms).

The results showed differences between amateur drummers and naïve people, it also support to the Paillard-Fraisse hypothesis. The next step is to finish the formal experiment and then to analyze the different forms of multi-limb coordination.

Remote effect of muscle relaxation

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Muscle relaxation is an "active process" requiring cortical activation, and not simply the end of contraction. The objective of this study is to clarify the remote effect of muscle relaxation of one limb on electromyographic (EMG), corticospinal and intracortical activity of muscles in the other limb. Firstly, we investigated the interaction between relaxation and contraction for muscles of ipsilateral hand and foot. When contraction of one limb was concurrent with relaxation of the other limb, the EMG activities of the contraction became smaller. Secondly, we investigated the effects of foot muscle relaxation on corticospinal excitability for hand muscles utilizing transcranial magnetic stimulation (TMS) technique. As a result, muscle relaxation of the foot reduces the

corticospinal excitability of the hand muscles. Then, we investigated the effects of foot muscle relaxation on intracortical inhibition in the hand area of the primary motor cortex utilizing paired-pulse TMS technique. It is clarified that muscle relaxation of the foot induced the increase in intracortical inhibition of the hand extensor. Finally, we investigated the effect of foot muscle relaxation on contralateral hand muscle. It is demonstrated that muscle relaxation of the foot reduces EMG activity and corticospinal excitability of the contralateral hand muscles. Based on these findings, it is speculated that contraction in one limb is difficult when relaxation is executed concurrently in the other limb, due to the cortical activation.

**Effects of sleep restriction on physiological functions:
A respiratory chamber study**

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The purpose of this study is to examine how sleep restriction affect energy expenditure, body temperature and endocrine system. Subjects were 9 healthy young males. Experiment was performed in two conditions (normal sleep condition: NSC, shortened sleep condition: SSC). In the NSC, 7h sleep was taken for 4 nights. In the SSC, subjects took 3.5h sleep for 3 nights following one recovery night sleep. Energy expenditure was measured by a respiratory chamber. In both conditions, energy expenditure and core body temperature continually measured for 48h (3rd, 4th, 5th experimental day). Blood was sampled twice on 4th, 5th day in the morning. Overnight polysomnography was examined 3rd, 4th nights' sleep quality. Time of sleep onset latency was shortened on 3rd

experimental night. Slow wave sleep was increase on 3rd night. There was no significant difference in total energy expenditure. While energy expenditure during shortened sleep decreased. Body temperature reduced after continuous sleep restriction. Endocrine systems also changed. TSH and 3-Hydroxybutyric acid tended to increase after shortened sleep. And GLP-1 and PYY were decreased. Increased slow wave sleep compensate impaired brain function. However 3.5h sleep may not be enough to recovery. Decreased body temperature may related to impaired brain functions. These results indicate that continuous sleep restriction affect physiological functions.

Factors that produce the functional coupling between hand and foot

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When human move their foot periodically, the neural activities in forearm muscles are modulated so as to correspond to the phase of the foot movement, which is termed "functional coupling". It is considered that the coupling enhances the synchronized movements between the limbs. The purpose of this study was to examine the factors that produce the functional coupling. We investigated the four possible factors; 1) motor execution, 2) motor programming, 3) interference of afferent signal, and 4) attention to the afferent signal. To examine the contribution of these factors, we observed whether the functional coupling appeared in the following four conditions of foot movement; 1) voluntary movement, 2) imagined movement, 3) passive movement without attention, and 4) passive movement

with attention. To evaluate the corticospinal neural activity, we measured the motor evoked potentials (MEP) from forearm muscles by transcranial magnetic stimulation. The MEPs were recorded in the movement phase of plantarflexion or dorsiflexion. The results indicated that in all conditions the MEP amplitudes in forearm muscles significantly modulated depending on the foot movement phase, that is, the functional coupling occurred. It is suggested that the "motor execution" and "attention to the afferent signal" would not be important to produce the functional coupling, because the functional coupling appeared in the motor imagery and passive movement without attention. In conclusion, the functional coupling would be generated in "motor programming" process and by "interference of afferent signal".

The validity of combining activity record and accelerometry to measure free-living total energy expenditure in female endurance runners

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We tried to prove the validity of new approach combining activity recording and accelerometry to assess total energy expenditure (TEE) in athletes. Eight female endurance runners participated in this study. TEE over 8 days in regular training season was measured by the doubly labeled water (DLW) method. As the combined method, activity record based on the rating of perceived exertion (RPE) was used to estimate energy expenditure (EE) during training period, and tri-axial accelerometer was used to evaluate EE during non-training time over the TEE measurement period by the DLW method. Training EE was calculated from subjects' individual RPE-VO₂ relations provided by exercise tolerance test. Resting metabolic rate (RMR) was measured using indirect calorimetry. There were no

significant differences in TEE, activity-induced EE (AEE) and physical activity level (PAL; TEE / RMR) between the DLW method and the combined method (TEE, 3032 ± 344 kcal/day vs. 2995 ± 498 kcal/day; AEE, 1585 ± 303 kcal/day vs. 1552 ± 439 kcal/day; PAL, 2.68 ± 0.37 vs. 2.64 ± 0.46; respectively). Significant positive correlations and no systematic errors were observed in AEE and PAL. Intra-class correlation coefficients were high (TEE, 0.829 (p = 0.003); AEE, 0.822 (p = 0.003); PAL, 0.864 (p = 0.001); respectively). These findings suggest that the combined method has high validity against the DLW method. Thus, the combined method would be available to estimate free-living TEE in regular training season for female endurance runners.

Coordinative control of posture and movement of tuck jump

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The goal of this study was investigate the influence of the complexity of techniques (arm swing and arm stay) and the role of sport experience on jump performance and posture control. Six baseball players (age=19.3±1.6, height, 174.3±4.0cm; body mass, 71.83±7.4kg) and six soccer players (age=21.5±1.9, height, 171.7±2.2cm; body mass, 64.3±4.8kg) participated in the experiment. Participants performed tuck jump and vertical jump under two conditions by utilizing a repeated-measures design with barefoot while their body motion was captured with an 8-camera motion analysis system (Motion Analysis Corp., Santa Rosa,

CA).

Forty-seven markers were placed on the subject's bony landmarks [Hahn ME, 2004]. A force plate was sampled at 2000Hz (AMTI model OR6-5-1) and low pass filtered with a second-order Butterworth (10Hz). The results revealed that 1) arm swing did not influence on tuck jump height in both groups 2) soccer players seem to use arm swing better than baseball player for postural control after landing, which seem to reflect the ability obtained from sport experiences in soccer. We concluded that technique skill of arm swing could be used on jump movements for beginners.

