12-P-1

Coaches and Scientists Synergy —Ideals in Japanese Forum for Winter Sport Science—

Kuniaki IIZUKA
Japanese Forum for Winter Sport Science, Japan

Japanese Forum for Winter Sport Science established in 1990 has annual meetings where the scientists invite athletes and coaches and have symposium with them. Some of the titles of the symposium and the invited athletes & coaches in recent 10 years are: 26 Sep. 2004 " Top Athletes talk about Sports Science and Support " coordinated by YUKI Masahiro at Shinshu Univ. invited four Salt Lake Olympic athletes including IMAI Hiroyuki, cross-country skier, who was in Olympic Games in 1990,1994,1998,2002. 17 Feb. 2007 " Winter Sports Training " coordinated by KAWAHATSU Kiyonori at Hokkaido Univ. invited MIKATA Reiich, gold medalist in nordic combined skiing at Albertville Olympics 1992, Marja Liisa Kilvesniemi, triple gold medalist in 5,10,20 km cross-country skiing in Sarajevo Olympics 1984, and MORI Satoshi, nordic combined skier in Nagano and Salt Lake Olympics, who is also a forum member. 4 Aug, 2011 " Training Presentation for High School Ski Jumpers " coordinated by MORI Satoshi at Tokai Univ. and YAMAMOTO Keizo at Hokusho Univ. The scientist instantly showed the force curve of the high school ski jumpers themselves and gave them ideas from the scientific viewpoint while the experienced coach gave them instructions. 15 Jul. 2012 " A formula for the victory of Japan Nordic Combined Team in Sochi Olympic Winter Games " coordinated by TAKEDA Masaki, invited NARIATA Shuhei, Nordic combined team director of Ski Association of Japan. The forum includes scientists with Olympic experience and coaches with scientific back ground. The ideal of coaches and scientists synergy held by Dr. WATANABE and the other forum members will be approached by AACS and APCOCS.

Key words: scientific support

12-P-2

Coaching Management of School Sport in Japan

Seki T
Nayoro City University, Japan

The purpose of this study was to consider the evolution of coaching management of school sport in Japan. Firstly, I classified the sport systems of Japan and other countries into three types of "school model", "school and local model", and "local model". The "school model" is for Japan and the United States, and the "school and local model" is for the U.K. The "local model" is for Germany and North European countries. Then I made it clear that school sport in Japan has a specific coaching system. In addition, I devised five periods based on the rules of games with foreign teams from the end of World War Ⅱ to the present. They are "the first period" (1946-1960), "the second period" (1961-1978), "the third period" (1979-2000), "the fourth period" (2001-2010), and "the fifth period" (2011-). I relatively compared these five periods with the setting of periods in the Uchiumi theory and the Nakazawa theory. Although each theory shows a quite different development after the first period (1946-1960), Nakazawa and I regard the year 1978 as a key point. The year 1978 could be considered as a big dividing point in the history of school sport. In this research, I examined the evolution of coaching management of school sport in Japan looking at the previous theories critically.

Key words: five periods school model, Uchiumi theory, Nakazawa theory,

12-P-3

The Origin of the Coaching Consider from a Martial Arts Book of Secrets：Focusing on "Ittosai Sensei Kenpousyo"

Kim H[1], Watanabe K[1]
[1]Hiroshima University Collaborative Research Center Institute for Sport and Health Science

'Japanese budo association' established the budo charter, and showed the directionality of the martial arts in 1987. Through physical and mental training in the Japanese martial ways, Budo exponents seek to build their character, enhance their sense of judgement, and become disciplined individuals capable of making contributions to society at large. It show encouraging others to also strive to better themselves and diligently train their minds and bodies, while continuing to further their understanding of the technical principles of budo and allowing focus to be put on winning or losing in competition, or on technical ability alone. Above all, teachers having a responsibility to set an example as role models as coaching. This is also stressed in the philosophy of Jigoro Kano who thought out 'judo'

from ‘jujutsu’. He thought out philosophy of judo called the ‘kanoism’ from a martial arts book of secrets. In other words, the origin of the coaching in Japan is recognized as deeply staying in a martial arts book of secrets. In late years, the disgraceful affair, including violence and the harassment problem of the leader is taking place in the martial arts world, and the martial arts original coaching that there should be is asked it. Therefore in this study, the special attention was paid to "Ittosai Sensei Kenpousyo" among the early martial arts books of secrets in the early modern times, and consider from the original philosophy of coaching in the martial arts instruction, for better understanding of coaching in the modern society.
Key words: coaching, a martial arts book of secrets, “Ittosai Sensei Kenpousyo”

12-P-4
Teaching Method of Karate at Physical Education in Junior High School
Yamada Y, [1] , Takeda,T. [2] , Tanikawa M,[2] Sato R,[3] Kondo Y [3]
[1]Graduate School of Hokusho University, Japan; [2]Hokusho University, Japan; [3]Graduate School of Hokkaido University, Japan

Karate originated from Okinawa around 1890, based on Chinese martial art. In 1935 Gichin Funakoshi, the founder of Karate, systematized and published the textbook of Karate. Karate is the martial art fighting by only using hands and feet. Karate techniques consist of “punch”, “kick”, “guard”. Karate is played in all over the world. In Japan martial arts, for example; Judo,Kendo,Sumo,are compulsory subject in government guidelines for teaching of physical education in 2012. However, Karate is taught at few junior high school. There are not many researches on teaching method of Karate in junior high school. The purpose of this study is to propose the teaching method of Karate at physical education in junior high school. Method is described as below ;1) Techniques and tactics of Karate are systematized referring to previous study. 2) Teaching theory is organized ; teaching goal, teaching contents, teaching materials, teaching method, assessment.
Key words : Karate, physical education, teaching method, junior high school

12-P-5
Effectiveness of Teaching for Beginner Children in Triathlon
Moriya N
Bunka Gakuen University, Japan

The purpose of this study was to investigate the influence of the teaching program to be able to finish in triathlon safely. In order to examine the validity of the teaching program, the experiment class was conducted for 16 beginner children (2 hours per day, 3 days total). Teaching program objectives was to learn minimum technique and tactics and pace control ability. Teaching program was organized to use safely the school facilities, and education content was comprised with a progressive expanse. Analysis method was evaluation of the learning situation of using video techniques and tactics, formative evaluation by students and sport competence, a measurement of triathlon time.Main findings were as follows.1)Aiming at learning technique and tactics were to learn of many learners.2)Teaching program was embraced favorably by all learners, and perceived physical competence in sport competence significantly improved ($p<0.05$).3)Quantity of pace change in Run part significantly decreased ($p<0.05$).Many learners came to be able to use technique and tactics, but there is room for the improvement in the teaching program.
Key words: teaching program, triathlon, technique and tactics, sport competence

12-P-6
Teaching Program of Skiing for Elementary school
Takeda T [1], Kondo Y [2], Sato R,[2] Yamada Y,[3]
[1]Hokusho University, Japan; [2]Graduate School of Hokkaido University, Japan; [3]Graduate School of Hokusho University, Japan;