Elite dancers have greater auditory-motor synchronization in tapping task

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Auditory-motor synchronization is an essential element for dancers when they perform dance to music. However, some beginner dancers have a tendency that their actions precede the beat, which is a major obstacle for them. In laboratory setting, a simple finger tapping task with an auditory metronome has been widely utilized. The tendency that tapping precedes sound was called the Negative Asynchrony (NA) (Miyake 1902). A recent study reported that elite musicians had smaller NA (Aschersleben 2002). This might be because 1) musicians have long experience of training in using hand, or 2) they may have good ability of auditory-motor synchronization in general regardless of the body part being used. To investigate this question, dancers are an ideal

experimental model because they have plenty of experience in moving the whole body, especially legs, with audio signals. Ten elite dancers and 10 non-dancers participated in this study. All elite dancers have experience in dancing for more than 5 years. Subjects were instructed to perform tasks of 1) right index finger tapping, 2) right foot stepping, or 3) both, to metronome sounds at a tempo of 50 beats per minute (bpm), 100 bpm, or 200 bpm in randomized order. NA was calculated from the time difference between sound onset and tap or step which was detected by force sensors. In all conditions, NA in dancers for tapping was smaller than that in non-dancers. It is possible that dancers were able to improve auditory-motor synchronization by practicing dance to music.

**Preparation of response sequence complexity and movement duration:
Inferences from lateralized readiness potential**

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The purpose of this study was to reveal the functional loci of two movement parameters, namely, response sequence complexity and movement duration, when they were organized by the central motor program. Twenty-eight undergraduate students (sixteen female, all right handed, mean age: 24.5 ± 2.2 yrs) participated in this study. Participants performed a choice reaction time task, in which they responded to the letters L and R by tapping their left and right fingers, respectively, with different response sequences and movement duration. The onsets of lateralized readiness potential (LRP) were measured using baseline-deviation technique after applying the jackknife-based procedure. Both response sequence complexity and movement duration yielded

main effects on reaction time (RT), showing longer RTs in the more complex and longer-duration conditions. No interaction was observed. The onsets of stimulus-locked LRP did not differ among conditions. However, significant main effects of both response sequence complexity and movement duration were found on the response-locked LRP onsets, showing longer latencies in the more complex and longer-duration conditions. Behavioral data indicated the existence of two independent stages associated with response sequence complexity and movement duration according to additive factor method logic. Electrophysiological evidence suggests the motoric loci of both factors in independent stages.

**The role of vision in suppressing the rotational vertigo
in figure skaters and ballet dancers**

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Why don't ballet dancers and figure skaters feel dizzy with spinning? The aim of this study is to answer this question. Subjects were 8 figure skaters, 8 ballet dancers, and 8 control subjects who have no experience of figure skate nor ballet. They sat in a revolving chair that rotate at 0.37 rps for 50s. There are three tasks: (1) wearing a blind goggle (B task), (2) not focusing on any objects (NF task), and (3) focusing on a ball fixed in front of the subject (F task). Each tasks were conducted in directions of clockwise and counter-clockwise (CW and CCW). The order of three tasks and directions of rotation was randomized. To analyze the nystagmus during and after the rotation, electro-oculogram was recorded with

electrodes attached to the lateral side of both eyes. The magnitude of after-nystagmus in the NF task in the ballet dancers was significantly smaller than that of the control in the direction of CW ($p < 0.05$). In contrast, the magnitude in figure skaters was smaller than that of control in the direction of CCW ($p < 0.1$). The main direction of rotation in classical ballet is usually CW, whereas that of figure skating is CCW. Thus, we speculate that athletes could habituate to rotation with their daily practices, but the habituation occurs only for the direction of rotation that they are doing practice. As a basis of this habituation, some inhibitory mechanism would be activated that suppressed the after-nystagmus and rotational vertigo.

Global and unique translational regulation suggests a novel regulatory mechanism of the inflammatory response to LPS in macrophages

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Once organisms encounter bacterial infections, rapid cellular response is critical to initiate the inflammatory response. A widely used model of acute inflammation, lipopolysaccharide (LPS)-stimulated macrophage, dramatically shifts the cellular conditions toward sophisticated pro-inflammatory status. This is exemplified by the phosphorylation and the activation of pro-inflammatory signaling cascades and related transcription factors, such as Mitogen-Activated Protein Kinase (MAPK), Inhibitor of κ B (IkB), Nuclear Factor of κ light polypeptide gene enhancer in B cells (NF κ B), Activator Protein 1 (AP-1), and Interferon Regulatory Factor (IRF) as well as the increased synthesis of chemokines and cytokines. To provide a comprehensive perspective of these complex mechanisms, global analyses have recently been conducted focusing on phosphoproteomics,

transcriptomics, and epigenomics. However, the importance of global translational regulation in the inflammatory response is still poorly understood. Here we used recently developed ribosome profiling based on high-throughput RNA sequencing (RNA-Seq) and conducted a genome-wide translational analysis of the early inflammatory response to LPS (30min) in RAW264 macrophages. The result showed unique translational dynamics, independent to the pro-inflammatory transcriptome regulation. We provide evidence that global translational regulation, especially down regulation, has a potential role in triggering and/or modulating the early inflammatory response of macrophages to LPS. This implies a possibility that global translational regulation is one of the critical regulatory mechanisms underlying in the exercise-induced pro-/anti-inflammatory responses.

**Associations between physical activity and serum 25(OH) D
with plasma IL-17 in older men**

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Physical inactivity and lower serum 25(OH)D have been associated with elevated risk of infection. Interleukin-17 (IL-17), a recently discovered cytokine, has been well known for its protect function against infection. However, no data exists on the associations between physical activity and serum 25(OH)D with circulating IL-17 concentration in older men. Purpose: The purpose of this study was to examine associations between physical activity and serum 25(OH)D with IL-17 in older men. Methods: Physical activity was assessed objectively using the activity monitor for 7 consecutive days in 93 participants aged 60-79 years, and serum 25(OH)D and plasma IL-17 concentrations measured by enzyme-linked immunosorbent assay. Multiple linear regressions were used to assess whether physical activity and serum 25(OH)D were associated with IL-17 adjusted

for potential confounding variables (age, BMI, seasons, medication use, smoking status, alcohol consumptions, vitamin D and calcium intake). Results: The average concentrations of serum 25(OH)D and IL-17 were 18.5 ng/ml and 12.7 pg/ml respectively. Of 93 participants, 62 (66.7%) were deficient (<20 ng/ml), 21 (22.6%) were insufficient (20-30 ng/ml), and only 10 (10.8%) were sufficient (>30 ng/ml) for the vitamin D status. Serum 25(OH)D was positively related with IL-17 ($\beta=0.267$, $P=0.018$) after adjusting for age, BMI, seasons, medication use, smoking status, alcohol consumption and vitamin D intake. However, no significant relationship was detected between physical activity and IL-17. Conclusions: This study shows higher levels of serum 25(OH)D concentrations is independently and positively associated with increased IL-17 concentrations in older men, but physical activity is not.