Skiing is popular sports at Snowy religion in winter. There are many elementary schools which skiing for physical education in Hokkaido. However, it is increasing such as teachers who are not good at teaching ski. They have not been enough time to spend in skiing. The purpose of this study is to propose the teaching program of skiing at physical education in elementary school. Method is described as below ;1) Techniques and tactics of skiing are systematized referring to previous study. 2) Teaching theory is organized ; teaching goal, teaching contents,

teaching materials, teaching method, assessment. We made the teaching program which elementary school teachers are able to teach ski using it.
Key words :Ski, physical education, teaching Program, elementary school

12-P-7
Research on the Coaching Performance Factors of Expert Golf Coaches
Lim Hyosung, Choi Kwan-Yong
Korea National Sport University, Korea

The purpose of this study was to understand the coaching of expert golf coaches in depth and explore its factors through qualitative study method. In doing so, I attempted to define what is needed for coaching as coaching performance instead of leadership, ability, competence, etc. To perform this study purpose, 3 golf coaches with more than 10 years coaching experience and formal coaching experience of national team or back up national team were selected as study participants and the data were collected through literature review, in depth interviewing, and participant observation. With collected data, inductive categorization was conducted and the results were drawn. The truth of data was secured through triangulation methods, checks between members, peer debriefing colleagues, and author's methodological reflection. Through these study processes, the coaching performance of expert golf coaches were found comprised of a number of factors in combination and the study results are as follows. Firstly, one of the coaching performance factors of expert golf coaches is expertise in own sport. As sub-categories of the expertise in own sport, technique, knowledge, and coaching method were drawn. Secondly, one of the coaching performance factors of expert golf coaches is coach-athlete relationship. As sub-categories of coach-athlete relationship, management, communication, trust, understanding, and support to athletes were drawn. Thirdly, one of the coaching performance factors of expert golf coaches is educational refinement. As sub-categories of the educational refinement, reflective attitude, sense of duty, and coaching philosophy were drawn. Fourthly, one of the coaching performance factors of expert golf coaches is administration and management skills. As sub-categories of the administration and management skills, external relations, and operational office management were drawn.
Key words: golf, coach, coaching performance

12-P-8
Development of a Badminton Coaching Program for Schoolchild Beginners
Kishi K[1], Ushiyama Y[2]
[1]Kyoai Gakuen University, Japan（Doctoral Program, Niigata University）,[2]Niigata University, Japan

The purpose of this study is the development of a badminton coaching program for elementary schoolchild beginners. The author has tackled practical research on badminton beginners over a long period of time. One of these programs was a course of badminton lessons for 18 elementary schoolchild beginners was held for two months between May and July 2012. One 90 minute lesson was held per week and for a total of 9 times. This report shows results of this study and further implications. The badminton coaching program in the study is based on the result of continuous small improvements made to earlier programs. In the program study, important points to mention are the use of special net supports, adjustments made to the height of the net and only using a particular commercially available junior racket. As a result of these advances in the program, individual improvement in skill was found. However, some a point to consider for future programs also emerged. The part of the program which gets children used to the movement of racket and shuttle did not fully develop an improvement in the schoolchildren’s movement. Therefore, implications of this study are to develop the program by introducing the heightening of coordination ability.
Key words: school physical education , task of movement, practical investigation

12-P-9
A Study on the Evaluation Methods of the Skill Acquirement in Artistic Gymnastics.
Mariko Kanaya
University of Tsukuba,Japan

Purpose of the study was to examine the methods required to appropriately evaluate an athlete’s skill acquirement by focusing on training of gymnastics skills. In this study, the coach targeted on a female collegiate gymnast

(Subject N) and examined one particular training aimed to improve her skill towards perfection. The objective of the skill was a “Swing backward and salto forward straddled to hang (Jäger)” on Uneven parallel bars in women’s gymnastics. Despite the fact that it had been approximately five years since Subject N had acquired this particular skill and has shown less consistently in successfully completing the skill. Against this conditions, the study assessed the competency in Subject N’s “Jäger” and clarified the technique components of the skill as a mode to increase stability in succeeding the skill. The study was conducted via morphological movement analysis of the “Jäger” along with an interview process. As a result of the proposed movement analysis, during one of the most important transition phases from “hang” to “rotation”, it became clear that there was a faulty point characterized by a decrease in the angle at the shoulder joint. Through an interview, there was a subjective understanding of “what should be done” in order to fix the faulty movement while executing the skill, yet question related to “how to actually fix the issue” was unanswered. In summary, Subject N was somehow able to execute the release skill; however, there was a lack of perfection in acquiring the preparatory phases that significantly impact on the success rate of the main phase.
Key words: evaluation, skill, gymnastics

12-P-10
A Study of the Coaching Method of “Cartwheel” in Floor Exercise－Based on “Detour” of the Generative Theory of Movement－
Shuto K
Joetsu University of Education, Japan

Noboru Watanabe points out "the detour" presented by Weizsäcker in a report of the hysterics paralytic can be analyzed as agenerative theory of movement. The purpose of this study is to show coaching of "Cartwheel" and to advance new coaching adopting "the detour" theory based on Watanabe's indication. The author instructed four students (sixth graders in elementary school) who cannot do Cartwheel. The author surmised that the problem would lurk in the skill level of a students' handstand. And the author raised the skill of their handstand through a new method based on the sensory similarity of movement. As a result, four students have mastered Cartwheel straightaway. In practice of Cartwheel, coaching for improving the skill is usually carried out within the range of student’s capability. However, present study has revealed that Cartwheel can be attained by raising the skill of a handstand. This can be interpreted as Weizsäcker's "detour" following Watanabe’s idea.One of the important findings of this research is that carrying out coaching based on the sensory similarity of movement rather than carrying out coaching based on the superficial image of target movement. The present study appears to indicate that the "detour" theory is effective as a method of coaching for movement. Moreover, it is important to collect cases of this kind not only for coaching of movement also for coach training.
Key words: detour, generative theory of movement, Cartwheel in floor exercise

12-P-11
A Study of the Method of "Detour" in Coaching of the Backward Roll in Floor Exercise
Yamamoto S[1], Shuto K[2]
[1] Takada-Minamishiro High School, Japan; [2]Joetsu University of Education, Japan

The purpose of this study is to reveal the importance of the "detour" (by Weizsäcker) of a generative theory of movement based on an instruction example of backward roll in floor exercise. The main phase of backward roll is "over-the-head" movement that the body crosses over the head. The example taken up in this research is a backward roll called "crushed" in this phase. Student A (a third grader, elementary school) of this example said, "The neck is painful". This is a typical problem often seen in the acquisition process of backward roll. We demonstrated from the experiment to skilled student that in the process of backward roll she put muscle into the cervix so as the neck joint may not bend too much. Based on this experiment, we made a conjecture that the Student A's "crushed backward roll" resulted from not putting muscle into the cervix. We gave Student A the following instruction that they made "the Daruma-roll" to avoid touching their heads to the mat. Through this practice the Student A can master how to put muscle into the cervix. The Daruma-roll differs in shape from a backward roll. However, we thought that Student A could "the movement of fixing his cervix". As a result, Student A could acquire "the movement of fixing his cervix" and has held that feeling of the movement, and since then he has attained the backward roll.
Key words: detour, generative theory of movement, backward roll in floor exercise