Effect of sodium butyrate on histone acetylation in L6 myotube

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Exercise training promotes adaptive changes in skeletal muscle that result in an improved carbohydrate and lipid utilization. The molecular mechanisms mediating the cellular adaptations to exercise training in skeletal muscle are partially due to transcriptional regulation. Recently, it was suggested that the pattern of histone modifications are involved in gene expression, and histone acetylation at promoter regions has been associated with transcriptional activation. Because previous study reported that sodium butyrate inhibits histone deacetylation in cultured cells, it is plausible that exposure to the sodium butyrate promote the acetylation of histones in skeletal muscle. Therefore, the purpose of this study was to examine effect of sodium

butyrate on histone acetylation status in L6 myotube. After the rat skeletal muscle cell differentiated to the myotubes, the L6 cells exposed to 0 (Control), 500 μ M and 1 mM sodium butyrate for 24h. Western blotting was performed to evaluate whether the exposure to sodium butyrate affects histone acetylation status in the L6 cells. After 24h exposure, although exposure to 500 μ M sodium butyrate did not influence histone acetylation, the level of acetylated histone H3 was higher in the cells after treatment with 1 mM sodium butyrate than that in control cells ($p < 0.05$). Since sodium butyrate induces histone acetylation in the L6 cells, it is likely that exposure to sodium butyrate associated with transcriptional activation in skeletal muscle.

**The sex difference in relationship between insulin resistance and
body composition of Japanese heavy-weight Judo athletes**

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In our previous study, we reported that the prevalence of insulin resistance caused by excess fat accumulation was high in Japanese female Judo athletes of heavy-weight classes (BMI 33.8 ± 5.2). The purpose of this study was to examine sex difference in the insulin resistance of heavy-weight athletes. The subjects were 36 collegiate judo athletes (20 male and 16 female). Venous blood samples were taken in the early morning after over-night fasting. The body composition was measured by dual X-ray energy absorptiometry. The body weights were 122.4 ± 12.7 kg for male and 90.3 ± 17.0 kg for female. The percentages of body fat were 27.4 ± 4.9 % and 28.5 ± 6.0 % in male and female, respectively. The plasma glucose levels were in normal range for all subjects. However, 30% of male and 6.3% of female

exceeded the normal range of serum insulin level. According to homeostasis model assessment insulin resistance (HOMA-IR), the prevalence of insulin resistance in male athletes were 60%, and it was significantly higher than that of female athletes (25%). In female athletes, insulin level and HOMA-IR had a positive correlation with waist circumference, trunk and total fat mass. On the other hand, there were no significant correlations between these parameters in male athletes. These results may indicate that insulin resistance in male athletes is influenced by parameters other than previously mentioned body composition.

In conclusion, it found that there was sex difference in the insulin resistance affected by body composition in heavy weight Judo athletes.

**Fat oxidation during and following low-, moderate- and high- intensity exercise:
focused on the intensity of maximal fat oxidation**

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Many guidelines for exercise prescription recommend moderate intensity for prevention and treatment of obesity. The intensity of maximal fat oxidation (Fatmax) is the exercise intensity which induces the highest rate of fat oxidation during exercise. Fatmax can be observed at low- to moderate-exercise intensity. In contrast, moderate- to high- intensity exercise elicits an increase in fat oxidation following exercise. Thus, exercise prescription should be considered not only during exercise but also following. The purpose of our study is to clarify ideal exercise intensity which elicits maximal fat oxidation and apply to guidelines for exercise prescription to obesity. In the first study, we tried to reveal the intensity within moderate

which induces maximal fat oxidation during and following exercise. Eight men performed two intensity exercise (Fatmax vs 65%VO₂peak) on the treadmill matched for energy expenditure. Total fat oxidation was significantly higher in Fatmax trial than in 65%VO₂peak trial. Noradrenaline and FFA concentrations were significantly higher in 65%VO₂peak trial than in Fatmax trial immediately after exercise. These findings suggest that Fatmax is more effective intensity for fat oxidation than 65%VO₂peak within moderate. Now we conducted additional study to compare total fat oxidation of Fatmax and 85%VO₂peak exercise matched for energy expenditure.

Comparison of the effects of acute endurance exercise performed in the morning and evening on High-Molecular-Weight (HMW) adiponectin.

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Objectives. High-Molecular-Weight (HMW) adiponectin is the biologically active form of adiponectin and is related to enhanced insulin sensitivity and metabolic function. However, it is unknown whether acute endurance exercise which is conducted in different timing of the day affects HMW adiponectin. The purpose of this study was to investigate the influence of acute endurance exercise in the morning and evening on HMW adiponectin.

Methods. Eight healthy young men completed two trials in a randomized cross-over design: (1) morning (0900-1000) and (2) evening (1700-1800) trials on 2 days separated at least by a week. In the morning and evening trials, participants walked for 60 minutes at 60% of maximal oxygen uptake on a treadmill. Blood samples were collected to determine hormones (catecholamine and

insulin), metabolites (free fatty acid and glucose), and total and HMW adiponectin at pre-exercise, immediately and 2 hours after exercise.

Results. Plasma adrenaline concentrations were significantly higher in the evening trial than in the morning trial at immediately after exercise ($P < 0.05$). On the other hand, Plasma total adiponectin, HMW adiponectin, and the ratio of HMW to total adiponectin concentration were unchanged between pre and post exercise. Moreover, those changes did not differ between morning and evening trials.

Conclusion. Our data suggest that acute endurance exercise performed in the morning and evening did not affect total and HMW adiponectin concentration.