12-P-12

Comparison of Difficulty Operating on Aerobic Gymnastics and Artistic Gymnastics

Uematsu U
Nihon Sport Science University,Japan

International Gymnastics Federation has held a competition since 1994 aerobics competition that is derived from the fitness, source of significant rule changes, advances in mental, technical and physical fitness of the players is remarkable in 20 years. Score is determined by the sum of the arts , execution , and difficulty is the current rule but considered no significant difference in the art point scoring method according to the scale method, that there is a significant impact on the total order of difficulty points using incremental basis as in point using the demerit point system. There are a number of the same as the level of difficulty in the floor of the men and women gymnastics, but there is a big difference in the difficulty rating in the operation with the same phase structure, training programs in each country is not clear in aerobic gymnastics. By analyzing considered difficult operation (motion passed), finds the difficulty evaluation it should be in aerobic gymnastics, this study is a stepping stone for the program production and precise practice more for junior season to learn the basic operation it is intended to make.
Key words: evaluation method , Phase structure , The point of view

12-P-13

Relationship of Physical Fitness Factors to Brain-Derived Neutrophic Factor(BDNF) Among Sports Talent in Elementary School

Jae Kyung Byeon, Hyun Yong Kim, Sun Hee Park, Jae min Yoo, Jin Seon Kim, Hyun Joung Lee, Chenyanling
Chungbuk National University, Korea

The purpose of this study was to examine the physical fitness factors of sports talent elementary school and their BDNF (brain-derived neutrophic factor)-related factors, which were growth factors for cranial nerves, in an effort to determine which physical fitness factors among upper-limb power, muscular endurance, lower-limb power, speed, agility, flexibility and cardiopulmonary endurance would be associated with the BDNF-related factors(BDNF, growth hormone, serotonin, cortisol and IGF-1). When the physical fitness factors of the two groups were analyzed, there were significant differences between the physically gifted group and the ordinary group in upper-limb power, muscular endurance, lower-limb power, speed and cardiopulmonary endurance($p<.001$), and a significant intergroup difference was found in agility as well($p<.01$). But there was no intergroup difference in agility. As a result of making a comparative analysis of the BDNF-related factors, the sports talent group was significantly ahead of the ordinary group in BDNF and IGF-1($p<.05$). As a result of making a correlation analysis of the physical fitness factors and the BDNF-related factors, upper-limb power had a significant positive correlation to growth hormone($r=.361$, $p<.05$) and IGF-1($r=.422$, $p<.01$), and muscular endurance had a significant positive correlation to cortisol($r=.361$, $p<.05$) and IGF-1($r=.423$, $p<.01$). Lower-limb power had a significant positive correlation to BDNF($r=.313$, $p<.05$) and IGF-1($R=446$, $p<.01$), and agility had a significant positive correlation to IGF-1($R=.476$, $p<.01$). Speed had a significant negative correlation to growth hormone($r=-.389$, $p<.01$) and IGF-1($r=-.370$, $p<.01$). In conclusion, the sports talent group excelled the ordinary group in the physical fitness factors and the BDNF-related factors, and the physical fitness factors were partially linked to the BDNF-related factors.
Key words: physical fitness factors, BDNF, sports talent, elementary school

12-P-14

Relationship Between Thickness of Thigh Muscles and Competition Performances in Male High School and College Weightlifters

Akihara Y[1], Oda T[1],Hisano T[1,2]
[1]Hyogo University of Teacher Education, Japan; [2]Osaka University of Health and Sport sciences, Japan

Previous works have reported that the performance of weightlifting is positively correlated to muscle volume of the thigh. But little information is available on the change in the relations between the performance and the muscle volume of the thigh from the viewpoint of cross-section study design. Thus, we aimed to investigate this change in the relation cross-sectionally with respect to weightlifters from high school to college.Male high school (n=23) and college (n=41) lifters participated in this work. Morphology and the muscle thickness(MT) ｛relative to (lean body mass)1/3｝ of the thigh were measured by B-mode ultrasound from 8 sites (ploximal,middle and distal) of anterior of thigh and from 4 (middle and distal) sites of posterior of thigh. The lean body mass and regio femoralis

circumference of ploximal, middle and distal in collage lifters were significantly greater than those in high school lifters.Especially the difference of the circumference in distal portion was greatest. In addition, MT of only VI in college lifters was significantly greater. Correlation analysis showed that MT of VI and lateral portion of posterior thigh was only correlated with the competition performances significantly. Additional analysis of the muscle thickness ratio of RF and VI demonstrated that VI was thicker than RF in 70% subjects. These results indicate the importance to increase circumference of distal thigh, MT of VI and lateral portion of posterior thigh for improvement of competition performance in weightlifters.
Key words: ultra sound, weightlifter, muscle thickness, competition performance

12-P-15
The Influence of Plyometric Weight Training on Biomechanics of Lower Extremity
Shi FY, Liu Y, Jing LX, Fu WJ
Shanghai University of Sport,

The aims of this study were to (1) investigate the changes in muscle strength and power at each joint of lower extremity, kinetics and stiffness of hip, knee, and ankle joints during counter-movement jump (CMJ) with different weights before and after plyometric weight training (PWT); (2) compare each of the joint contributions during plyometric exercises with different weights. Sixteen basketball players were recruited. They were asked to perform the PWT, i.e. 3 groups continued CMJ with the weight of 30% 1RM for 8-weeks with incremental-loads. The subjects performed plyometric exercise (3 trials of counter-movement jump) with different loads percent of 1RM weights determined by squat jump. Before and after an 8-week training program, CMJ performance of each player was also tested by using the motion analysis system (Vicon, 120Hz) and the force plate (Kistler, 1200Hz) for simultaneously collecting kinematics and kinetics data. The results indicated that an 8-week plyometric weight training program could significantly increase jump height, peak GRFv, and power output. The results also revealed that muscle strength and power of hip were dominantly developed during PWT and the enhanced kinetics (moment and stiffness) of hip turned out to be a major factor responsible for the improved jump performance.
Key words: plyometric weight training, lower extremity, strength, kinetics, stiffness

12-P-16
The Relationship Between Center of Mass and Center of Pressure in the Limits of Stability
Toduka M[1], Ibuki A[1], Mani H[1], Hasegawa N[1], Ohashi T[1], Suwahara T[1], Takeda K[1], Itou K[1], Tsuda M[1], Zhao J[1], Asaka T[2]
[1]Graduate School of Health Sciences, [2]Faculty of Health Sciences, Hokkaido University, Japan.

The limits of stability (LOS) are defined as the maximum displacements of the center of body mass (COM) within the base of support. However, in the most of the previous studies concerning LOS, the center of pressure (COP) has been substituted for the COM since expensive equipments are required to measure the accurate COM. In addition, the positions of the upper extremities in these reports have been non-constant. The purpose of this study was therefore to investigate the relationship between the COM and the COP during the maximum leaning of the upright body with varying arm positions (free or cross one's arms) in the forward-backward and sideways directions. Twelve healthy young adults (7 male, 21.5 ± 0.6 years) participated in this study. A force plate and 3D motion analysis system were used to calculate the COP and the COM, respectively. In the results of this study, the maximum displacements of COP (COP_{max}) were significantly longer than that of COM (COM_{max}) in forward and backward directions except sideways. In addition, the average displacements of COM (COM_{ave}) were significantly longer than that of COP (COP_{ave}) in all directions except forward. No significant main effect of arm position was shown in all directions. The findings of this study would improve the understandings to evaluate LOS used by the COP in the clinical area.
Key words; stability limits, postural stability, dynamic balance

12-P-17

Difference of the Relative Distances From Center of Pressure to Center of Mass Between the Young and Elderly People During One-leg Standing

Mani H[1], Hasegawa N[1], Takeda K[1], Nanbu M[1], Totsuka M[1], Tsuda A[1], Itou K[1], Oohashi T[1], Suwahara T[1], Zhao J[1], Shih-Fen H[2], Asaka T[1]
[1]Hokkaido University, Japan;[2] Kaohsiung Medical University, Taiwan.