**Establishment of cell culture system for analysis
of exercise-induced immunoregulation**

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Innate immune responses are involved in the development of several chronic diseases, including atherosclerosis, diabetes and cancer. Indeed, the inflammatory responses of macrophages via activation of Toll-like receptor 4 play an important role in innate immune responses on pathogenesis of chronic diseases. On the other hand, exercise training suppresses production of pro-inflammatory cytokines and down-regulates Toll-like receptor 4. The several bioactive substances such as stress hormones (catecholamines and glucocorticoids) and cytokines are induced during exercise, and are involved in the exercise-induced immunoregulation. It has been found the stress hormones contribute to the anti-inflammatory effects of exercise. However, the mechanisms of stress hormone on the exercise induced immunoregulation are not well understood. Especially, the effects of stress hormones on Toll-like receptor 4 signaling pathway of macrophages

are still unclear.

To investigate the Toll-like receptor 4 signaling pathway of macrophages, macrophage's cell line RAW cells were stimulated by lipopolysaccharide (LPS). Also, to investigate the anti-inflammatory effects of stress hormones, LPS-stimulated RAW cells were treated with Adrenaline, Noradrenaline and Dexamethasone. After 24-hour incubation, cell supernatant was harvested for measurement of pro-inflammatory cytokine production (IL-6 and TNF- α) by enzyme-linked immunosorbent assay (ELISA). The production of IL-6 and TNF- α induced by LPS were significantly inhibited by treatment with Adrenaline, Noradrenaline and Dexamethasone.

To investigate the Toll-like receptor 4 signaling pathway, proteins of Toll-like receptor 4 will be detected by Western blotting analysis. In this symposium, we will report the results of proteins of Toll-like receptor 4.

Effects of antioxidant supplementation on exercise-induced activation of signal transduction pathways in mice skeletal muscle

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Contracting skeletal muscles generate reactive oxygen species (ROS) and prolonged and intense exercise can result in oxidative damage to cellular constituents. On the other hand, it has been known that ROS activates the signaling kinases which regulate several skeletal muscle adaptations. However, the effects of antioxidant supplementation on exercise-induced activation of signal transduction pathways of skeletal muscle adaptation have not been clarified. The purpose of this study was to determine the effects of antioxidant supplementation on oxidative stress and exercise-induced activation of signal transduction pathways of mitochondrial biogenesis in mice skeletal muscle.

C57BL/6J mice were allocated into 3 groups; control (Con) group, exercise (Ex) group or antioxidant supplemented exercise (Ex + AO) group. The mice of Ex + AO group were administrated vitamin C and vitamin E for two weeks.

The mice of the Ex and Ex + AO group were subjected to 25 m/min treadmill running for 90 min. After the exercise, muscle was dissected for the measurement of AMPK and p38MAPK phosphorylation and markers of oxidative stress.

AMPK phosphorylation was increased by exercise ($P<0.05$). However, antioxidant supplementation did not alter the increased AMPK phosphorylation by exercise. P38MAPK phosphorylation was increased by exercise ($P<0.05$). This increase was inhibited by antioxidant supplementation. No significant changes in markers of oxidative stress and antioxidant capacity were observed following exercise and antioxidant supplementation at present. However, hydrogen peroxide in skeletal muscle tended to be increased by exercise ($P=0.06$) and this tendency was abolished by antioxidant supplementation.

These results suggest that ROS participate in the activation of AMPK.

**Effects of macrophages depletion
on exhaustive exercise-induced acute kidney injury**

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Exhaustive exercise induces acute kidney injury. However, the underlying mechanisms on exhaustive exercise-induced acute kidney injury are unclear. Recent studies have indicated that macrophages might contribute to kidney injury. This study aimed to clarify whether macrophages modulate exhaustive exercise-induced acute kidney injury using clodronate liposome. Male C57BL/6J mice were divided into four groups: Sedentary

(n=8), Sedentary with clodronate liposome treated (n=8), Exhaustive exercise (n=8), Exhaustive exercise with clodronate liposome (n=7) groups. Exhaustive exercise groups were imposed a treadmill running at gradient 7% for 15 minutes and the speed of 10 m/min, and then 15 m/min, followed by 20 m/min, and finally kept at 25 m/min until exhaustion. Depletion of macrophages was accomplished by administration of clodronate liposome.

Effects of cardiorespiratory fitness, acute aerobic exercise and common single nucleotide polymorphisms in FNDC5 gene on serum irisin levels and glucose metabolism.

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The purpose of this study was to investigate the effects of cardiorespiratory fitness, acute aerobic exercise, and common single nucleotide polymorphisms (SNPs) in FNDC5 gene on serum irisin levels and glucose metabolism. In the cross-sectional study, cardiorespiratory fitness was assessed by measuring peak oxygen uptake (VO₂peak) in Japanese men (n=163) aged 21-79 years, and their serum irisin levels were measured by ELISA. Subjects were divided into low- and high-fitness groups according to the median value of VO₂peak in each decade. Common SNPs (rs3480 and rs16835198) were genotyped by TaqMan assay. Glucose metabolism was evaluated by measuring fasting glucose, HbA1c, and HOMA-IR. In the experimental study, 10 young men, 8 young women, and 9 elderly men performed bicycle ergometer exercise for 30 min at 70%

VO₂max, and blood samples were collected before, immediately after, 30 min, 1, 3, and 24 hr after exercise. Serum irisin levels were not associated with VO₂peak and parameters of glucose metabolism. SNP analysis revealed that subjects with rs3480 AG and GG genotype had higher HOMA-IR than AA genotype only in low-fitness group, (p<0.01). Furthermore, the GG genotypes of rs16835198 were associated with increased fasting glucose and HbA1c only in low-fitness group (p<0.05). However, no SNPs were associated with serum irisin levels. These results suggest that neither cardiorespiratory fitness nor common SNPs in FNDC5 gene are associated with serum irisin levels, but the SNPs are associated with glucose metabolism in low-fitness men. At present, we are investigating the effects of acute exercise on serum irisin levels.

Sports activities of the young men's association in the Taisho era to pre-war Showa era: Study from organ "FUCHU SPORTS".

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The young men's association was social education institutions for youth that played role of the subjected to industry and remedial education before the World War II. The institutions had emphasis on sports activities for the purpose of training of the mind and body. Most of all the researches on sports activities of the young men's association, however, has been clarified the history of system and policy. Therefore, it has not been cleared the realities of sports activities in the young men's association.

The purpose of this study is to clear the realities of sports activities in the young men's association from Taisho era to pre-war Showa era, focusing on activities in fuchu-machi young men's association's KYOGI-BU. This study used mainly "FUCHU SPORTS" which was published by fuchu-machi young men's association as historical material.

The results of this study are summarized as

follows.

1) In the time of inauguration, the fuchu-machi young men's association had not positioned sport activities formally.

2) The KYOGI-BU was organized by the member's suggestion. This process means that youths asked the young men's association for the environment of sports activities.

3) The KYOGI-BU that was organized managed with supporting by fuchu-machi and fuchu-machi young men's association. In particular, financial support was thick, and practice environment had been also developed. Students of vocational school in fuchumachi were also included in the KYOGI-BU.

This study cleared the part of realities about sports activities in young men's association from Taisho era to pre-war Showa era.

**Development of criteria for qualitative evaluation of running skill
in children over 7 years old.**

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The purpose of this study was to make criteria for qualitative evaluation of running skill in children over 7 years old and to validate the criteria.

Running skill is one of the Fundamental Motor Skills which are said to have great importance in lifelong motor development. However, it was claimed that instructions to enhance children's skill of running were not given sufficiently in Physical Education classes, so there are possibilities that many children's development of running skill might be stopped in lower stage.

But the actual condition of running skill development in children over 7 years old has not been cleared sufficiently by previous studies, so it needs to make new criteria and to evaluate their running skill qualitatively.

The subjects in this study to validate the criteria were 177 children (82 boys and 95 girls) in 5th and 6th grade and they performed 50m run. Their running form were recorded by video cameras from side and front view and evaluated by the criteria made in this study.

The new criteria made in this study were comprised of 3 categories ("posture", "upper limb", "lower limb") and each category has 2 or 4 items. As a result of qualitative evaluation of subjects' running form, it's indicated that the total score and the scores of each category have significant correlations with the time of 50m running. Therefore the new criteria are thought to have validity for qualitative evaluation of running skill in children over 7 years old.

Yoga for breast cancer survivors: psychological recovery and QOL

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Background

Many studies about yoga for cancer survivors have shown their effectiveness on physical and psychosocial QOL. It is also gradually accepted that applications of yoga to be helpful for grieving process. We consider breast cancer diagnosis as “object loss” directly impacts on their QOL.

Purpose

The purpose of this study was to explore the psychological effects and its mechanisms afforded by 12-week yoga program for cancer survivors.

Methods

20 Japanese breast cancer survivors aged over 20 were recruited for 12-week yoga intervention program. A 75 minutes yoga session consists of warm up, basic yoga postures, breath work and meditation. Group interviews and QOL assessments (FACT-B) were conducted at baseline and after 12

weeks intervention. All interviews were audiotaped with consent, and transcribed to analyze. The recovery stages were assessed and identified by two certified psychotherapists and the first author individually, then made it into a consensus.

Results

18 participants aged 36 to 53 (mean: 46.6) completed the program. Mean attendance was 11.3 of 12 classes. No serious adverse events were reported. We found that psychoanalytic defense mechanism “denial” was used commonly in participants who marked down on FACT-B score and the appearance of “denial” related words were significantly decreased after intervention.

Conclusion

Results suggested that yoga has a significant potential and should be further explored as a releasing trigger from “denial” stage of psychological recovery.

**A consideration of the “subject” in Toshio Nakamura’s P.E. theory:
With making the dispute about the meaning of “subject” after the War in to the key.**

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The purpose of this study is to consider the characteristics of the “subject” in Toshio Nakamura’s (1929-2011) theory about P.E. with making “the dispute about subject after the War” which argued about the meaning of “subject” in to the key.

In the previous study, there was the different opinion about his concept of “subject”. Then we analyzed his suggestion concerned with “subject” as follows. He insisted that teacher had to develop the “subject” of children who was development person of sport culture, and pointed out the lack of “subject” of teacher who kept the democratic education. Also, he insisted it on the basis of Masao Maruyama’s study.

For characterize his concept of “subject,” we analyzed the meaning of the concept of “subject” in “the dispute about subject after the War.” Then, we focused on the suggestion

of Katsumi Umemoto who insisted the importance of “subject” by the view of Marxism and Masao Maruyama who insisted it by his own view. Katsumi Umemoto’s “subject” was characterized as the people who always object-ized and conquer the environment which called “Reflexive subject.” On the other hands, Masao Maruyama’s “subject” was characterized as the people who were the independent existence from environment which called “Self-supporting subject.” In conclusion, the concept of “subject” by Toshio Nakamura was close to “Reflexive subject.” However, we cleared above that he supported Masao Maruyama’s study. That is to say, there was confusion between his suggestion and his concept of “subject,” it leads the different opinion in the previous study.

Progress report of physical activity study among middle school students in Beijing

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The objectives of this study were to: 1) determine the levels of physical activity (PA) during physical education (PE) classes in Beijing; 2) measure the PA opportunities in and out of school. For part 1 (PA levels during PE classes in schools), 4 school districts were selected from 16 districts. Five middle schools were sampled from each selected school district; Six PE classes from each sampled school were observed; Accelerometers were worn by 5 students at each class. PA is objectively measured using accelerometer and converted to counts per minute, and time spent in moderate-vigorous PA (minutes per class). For each student observed, a trained interviewer directly entered into a notebook computer the student's sex, activity intensity, type of

activity, whether the student was "on task" or "off task," and instructional mode. For part 2 (PA opportunities in and out of school), a questionnaire survey was conducted in 8 junior high schools (4 in rural areas, 4 in urban areas). A total of 1800 questionnaires were distributed. The questionnaire includes: 1) Physical activities in and out of schools; 2) Health behaviors (smoking and alcohol drink), nutrition knowledge and food preference; 3) Students' Attitudes Toward PE Scale and EQ-5D health questionnaire. The primary outcome is to elucidate the PA levels among PE classes and PA environments for junior high school. The results will be used for future research concerning methods of increasing children's activity and improving the efficiency and effectiveness of PE classes.

Determinants of the public acceptance of the elite sport policy in Japan

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Public investment for elite sport is generally justified on the basis that the elite sport success has a wide range of social and psychological benefits for the public (Grix & Carmichael, 2011; Goodwin & Grix, 2011). Governments increasingly use this argument to further invest in elite sport and participate in the 'global sporting arms race (Oakley & Green, 2001)' without showing any evidence to convince the taxpayers, despite the recognition of the necessity to obtain understanding of the whole society (Ministry of Education, Culture, Sports, Sciences & Technology in Japan [MEXT], 2012). Therefore, the purpose of this study was to examine the determinants that influence

public acceptance of the development of the elite sport policy in Japan. Data was collected from n=1,000 stratified randomly selected Japanese by means of an Internet survey. The results of this empirical study reveal that the public acceptance of the promotion of elite sport policy is determined by their perceived benefits of elite sport policy which produces the success of Japanese athletes, and perceived risks, namely negative perspective of elite sport. The public's perceived benefits and risks of elite sport are further determined by social trust in the elite sport actors and the Japanese athlete's role model influence, except the influence of social trust on risk perception.