The purpose of this study was to investigate the effects of aging on the relative distances from the center of pressure to the center of mass (COP-COM) during an one-leg standing (OLS). Twenty-two healthy young (n=11; 21.9±1.4 years) and old (n=11; 68.1±2.2 years) males participated in this study. They were asked to stand as long and steady as possible in the non-dominant lower limb. A 3D motion analysis system and two force plates were used to calculate the COP and the COM displacements in the frontal plane. Acceleration phase (AC) and deceleration phase (DC) were defined as the duration when COP-COM distances were negative or positive respectively. The onset of steady phase (ST) was defined as the COM velocity reached zero. The duration of OLS was measured and the root mean square (RMS) of COP-COM distances (RMS_{AC}, RMS_{DC}, RMS_{ST}) were calculated. The average OLS duration was 19.5±8.9 sec in the elderly group, while the younger subjects were able to last over 30 sec in all trials. Compared with the younger group, the elderly group showed larger RMS_{DC} and RMS_{ST} ($p<0.05$), their RMS_{ST} was also correlated with the OLS time ($r = -0.75$, $p<0.01$) and RMS_{DC} ($r = 0.76$, $p<0.01$). It may indicate that the postural instability in the DC phase causes the instability in the ST phase, and decreases the OLS duration as a consequence. The postural control during the DC phase should be addressed specifically in OLS training for improving postural stability in older individuals.
Key words; postural control, aging, fall prevention

12-P-18

Effect of Plantar Cutaneous Inputs on Center of Pressure During Quiet Stance in Older Adults

Wang Y [1,2], Watanabe K [3], Wan FT [2]
[1] Tianjin Key Lab of Exercise Physiology and Sports Medicine, China; [2]Department of Health and Exercise Science, Tianjin University of Sport, China; [3]Institute of Sports and Health Science, Japan

We investigated the effect of plantar cutaneous inputs on the postural sway during quiet standing in the older adults. Eight healthy elderly subjects stood on a force platform during 30 s without and with mechanical facilitation of sensation from the forefoot (a small coin-shape object under the sole), and their eyes closed. 95% confidence ellipse area and mean velocity of center of pressure (COP), rambling and trembling trajectories in the anterior-posterior (AP) and medial-lateral (ML) directions were analyzed. The ellipse area in the stimulation condition was significantly reduced as compared to the control condition. Significant decreases were also observed in the stimulation condition for the velocity of the COP in both AP and ML directions and for velocity of the TR in the AP direction. These findings indicate that mechanical facilitation of sensation on the plantar soles enhanced the balance performance of healthy older adults. The results may be directly transferable to the design of special insoles to overcome functional difficulties due to age-related sensory loss.
Key words: elderly, sole stimulation, balance, postural control

12-P-19

Development of "Step Balance Training System": Basic Idea and Application

Kazuhiko Watanabe[1], Kazuyoshi Mizusaki[2], Yun Wang[3]
[1]Institute of Sport and Health Science, Janan; [2]Yuge National College of Marine Technology, Japan; [3]Tianjin University of Sport, China

Falling, for example, during walking is mostly risky case in older adults. "step strategy" has demonstrated as one of the most useful ways of postural control for avoidance from disturbance which leads to falling. A new model for postural control has been developed, focusing on "step balance training". The "step balance training" system has devised also for training for example, athletes. The Method is described as follows:1)The function of the "step balance training" system;The shift board able to move the distance of 200mm, and the maximum speed was 400mm/s from 1mm/sec. The stop position of the shift board is changeable at any position which controlled by computer system. 2)Procedure of the "step balance training" ;The direction of the step (forward or backward, etc.) was informed to the subjects at the beginning of the training program. After the subject well adapted to the primary

program (shift board movement), more difficult program was given.3)The definition of posture and postural control, relating “step balance training”; Upright posture and postural control were defined as follows: ‘Static Posture’ of Standing: Standing still, both foot placed on the ground, and keeping stable position. Absolute Static Posture (like statue).Relative Static Posture (with postural sway). ‘Dynamic Posture’ with Standing; Without stepping: Use Ankle, Knee, Hip, and Arm movements for stability, against the disturbance. With stepping: Use Stepping for stability against the disturbance.The adaptation to the shift board (horizontal stimulus) by ‘step strategy’ was well performed in the healthy older adults. In the young students, the step strategy was also demonstrated well on the shift board.
Key words: Posture, training, step, strategy, Postural control

12-P-20
Different Effects of Motor Learning Between Visual and Auditory Feedback Exercises in Dynamic Postural Balance
Hasegawa N[1,3], Sakuma M[1], Mani H[1], Totsuka M[1], Tsuda A[1], Ito K[1], Ohashi T[1], Suwahara T[1], Takeda K[1], Zhao J[1], Shih-Fen H[2], Kasahara S[1], Asaka T[1]
[1]Hokkaido University, Japan; [2]Kaohsiung Medical University, Taiwan; [3]Sapporo Yamanoue Hospital, Japan.

The purpose of this study was to investigate the different learning effects between visual and auditory feedback exercises in dynamic postural balance. Eighteen healthy young adults participated in this study. The subjects were randomly separated into the two groups (n = 9 in each group). The task required the subject to voluntarily swaying their body to match the displacement of the center of pressure (COP) with a visual target as possible during 30 sec of stance. Subjects would receive a feedback information in the format of visual signs (VF group) or beep sounds (AF group) when their COP shifted into a certain range of the base of support. All subjects were required to practice the tasks for 20 times within a day, and they were examined before the practice (pre-test), just after (post-test), and 48 hours later after the practice (retention). The root mean square of the distances from the COP to the target (D_{RMS}) was calculated, and repeated measure ANOVA was used to compare the D_{RMS} under the VF or AF condition across the test sessions. Both VF and AF groups showed significant reduction ($p < 0.05$ and 0.01 respectively) in D_{RMS} at post-test. However, only the AF group could demonstrate such reduction at retention test ($p < 0.01$). The results indicate that using auditory feedback is superior to visual feedback in motor learning of dynamic postural exercise.
Key Words: motor learning, voluntarily swaying, training

12-P-21
High-Speed Power Training: A Novel Approach to Resistance Training in Older Adults
Heejae Kim[1], Donghyun Yoon[2], Wook Song[3]
[1]Health and Exercise Science laboratory, Korea; [2]Institute of Sports Science, Korea; [3]Seoul National University, Korea