An understanding of Japanese children's perceptions of fun, barriers, and facilitators of active free-play

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Physical activity contributes to children's physical and mental well-being. Research suggests that active free-play helps to maintain and increase physical activity in children, also contributes to social and emotional well-being. To date, these studies have focused on Western countries. Thus, this study was conducted to gain insights into the factors of perceptions of fun, barriers, and facilitators affecting active free-play from Japanese children's perspectives using focus group interviews. Twelve focus groups were conducted with 60 children aged 9–11 years in Japan. Children's perceptions of fun in active free-play were categorized into socializing, achievement, emotions, and freedom. Additionally, active boy groups were interested in free-play and adventure play;

girl groups were interested in free-play with less physical movement and challenges; inactive boy groups were interested in relaxing and competitive play with bodily contact. However, children mentioned that busy schedules, weather, and health-related factors acted as main barriers. Lastly, children noted facilitators include setting schedules, having access to equipment and playgrounds, and holding special events. The findings provide insights into active free-play related factors for active and inactive Japanese children, as well as clarified the differences between Japanese and Western children. Such findings will contribute to designing interventions to increase active free-play.

Motives of sport spectators in China: A case study of the Chinese super league

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The main purposes of this study were to develop a Motives of Sport Spectator Scale for Chinese professional football (CSL) and to explore the characteristics of CSL spectators. Based on the results of a focus group and a comprehensive literature review, a 12-motive, 38-item scale was developed. Questionnaires were distributed among CSL spectators in Shanghai. The 333 usable questionnaires were divided into two groups, and two confirmatory factor analyses were conducted to validate the scale. Finally, a 9-motive, 24-item scale was confirmed. The adequate Cronbach's alpha coefficients (from .60 for interest in player to .88 for family bonding), AVE values (.43 ~ .70), RMSEA (.072) and CFI (.900) indicated that the new scale was

reliable and valid. Further, the results indicated that sport interest, achievement, and socialization were the most important motives for CSL spectators, while, support the city, family bonding and interest in player were the least important motives. Male spectators were more interested in football than female spectators were, attended more games, and were more willing to attend future games. Similar to previous studies, female spectators were more motivated by individual players. The results of the multiple liner regression showed that achievement could explain 30.8% of the dependent variable of intention for future attendance. Suggestions and implications for sport managers and marketers are given.

**Research on China's university and college sport:
An analysis of the expression, reconstruction, development of university and
college sport in three periods**

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This study chose sport in China's higher education institutions in three periods as object, adopted historical studies that analysis literature of university and college sport, interview by communication with experts for gaining original data to analysis theirs sport in different periods. The study purpose was that focused on China's university and college sport in three different periods, by reviewing literature and implementing interviews, summarized the emergence (the 1890s - 1937), the reconstruction (the 1950s - the 1970s), and the development (the 1980s - present) of sport in higher education institutions.

The conclusions of this study summarized in the following points. From the 1890s to 1937, sport in higher education institutions

acted as the initiator and participant of sport in China. The sporting level of it represented the highest level of sport in China. In the 1950s to the 1970s, higher education institutions' sport was restructured and sports colleges that training sport teachers and athletes were established. The restructure of university and college sport was a consequence of political movements. The separation of sport from education system resulted in the separation of sport from education. The policies were the major elements dominating the development of university and college sport since the 1980s. With the guiding policies, high-level sport teams became the main vehicle of university and college sport.

**Factors related to the sustainable event of the demonstration program
in National Sports Festival:
A case report on a walk rally event in M-town**

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The demonstration program, one of the sports events of the National Sports Festival (NSF) in Japan, has been held by the municipalities of the hosting prefectures every year for the residents. In this program there have been many kinds of new sports events, such as Walking, Ground Golf, Petanque and others. In the previous study, it became clear that there was some municipalities where the legacies related to sports environment for residents continue to exist (22.1%) by hosting this program.

The purpose of this study was to introduce the case of M-town where the walk rally event has been held after the NSF, and explore the maintenance processes to extract some factors for sustainable event. An interview

survey was conducted, and in order to get more detail data, we referred to materials related to the event, and joined the 16th walk rally event in M-town.

As a result, during the preparation period, the M-town administration had an intention of sustaining a walk rally event, and there were following three important factors for sustainable event. 1) Hospitable support by administration: A source of revenue and enough staff for the event. 2) Residents' cognition of the event and walk rally by sufficient PR activities and reservation of the number of participants. 3) Staff training program for learning the Know-how of making a good walk rally event.

The relationship between evaluation of elderly customer and their active aging status in community sports clubs.

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This study aimed to discuss the relationship between members' evaluation and their active aging status of older people in community sports clubs. The characteristics of members which influence their evaluation on CSC were discussed as well. The method employed by this study was questionnaire, and 545 participants aged above 60 years old from 8 CSCs were selected as the sample. Regarding of data analysis, one-way ANOVA, Scheffe post-hoc tests, independent samples t-tests, multiple regression analysis, and canonical correlation analysis were computed to understand the relationship between service quality and active aging. The results showed that confirmatory factor analysis of the revised scale with 11 items and 4 factors produced a good fit indices (RMR= .03; GFI= .94; AGFI= .90; PGFI= .26; DELTA2= .95; CFI= .95; RMSEA= .08).

Next, the results of ANOVA and t-test indicated that Otsuki, sport, health, and female groups had significant higher score than opposite groups in all dimensions. Thirdly, the results of stepwise regression analysis showed that the dimension of interaction alone accounted for 59.2 % of the variance ($R^2 = .592$; $p = .000$) in the first step. The results revealed that service quality for sports together contributed a significant percentage of variance to general value, $R^2 = .70$, $F(4, 522) = 307.30$, $p = .000$. Finally, concerning the results of canonical correlation analysis, it indicated that low service quality evaluations on Interaction (-.81), Access (-.68), Management (-.73), Benefits (-.93), and General value (-.78) were associated with low active aging status on Psychological (-.94), Social (-.80), and Morale (-.76).

Constraints of spectator sport - Focusing on the J League spectators-

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For the professional sport teams, it is important to understand what factors attract the spectators to come to the venue because the gate money is one of the largest incomes for the team. Although there are many research papers focusing on the spectators "attendance," only a few paid attention to the "constraint."

In Japan, "J. League," the first professional soccer league, in which team represents their hometown, was established 20 years ago. In the beginning, the number of spectator grew rapidly, but after hitting the peak, the total number started to decrease. Maruyama (2002) considered organization should maintain the existing customers, rather than using managerial resources for acquiring new

customers. Therefore, the purpose of this study is to reveal what the constraint factors for the soccer spectator's continuous attendance are and verify the differences according to the demographics.