Resistance training with strengthening components has traditionally been recommended to improve health and physical function in older adults. Muscle power (force x velocity), or the ability to produce force rapidly, has recently emerged as an important predictor of functions in older men and women and has been the current focus of many RT studies. In the present study, the physiological changes that contribute to the declines in muscle strength and power with aging will be examined. Forty subjects were enrolled into the study. High-speed resistance training group fulfilled a twelve-week program using an elastic band (Green) and was encouraged to perform home-based exercise during the intervention period. The results showed significant increase in the cognitive function, physical performance, isokinetic tests as of digit span forward test (P<.001), digit span backward test (P=.003), and Stroop test B (P=.031), SPPB score (P=.010), right knee 60° extensor peak torque (P=.004), 60° flexor peak torque (P=.001), 180° extensor peak torque (P=.020) and grip strength test (P=.025). In summary, 12 weeks of high-speed power training using elastic bend significantly improve the physical performance and muscle strength with increase of cognitive function in older adults.
Key words: resistance training, power training, muscle strength, frail elderly

12-P-22

The Present Situation and Developing Trend of City Elder People's Physical Lifestyle in China Tianjin

Yan H, Chen L, Ju ZK, Wang R,Wu JP
Tianjin University of Sport, China

Using the methodologies of fieldwork survey, questionnaire on people of four age groups, 40-49, 50-59, 60-69 and above 70 from Hexi District, Tianjin city, this paper tries to make in-depth and overall analysis from the outcomes of the questionnaire and conclude that most of the elderly like to participate in physical exercise, such as walking, badminton, table tennis, hand met smash, community fitness equipment, and etc. They also expressed that they had been benefited themselves from doing it in terms of job, life, body and emotional states. However, some people do not like to participate in physical exercise and the reasons of different age groups vary. In order to encourage more people to participate in physical exercise, this paper then proposes some suggestions and ideas for the development in the future contributing to the cause of local and national fitness.
Key words: Tianjin City, the elderly, physical exercise, participation

12-P-23

Report on the Sustained Exercise Program in the Subsidized Homes for Older People in Japan

Kozakai R[1], Niino N[2, 3]
[1]Hokusho University,Japan; [2]J. F. Oberlin University, Japan; [3]Shisei senior service center, Japan

Appropriate exercises help to improve functional ability in older people with various health conditions. It has been common to recommend exercise for community-living older people. However, for older people in nursing homes it is a much less familiar practice. Also most members of staff in nursing homes have not enough knowledge and experiences of providing exercise. The purpose of the present study was to describe the process of setting up and the effectiveness of the exercise program in the subsidized homes for older people. The participants at the baseline were 50 people aged 60 years and over, who were residents of a subsidized home for the elderly in Tokyo. The intensive intervention program of exercise was conducted for 10 months in 2008-2009. The program had a regular exercise class (once a week for 45 minutes) which included stretching, rhythmic exercise and strength training. The participants were checked for physical fitness, physical activity and health conditions at the beginning and end of the program. Health conditions were also checked at the 1-year follow-up. About 7 staff such as care workers, nurses, a physician and a health fitness programmer supported the program. The care workers trained how to give exercise instructions with the health fitness programmer. After the intensive program, the regular exercise class continues to be run, mainly by the care workers. The exercise class provides an opportunity for trying exercise among older people who have difficulties living at home. The effort of the care workers to learn exercise may be one of the most important factors in sustaining the exercise program in the subsidized home.
Key words: care workers, nursing home, practice,

12-P-24

Effects of the Physical Exercise Program on Longitudinal Changes in Physical Fitness Among the Community-Living Older People in Hokkaido

Ueda T[1] , Kozakai R[1] , Honda R[2] , Ogawa H[3] , Ide K[1], Oda S[1] , Takeda T[1] , Odajima M[1] , Aiuchi T[4]
[1] School of Lifelong Sport, Hokusho University, Japan; [2] Northern Regions Lifelong Sports Research Center, Hokusho University, Japan; [3] Graduate School of Lifelong Sport, Hokusho University, Japan; [4] Nonprofit Organization Center for Social Business Promotion, Japan

Dwindling birthrate and an aging population causes declining population in rural areas and an increasing cost of social security in Japan. This phenomenon is especially serious in the northern prefecture of Hokkaido. The purpose of this study was to assess the effect of physical exercise on changes in physical fitness in the community-living older people in Hokkaido. The participants were a total of 527 community-living people aged 60 years and over, who were residents in A city in Hokkaido. Physical fitness tests were conducted once a year during the period 2010-2013. Grip strength, sit and reach, one-leg standing with eyes open, 30-s chair-stand, functional reach, 10m walking time and 10m obstacle walking time were assessed. A physical exercise program which mostly included muscle training for lower-extremity function, rhythmic exercise and recreational activities was provided once a week year-round in a group setting at the city center. Whether the subjects had engaged in regular exercise, and the name and frequency of the regular exercise was checked using a questionnaire. Subjects who engaged in the

physical exercise program had significantly lower decline rates in 10m walking time and 30-s chair-stand than those who did not engage in the physical exercise program. Physical exercises in our program may help to prevent decline in mobility among older people.
Key words: physical exercise, physical fitness, community-living older people,

12-P-25
The Comparison of Energy Expenditure and Hindlimb Muscle Activities When Using Different Types of Footwear During Exhaustive Walking Exercise
Wook-chul Choi, Byeong-hwan Jeon
School of Sports and Health, Kyungsung University, Korea

This study was aimed to compare the energy consumption and activity of the major muscles by analysis of Surface EMG during exhaustive walking when wearing different kinds of shoes. For this research, 10 males(20's) performed 3 types of treadmill walking exercise with running shoes(RUN), minimalist shoes (MINI), and without shoes wearing(BARE) on different experiment days. There were 2 days of interval between exercise treatments for recovery. A walking exercise program using a modified Balke protocol was implemented until volitional fatigue. Through the exercise treatment results were derived as following. 1. Energy expenditure and oxygen uptake during walking exercise were increased with exercise load and with independence to footwear type. 2. Muscle activation with minimalist shoes showed the highest level compared to the level with running shoes and barefoot during walking exercise. 3. Quadriceps femoris muscle activity during walking exercise appeared higher than other muscles of the hindlimb. The initial tibialis anterior muscle activity was lower, coupled with low muscle fatigue attributed to the gradual increase in exercise intensity before treatment termination. On the basis of these results, considering the activity and fatigue of the muscles segment recruited during exhaustive walking exercise would be more important than the effect of footwear type on the energy consumption and muscle activity.
Key words: walking exercise, energy expenditure, oxygen consumption, muscle activity, EMG

12-P-26
The Kinematics of Barefoot Walking Test Before and After Wearing Unstable Function Shoes for 8-week
Ying-Fang Liu[1], Chi-Huang Huang[2]
[1]Office of Physical Education, Hsin Sheng College of Medical Care and Management, ; [2]Department of Athletic Training and Health, National Taiwan Sport University,

Abstract: The Purpose of this study was to investigate if unstable function shoes would changed the walking posture and gait after 8-week by wearing MBT. There were 18 women 42-year-old and wear MBT 8 hours per day, 5 days per week. And the average steps were 6784 everyday. They did walk 5 trials successfully via 10 Vicon high-speed infrared cameras and 2 Kistler force plates. The kinematics result were included GRF(BW), Tibia/Floor angle(degree), Hip angle(degree), Forward speed(cm/s), One step time(s) and One gait time(ms). The hip angle means flexion-extension angle at mid-stance while walking; positive value means hip flexion and negative value means extension. Most data showed no significantly different except the GRF, the post higher than pretest. The walking posture at mid-stance showed no significantly change beneficial result after wearing MBT for 8 weeks, but the step and forward speed showed accelerate.
Key words: MBT, kinematics, forward speed, gait