The survey was taken at the official game of J. League Division 2. The items introduced in this survey were used in the leisure studies, and improper for sport spectator scene was erased. 829 surveys were given to the spectators in two teams and 612 were valid responses. The samples were divided into two. Factor analysis was used to clarify the factors reflecting spectator's constraints and reveal the differences according to the demographics.

A performable exercise: The development of Belly Dance in local Taiwanese communities

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In contrast with Egypt or some Western countries where belly dance shows usually occur in nightclubs or ethnic restaurants in big cities targeting foreign tourists, most belly dance performances in Taiwan actually are held as local events. Considering its short history in Taiwan, this study aims first to explore how belly dance quickly spread to so many local communities. The second purpose is to compare the features of these community-based belly dance shows with those that take place in commercial venues. This study employs methods of text analysis and participant observation. The data collected show: First, cooperation between belly dance instructors and the dominant

adult education institute—Community University, which has about 100 branches in all over the island—played a crucial role in the expansion of the dance. Second, while belly dance shows in clubs or restaurants in other countries are generally performed by professional dancers, shows in local Taiwanese events are mostly performed by amateur dancers who are members of community belly dance clubs or nearby dance studios. These amateur dancers see performing as a way of giving support to those local events with poor budgets, through which they also get a stronger sense of being a part of their community.

**A Research of traditional sport rituals of minorities in southwest China
from the perspective of cultural anthropology**

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Chinese Nation, with an immemorial civilized history, has a long history of traditional ethnic sports and deep culture accumulation. As most Chinese minorities scatter in the southwest of China, where there are precious historical cultural recourses of traditional minority sports which belong to the traditional sport treasure of Chinese Nation, the traditional minority sports are of such distinct cultural values as national, regional, recreational and body-building characteristics.

One of the instruments to break the social cultural core is the anthropological study of rituals which opens up a way for research of cultural depth of traditional minority sports. The theme of primitive belief and worship in the rituals of the traditional minority sports

meets both people's needs of entertainment and beliefs. The ritual of the traditional minority sports is a carrier of folk beliefs entrusted with such simple wishes as praying for pregnancy and blessing, favorable weather, no illnesses and misfortunes, good harvest next year, and social peace and prosperity. So an important means to guarantee stability and harmony is the correct guidance of these belief needs existing under the objective circumstances. What's more, through this research, some cultural recourse ignored by China National Games of Minorities could be found in the ritual activities of traditional minority sports. Excavation of such recourse might add new symbolic connotation to the national unity appeal of China National Games of Minorities.

**A new miraculous revitalization of Japan?
A comparative analysis of the 1964 Tokyo Olympic Games,
the failed 2016 bid, and the bidding for 2020**

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This article provides an analysis of the possible relationship between the revitalization of Japan and the hosting of the Olympic Games. It illustrates the great changes that the 1964 Games brought to Japan. It also describes the huge benefits that were expected from the hosting of the 2016 Games, though the bid ultimately failed. Moreover, it describes the huge benefits that are expected from the hosting 2020 Games. The first part of the article shows the main conditions of Japanese economy and society

before the 1964 Games. The second part elaborates on the Games' crucial role in the fast economic and social recovery of Japan. The third part explains the main reason for the failed 2016 bid and the economic vision that did not materialize. The final part discusses the inevitability of bidding for the 2020 Games and compares this with the 2016 bid to emphasize the significance of hosting the 2020 Olympic Games to ensure a new miraculous revitalization on Japan.

Appropriate role allotment of teacher and external coach in the school-based extracurricular sports activity

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Introduction: School-based extracurricular sports activity (SBECSA) has developed as an opportunity that adolescents play sports in Japan. However, lack of teacher who can coach SBECSA expertly, and large imposition of SBECSA teachers to manage SBECSA are reported as issues. For resolving these issues, promoting engagement of external coach is favorable. Nevertheless, there were difficulties to manage SBECSA with external coach such as unclear roles of external coach, and uncooperative SBECSA teachers. Therefore, defining clear role allotment between SBECSA teacher and external coach is necessary. However, appropriate role allotment of teacher and external coach has not been discussed.

Purpose: The purpose of the present study

was to examine the appropriate role allotment of teacher and external coach in the SBECSA, especially from the perspective of the SBECSA members.

Methods: Personal semi-structured interviews were conducted to 23 SBECSA members aged from 12 to 17 who engaged in either a public junior high school or a public high school that have external coach. The participants were from five prefectures in Japan. In the analysis of the present study, the KJ method—a type of qualitative analyses—will be used. Currently, all interview data are transcribing.

Results: The brief results will be introduced at the GCOE symposium.

Gender differences in perceived benefits and walking

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This study aimed at understanding gender differences in perceived benefits through walking behaviour.

This cross-sectional study was conducted with 3000 Japanese people aged between 40 and 64 (1482 male, 1518 female). These participants were asked to complete an internet-based questionnaire which consists of Perceived Benefits for Walking Scale (PBWS) and Walking Behaviour Assessment Scale (WBAS). Participants categorised by walking time (<150min/week or >150min/week) and perceived benefits (low or high group divided by medium value). To identifying gender differences in the relationship between walking behaviour and its related benefits, interaction analysis and logistic regression analysis were utilised with the adjustment of potential confounders.

Regarding to the relationship between walking behaviour and its perceived benefits,

significant gender differences were observed in three benefits: "Energy-saving", "Social connection" and "Positive mind-setting". "Energy-saving" was significantly correlated with walking behaviour among men whereas "Positive mind-setting" was greater among women. "Social connection" was negatively related with walking behaviour among women. Assessing gender differences in specific purposes for walking, "energy-saving" and "Fulfil leisure interests" were more significantly related to transportation walking among men. Unlike transportation walking, "Social Connection" was negatively related with exercise walking among men.

Our results identified gender differences in perceived benefits from walking behaviour. In order to provide a more effective strategy for promoting walking, gender differences should be considered.

**A study of the structural break that spectator's consciousness
by time series data analysis.**

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The purpose of this study was to examine whether the structural break consciousness and expectation of the spectator change with the World Cup held in France (1998) or held in Korea and Japan (2002). This paper assumes that competitive balance ratio(CBR) effects average attendance in J.League(J1). We performed a regression analysis and it examine the structural break point in the person of watching J.League games making use of analyzing the time series data from 1993 to 2011.

As a result, at the time of the World Cup of 1998(France) , the value of F-stastic of Chow Breakpoint Test was 0.769 and the value of probability $F(2,15)$ was 0.481.

The hypothesis that there was not a

structural change is not dismissed as of 1998.

And at the time of the World Cup of 2002(Korea Japan) , the value of F-stastic of Chow Breakpoint Test was 5.027 and the value of probability $F(2,15)$ was 0.021. The hypothesis that there was not a structural change is dismissed as of 2002.

This implied that a structural change was seen at the time of the World Cup of 2002.

The impact of the World Cup 2002 had a big influence on spectator in J.League and promoted a change of the consciousness.

After this time, it is guessed that the consciousness of football spectator varied from an American model to a European model.

Association of physical activity and sedentary behavior with psychological distress among Japanese adults: a cross-sectional study

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The purpose of this study was to investigate the joint effect of physical activity (PA) and sedentary behavior (SB) on psychological distress.

We evaluated PA and SB on risk of psychological distress. We evaluated PA and SB on risk of psychological distress in 785 Japanese men and women (20-75 years old). Psychological distress was assessed using Kessler-6 (K6). PA and SB were estimated using the short form of international physical activity questionnaire short version (IPAQ-SF). Subjects were categorized into sufficient PA/low SB, sufficient PA/high SB, insufficient PA/low SB, or insufficient PA/high SB categories as per "Physical Activity Reference for Health Promotion 2013" and the median of SB. Relative risk of and 95%

confidence intervals for psychological distress prevalence were obtained using the multivariable logistic regression analyses while adjusting for age, sex, body mass index, drinking, smoking, employment status, living with family, social participant.

The category of sufficient PA was negative associated with decreased odds (OR=0.59, 0.34-1.01) and low SB associated with increased odd (OR=0.71, 0.45-1.14). But both associations were not significant. But, using the insufficient PA/high SB group as reference, the relative risk and 95% confidence intervals were 0.37 (0.18-0.79) for the sufficient PA/low SB group. This result suggests that Japanese with sufficient PA and low SB have a lower risk of psychological distress.

Research on the development of Chinese Korean Ssireum Rules

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China is a country that consists of 1 majority and 55 minorities, among these minorities; Chinese Korean is an important one. China's Sixth National Population Census in 2010 shows that Chinese Korean has a population of 1,830,929 in total, which is the 14th top in all minorities of China. Each year Chinese Korean holds wrestling competitions on the Dragon Boat Festival (on May 5th in lunar calendar) and the Mid-autumn Festival (on August 15th in lunar calendar).

Korean wrestling is a unique traditional sport invented by Korean people and its wrestling rules experienced three big changes in history. The study in this article aims to clarify the development

context of the Korean wrestling rules and

identify its specific changes, then analyze the changing reasons and find out the influencing factors, and finally give the advice on the future development of the rules. The author has tripped to Yanji City, which is the capital of China's Yanbian Korean Autonomous Prefecture, and made a fieldwork for three times to collect the information on Chinese Korean wrestling in the following ways: face-to-face talk, taking photos, shooting videos, searching the literature data and making historic investigation, etc. This study bases on a historical and anthropological perspective to read and make an analysis on the literature data and information relevant to the rules of Chinese Korean wrestling.

**A study on the corporal punishment on athletic club activity:
With focus on responsibility for pursuit of victory in the coach**

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Focusing on responsibilities for victory-oriented attitude by coaches who account for the most part of corporal punishments during extracurricular sport club activities in which such punishments have been rampant, we limited subjects in the present study, in particular, to those of baseball clubs which have deep-seated problems of corporal punishments. Objective of the study was to clarify how coaches of clubs in baseball superpower schools or those trying to become such a superpower school, who have been under pressure to pursue victory more than ever, take responsibilities for victory-oriented attitudes based on what kind of logics. We adopted the responsibility

concept set up by Omine et al. (2013).

As the results, it has been proved that coaches in baseball superpower schools or those trying to become such a superpower school take structural responsibilities for their victory-oriented attitudes from a sense of responsibility with obligation generated from victory-oriented attitudes ① in association with participation in baseball as a competitive sport, ② expected by those who are involved in baseball clubs and ③ based on educational logics. It has also been suggested that coaches of baseball clubs have such structural characteristics that victory may be positioned as an aspect to be most evaluated among others.

**Differences in the cognitive understanding of the concept of social harmony
in the national traditional games among ethnic minorities in China**

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In order to protect and promote ethnic sports culture in China, the National Ethnic Games (The Games) were launched in 1953; these Games have been held nine times between 1953 and 2011. Equality, unity, struggle, mutual savings and harmony are important elements for the maintenance of national relationships in China. With that in mind, this study focuses on the 9th Games, held in 2011, with three main aims.

In this study, first, we ask how the Chinese government practiced the ideology of national union and social harmony during the Games. Second, we consider the motivations of local organizers. Finally, we ask: what was

the purpose of athletes at the 9th Games?

Semi structured interview and literature collection was be used in this study.

Our study found that the Chinese government operationalized the concepts of unity and harmony during the National Traditional Games. For the local organizers, the 9th Games were an important opportunity to demonstrate to citizens certain capabilities. For many minority athletes, the motivation to participate came from the opportunity that they saw in the Games to improve their way of life; if they won a large award, they would be able to turn their lives around for the better.

Excitement, moral panic and sportization of motorcycle racing in Taiwan

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This study investigates how motorcycle sport in Taiwan produced its distinction with street racing at its initial phase of development. The concept of sportization and moral panic serve as the main theoretical background for this paper. Sportization indicates that with the refinement of social standard and manner, explicit regulations and stricter rules were also enforced to control the decontrolled of emotion, violence and danger within sports. Since the danger and risk of motorcycle sports was constantly addressed back in 1980s, especially under the outburst of street racing, the examining on the sportization of motorcycle sport in Taiwan may offer some insights to the discussion. Meanwhile, the earlier street racing was not involved with criminality or violent behavior, it was still considered to pose potential risks to the existed social order. This unease

brought stigmatization to “formal” motorcycle sport. This study also intends to examine several incidents that were obstructed and stopped through the theory of moral panic.

Content analysis of newspapers and motorcycle magazines was utilized. The table content of “Autobike” motorcycle magazine from 1986 to 2002 was input and retrieved in several related words. This study found that in order to gain the legitimacy of motorcycle sport, instead of emphasizing the thrill and excitement brought by the racing event, the media and organizers focused more upon the regulation and safety. This contradiction reflects the negotiating process on social regulation and standard of conducts, especially in the post martial law period of time.