12-P-27
The Development of an In-Shoe Device for High-Heeled Shoes
Taira R[1], Shionoya A[2]
[1]Nagaoka University of Technology Graduate School, Japan; [2]Nagaoka University of Technology, Japan

High heels are now commonly used among women because of its high-fashionability. Furthermore, high heels have became a part of business fashion and for this reason, there are many women who wear high heels with feeling pain and fatigue on lower limb. According to the previous study, it is reported that more than half of women complain a range of symptoms including foot pain and shoe sore even when they wear competitively-low heeled shoes. Although women should avoid wearing high heels for many hours, choosing correct shoe size that fits to own foot and improving the gait could prevent pain and fatigue. In this study we focus attention on the gait of walking with

high heels and purpose a development of an in-shoe device to measure a sole pressure in high heeled shoe. The device is mainly composed by some pressure sensors and microcomputer. It can be used to monitor plantar pressure and is expected to contribute to improving the women's gait during walking in high heels.
Key words: high heels, gait, plantar pressure

12-P-28
Are Compression Shorts Beneficial for Jump Performance During Drop Jumps?
Lu ZQ, Fu WJ
Shanghai University of Sport, China

The purpose of this study was to investigate the effect of compression shorts on jump performance (height), hip joint angle, hip joint moment, and hip joint stiffness during drop jumps from three different heights. Twelve male basketball players were recruited for this experiment. All were requested to wear two types of shorts [nylon-elastane compression shorts (CS) vs. loose fitting shorts (as a control condition, CC)] to execute three trials of maximal effort drop jump from each of height (30, 45, and 60 cm) from a custom-made platform. A VICON motion analysis system (120 Hz) and two 60 × 90 cm force plates (Kistler, 1200 Hz) were used to collect kinematics and kinetics data simultaneously. The commercial compression shorts adopted in the present study did not improve jump height during drop jumps from three heights. However, the tight and compression fit results in a great change in hip joint kinematics and a considerable moment generated by the hip both in flexion and extension phases during 60 cm drop jumps. Future research is warranted to investigate this effect in jumping events (e.g. high jump and long jump) and further confirm the role of compression apparel on joint stiffness as well as performance benefits.
Key words: compression shorts, drop jump, jump height, hip kinetics

12-P-29
Proposal of Inexpensive and Portable Apparatus for Jumping Movement
Yamamoto K, Matsuzawa M
Hokusho University, Japan

In many sports, the jump movement is one of the important basic movements. It is useful to analyze the jumping ability dynamically to perform a training effectively. However, the opportunity of the dynamic measurement is limited in daily training because expensive measuring equipment represented by a force platform is necessary to quantify the jump movement dynamically. Therefore. For this problem, this study aimed to propose the inexpensive and portable apparatus for jump movement. The Wii balance board (WBB, Nintendo Co., Ltd.) was used as force sensors to measure a jumping force and weight distribution. The WBB has four strain gauge force sensors under each corner of the board. The measurements by these sensors were transmitted to a Windows PC via Bluetooth wireless technology. The signal processing and screen display were performed using the custom-written software with Actionscript 3.0 (Adobe systems Software Ireland Ltd.). The vertical ground reaction force (vGRF) was calculated by summation of the measurements of four sensors. The position of center of pressure (COP) was computed by the weight mean of four force data. The force-time curves of vGRF and path trajectory of COP were depicted on a PC monitor in real time. According to Yamamoto and Matsuzawa (2013), a WBB can take measurements with precision of less than 2%. Using this system, athletes and coaches could confirm the force exerted (vGRF) and the weight position (COP) in real time during training. The proposed system was constructed only with a PC, a WBB, and a Wii Remote controller. The apparatus necessary for this system would be obtained for approximately USD$100 except a PC, and total weight was less than 4kg without a PC.
Key words: Wii balance board, ground reaction force, center of pressure, dynamic measurement

12-P-30

The Effect, Observing Oneself Exercise While Following an Exercise Video, Has on the Quality of Exercise Movements.

Kouchi E[1], Shionoya A[2]
[1]Nagaoaka University of Technology graduate school, Japan; [2]Nagaoka University of Technology,Japan

It is well-known that obesity can lead to various diseases. According to the World Health Organization (WHO), obesity in the world has doubled since 1980. Obesity is no longer a problem in developed countries alone. Lack of exercise is considered to be a major factor. Typically, people go running or go workout at a training gym to get their exercise. Recently, a lot of people watch and follow exercise videos at home at their own leisure. However, in many cases, joint angle and position of the body while exercising are major factors to consider in order to maximize the effect of an exercise. Where an exercise instructor is not around to point out the critical points to follow while exercising, it is often difficult for people exercising on their own to achieve good results. In some cases, wrong methods of exercising can result to an injury. In this study, we propose a system which enables the person exercising to see his/her image exercising and at the same time watch the exercise video. We will have two groups. One group will exercise following the exercise video only. The other group will follow our proposed procedure. We will make them exercise three times for one minute. After that, we will use an image analysis software to compare the joint angles and speed of movement of those exercising. In this way, we will be able to verify the effect that simultaneously watching oneself exercise while watching an exercise video has on the quality of exercise movements.

Key words: training, Sports Mirror, image analysis

12-P-31

Using Smartphone as Coaching Method to Promote Physical Activity Level and Exercise Participation.

Kim Hak Kyun, Kim Yeon-Soo
Seoul National University, South Korea

To promote exercise participation and increase physical activity level is an important issue in industrialized countries to reduce the risk of metabolic disease. As dramatic changes in modern lifestyle, the new technology gives unique opportunities to overcome barriers of physical activity. The purpose of this study was to identify the Smartphone application coaching program can increase physical activity level and exercise participation frequency. Participants were divided into three groups of control (ExA, n=23), smartphone exercise group (ExB, n=30) and exercise with self-recording dairy group (ExC, n=17). Before and after 6-week of experimental period, their physical activity level were assessed by accelerometer and completed International Physical Activity Questionnaire (IPARQ). Participants were encouraged to 30-min dairy exercise and check their exercise participation via smartphone application and self-recording dairy by their groups. Comparisons between groups were made using two-way ANOVA with repeated measures and t-test for exercise participation. The exercise participation rate of smartphone group was significantly higher than self-record group (26 times Vs. 16 times, p=0.039). The physical activity level of smartphone group was significantly increased comparing with control group (p=0.037) but there were no significant difference between smartphone group and self-record group (p=o.411). Smartphone exercise coaching program was a useful tool to increase in physical activity level and exercise participation numbers. Self-recording dairy also can be used to promoting physical activity level and exercise participation. Future studies need to examine more exercise promoting content in smartphone application could resulting in increasing physical activity and exercise participation rare over the long term period.

Key words: Physical Activity Promotion, Exercise Participation, Smartphone Exercise Application

12-P-32

Pointing Practice Enhances the Adaptation of Walking with Prism Glasses which Cause Right-left Reversal of the Visual Field

Iwatsuki H, Yurugi Y, Bunno Y, Nakamura A, Sakamoto M
Graduate School of Aomori University of Health and Welfare, Japan

Unilateral spatial neglect is a behavioral syndrome occurring after a right-hemisphere stroke. Treatment for spatial neglect focuses on cognitive rehabilitation that uses prism adaptation therapy as one approach. However, this

therapy has limitations both in terms of its narrowness of focus and duration of the beneficial effects. This study was carried out to evaluate the effects of pointing practice on walking performance looking through a right-left reversing prism. The participants were fourteen right-handed healthy persons with a mean (SD) of 26.3 (7.1) years. They put on prism glasses causing right-left reversal of the visual field, and were asked 30 times to point to targets placed 3m in front using a laser pointer. Timed up and go (TUG) test and walking around the edge of a 3m square (SW) were used to measure walking performance and were evaluated 3 times (before, immediately after and 5 mins after the pointing practice). The required times, both TUG and SW, recorded immediately after and 5 mins after the pointing practice were significantly shorter than that of before. In particular, the deviations from the walking path in SW showed significant differences between the values recorded immediately after and 5 mins after the pointing practice and that of before. Improvement of walking performance with a prism after the pointing practice might have facilitated adaptation between mediated proprioceptive perceptions and visual information. The efficacy of single-session prism adaptation suggests general improvement of daily activities in patients with unilateral spatial neglect.
Key words: Prism adaptation therapy, Pointing practice, Walking performance

12-P-33
Effect of the Rest Interval on Physiological Response During the Battling Rope Interval Exercise of Judo Players
Kubo J, Palka R
Heisei International University, Japan

Judo is a combat sport that requires a high level of various types of physical fitness. In particular, strength and power of the upper body is required. Recently, various sports athletes use battling rope exercises. In their training, battling ropes are a relatively new exercise that improves the strength, power and endurance of the upper body. The purpose of this study was to investigate the effect of rest interval time on the physiological response during battling rope interval exercise of judo players. Ten university male judo players participated in this study. The exercise time was 20 sec and interval times for rest were 15 sec, 30 sec, and 60 sec. Heart rate was measured during exercise, and blood lactate was measured immediately, 3 min, and 5 min after exercise. Our results suggest an effective protocol for the use of battling rope interval exercise in the training of judo players.
Key words: judo, blood lactate, heart rate

12-P-34
Effects of High Intensity Interval Exercise on Visuospatial Attention – a Pilot Study
I-Fan Chen[1], Chen-Kang Chang [2], Huey-June Wu[1]
[1]Graduate Institute of Sport Coaching Science, Chinese Culture University, Taiwan; [2] Sport Science Center, National Taiwan University of Physical Education and Sport, Taiwan

The aim of the present pilot study was to investigate the effect of central fatigue induced by high-intensity interval exercises on the visuospatial attention and reaction time. Six intercollegiate male athletes (age 19.7 ± 8.3 years old, weight 67 ± 9.1 kg., and VO_2max 59.6 ± 8.8 mL/kg/min) underwent high-intensity interval exercises (20-min sprint in 65% VO_2max; then 2-min sprint in 85% VO_2max and 3-min sprint in 65% VO_2max, repeated 8 cycles) to elicit peripheral and central fatigue. The covert orienting of visuospatial attention task (COVAT) was used to evaluate the visuospatial attention and reaction time before and after exercise. The inhibition reaction time in upper limbs and all limbs was significantly worsen after the exercise, indicating a decrease in visuospatial attention. There was no significant difference in simple reaction time. The present findings suggested that the high-intensity exercise may decrease the visuospatial attention performance, but have no effect on reaction time. The COVAT method appears to be a suitable method to measure the changes in visuospatial attention after exercise in athletes.
Key words: covert orienting of visuospatial attention task, inhibition reaction time, central fatigue

12-P-35

Study on Feeling of Group Effect in the High School Volleyball Player

Enokito S[1], Endo T[2], Kondo K[1], Ikeda S[1], Iizuka S[1]
[1] Daito Bunka University graduate school, Japan;[2]Daito Bunka University, Japan

The purpose of study was team sports, it is thought that the psychological factor at the group level is important as well as a personal level. One of the psychological factors at the group level includes "a feeling of group effect". Kawazu and others (2012) and Serizawa and others (2008) state that a feeling of group effect affects the competition results and the performance. However, it is not supposed a study in a specific event. Therefore, in this study, I paid my attention to a feeling of group effect of the high school volleyball player and was intended that I clarified the characteristic. I performed inventory survey for 477 high school volleyball player men and women (208 boys, girl 269) using CES-JHSA (feeling of group effect standard for member of high school athletic club).As a result of analysis, significant difference was recognized in "ability display", total understanding and showed the score that non-regular group was higher in than regular group again. Because oneself thinks that it is possible than regular group in the non-regular group having few opportunities to participate in a game without awareness, recognition being still done by an opponent how much is used, it is guessed when a difference was seen in a feeling of group effect. Furthermore, a feeling to want to become a regular is strong and is guessed when overconfidence that oneself can contribute to the team may influence a feeling of group effect.

Key words: volleyball, CES-JHSA, regular group, non-regular

12-P-36

Examining Skill Correction, Focusing on Identifying the Difference Between Erroneous and Correct Movements-Old way/New way

Yoshida S[1], Minouchi Y[2]
[1]Conditioning Lab, Japan; [2]Hokusei-Gakuen University, Japan

It takes a long time to correct habitual errors. Athletes sometimes revert to their old, incorrect movements when they are in high-pressure competitions. The purpose of this study is to examine the effectiveness of rapid movement corrections and performance improvement through Lyndon's (1989) old way/new way, which can be used to learn a new skill by reviewing video recordings of their own movements and then identifying the difference of movements by contrasting the old, erroneous ways to the new, correct ways. A weightlifter, who has been working to correct a technique problem, used this method one month prior to a game. To achieve movement correction in the quickest way possible, the following procedures were completed: error analysis, recognition of the erroneous movements, correction of the erroneous movements, identification of the erroneous movements and the correct movements, verifying the desired movements, and reviewing the games. As a result, Athlete A corrected 100% of his movements at a game, which is verified in the video recordings. His record shows that snatch (S): 100 kg and jerk (J):120 kg at the game; the results were close to his self-record. Athlete B corrected 100% of his movements at a game, which is verified in the video recordings. His record at the game was (S): 93 kg and (J):103 kg; he made a new self-record. The evidence suggests that the athletes who used old way/new way corrected the erroneous movements efficiently, and their improved abilities were demonstrated with the corrected movements at the games. Therefore, this method is considered to work effectively.

Key words: Old way/New way, Skill Correction, Self-analysis, Performance,

12-P-37

A Method of Psychological Conditioning for Competition

Minouchi Y.
Hokusei-Gakuen University, Japan

The purpose of this study was to examine a method of psychological conditioning for competition. Specifically, the effectiveness of a method to create the optimal psychological condition for competition by monitoring the emotional state was verified. The emotion monitoring applied IZOF theory (Hanin, 1997) was conducted by controlling the antecedents of emotions.

The subject was a male cross-country skier of Japanese top-leveled. First, we identified performance-related emotions by comparing the emotion-profiles between the best performance and the worst performance in previous season. So, we considered about the antecedents of the emotions and tried stabilizing the emotion states by managing the antecedents of the emotions.

There are clear differences in emotion profiles between the best performance and the worst performance. It was found that “vitality” and “exhausted” greatly influenced to performance. “Good preparations”, “take a break properly” and “nutritious meals” were considered as the antecedents of “exhausted”. The controlling of the antecedents was conducted for competition. As a result of the managing in the competitions, it seemed that the controlling the antecedents contributes to stabilize the emotion states and that leads to enhance sport performance. These results and subject’s introspections suggested that it was useful to manage the antecedents of the emotions for psychological and physical conditionings for competition.
Key words: psychological conditioning, IZOF model, emotion control, cross-country skier

12-P-38

To Investigate the Relationship Between the Mental Condition of Judoka During Preparation for a Competition and Coaches’ Evaluations of Their Performance in That Competition

Hiraoka H[1], Ishii T[2], Fjita Y[2], Okada H[2], Masuchi K[2], Komata K[2]
[1]Ryotokuji medical college, Japan; [2]University of Tsukuba, Japan

To obtain suggestions for effective coaching, the present study aimed to investigate the relationship between the mental condition of judoka during preparation for a competition and coaches’ evaluations of their performance in that competition. The Profile of Mood States – Brief Form was used to objectively determine participants’ mood states. Coaches were asked to rate the participants’ competition performances on a 10-point scale ranging from 1 (completely unable to perform) to 10 (performed extremely well). Participants with lower performance rating scores (the low score group) had decreasing tendencies regarding mental condition, while those with higher scores (the high score group) showed increasing tendencies. The present findings suggest that it is necessary for coaches to adequately evaluate the mental condition of judokas in the run up to a competition.
Key words: Profile of Mood States (POMS)

12-P-39

Longitudinal Validation on Factors Affecting the Collective Efficacy Scale for Basketball

Ikeda E[1], Iwai K[2], Yoshida K[3], Uchiyama H[3]
[1]Graduate School of Comprehensive Human Sciences, University of Tsukuba and Center for Medical Sciences, Ibaraki Prefectural University of Health Sciences, Japan; [2]Center for Humanities and Sciences, Ibaraki Prefectural University of Health Sciences, Japan; [3]Institute of Health and Sport Sciences, University of Tsukuba, Japan

Collective efficacy (CE) is a key factor for understanding the function of organizations or groups. Most researchers advocate that CE has a close relationship with performance. Previous studies in sport psychology, both domestic and international, have been confirmed the high utility of the concept of CE. However, these studies have not derived valuable findings with potential application in the field of sports coaching. Especially, it is necessary to examine that identification of resources affecting CE and gather the longitudinal data. Therefore, the purpose of present study was to investigate the changes in CE and factors that may affect CE. The participants were 38 varsity athletes (19 women, 19 men) of 3 different basketball teams. CE was measured by the Collective Efficacy Scale for Basketball (CESBO) developed by Ikeda et al. (2013). Team performance was measured using indices and equations in “notational game analysis”. The questionnaires were administered 4 to 8 times during the Kanto Collegiate Basketball Leagues in 2013. Repeated-measures ANOVA and Bonfferoni post hoc test showed that the scores of CESBO subscale were significantly increased or decreased in response to the influence of performance, with larger effect sizes ($p < .05$).
Key words: collective efficacy, group function, team performance, group dynamics, effect size

12-P-40

The Influence of Teammate to Motivational Climate in High School and College Baseball Team - Focusing on the Intra-Team Competition -

Hirama K[1], Sagawa M[2]
[1]Sapporo International University(part time), Japan; [2]Hokkaido University of Education Iwamizawa, Japan

The purpose of this study is to examine influence of teammates on motivational climate of high school and college baseball teams, to find relationship between motivational climate patterns and intra-team competition and to contribute to improve teamwork and motivation of team members. The study was done on 333 male athletes (153 high school players with their age of 16.30 ±0.74 years old; 180 college players with their age of 20.19 ±1.35 years old) belonging to the 4 high school and 5 college baseball teams in Hokkaido. The research was carried out to ask each baseball team to fill out a questionnaire that I had made for the study. The contents in the questionnaire were based on their individual profile, such as ages, gender, and so on, and some questions to measure motivational climate of the team and to understand the interaction among the teammates. From the research, I found the following results: In case some players in the teams show unfavorable attitudes toward the other teammates or some players who are physically gifted don't feel the need to practice, these negative factors often influence strongly the players' performance climate. Intra-team competitions develop not only performance climate but also mastery climate. There is a possibility that promote the autonomy of the players by teammates to help each other progress. This suggests that improvement of both mastery climate and performance climate is lead by consequence of effort to produce higher performance, not comparison of one's talent.
Key words: teamwork, motivation, mastery, performance, effort, talent

12-P-41

Combination for Scoring in Lin Dan and Lee Chong Wei

Chen Zhouye
School of Physical Education and coaching, Shanghai University of Sport, Chaina

Lin Dan and Lee CHongwei are the most outstanding men's singles badminton players in the world. We analyzed Lin and Lee in the recent 3 games by observation, the men's singles final of 2010 Asian Games, 2011 World Championships and 2012 Olympic Games. We found that, although Lin and Lee were different in style of play, Lin Dan mainly used for pressing Lee to the backcourt and got chance to assault, LEE more inclined to create opportunities near the net for assault. But they were very similar in the way of scoring. 1.Lin and Lee mainly created opportunities to attack for scoring at the forecourt near the net, the proportion is over 50%. Combined technical methods were as follows: drop and net shot or push, drop and attack, or push and attack.2.Secondly the backcourt, combined technical methods are as follows: attack and net shot or push or cross clear,gently attack and assault. 3.The common characteristics of the above methods showed that, aggressive consciousness and the coherence of technology combination, changing the rhythm and changing speed of action for sudden attack were the important factors.
Key words: badminton, technical combination

12-P-42

A Clarification of Tactical Behavior Using Sequence Analysis in Ball Game

Ichimura S[1], Moriguchi T[2], Shimizu N[3]
[1] Tokyo University of Science, Japan; [2] Kagoshima University, Japan; [3] International Budo University, Japan

Recent studies have used a notational analysis to analyze performance in ball sports. In generally, a notational analysis could assess the total tactical behavior and the important aspects of the game to evaluate the single actions. In order to gain deeper insight into the tactical behavior of the individual and team, it is necessary to record the multiple tactical actions and to analyze the sequence of attacking play actions in chronological order. This study used the sequential analysis to examine the attack aspects of offense set-play in team handball. There were analyzed the offense set-plays of women's teams in 2012 London Olympic games. We categorized 5909 attacking play actions out of 1631 offense set-plays, were performed by 25 games from five nations. The attacking play actions during the offense set-play were classified into the 12 types of attacking play actions, according to the moving and throwing directions on previous player and the attacking direction of player while receiving a ball. We lined up the multiple attacking play actions in a cl er during each offense set-play. The sequence of

attacking play action during offense set-play was divided into the sequence codes of two, three, four, and five characters (alignment). In this study, the specific sequence codes of combined multiple attacking play actions in offense set-play existed to perform the sequence analysis in team handball. This new analysis method using sequence analysis might provide the evaluation of the characteristic of the offense set-play in team handball and the specific offense set-play for each team.
Key words: notational analysis, team handball, alignment

12-P-43
Comparison of Trainings for Young Players in European Handball
Yamada E
University of Tsukuba, Japan

The purpose of this study is to reveal training regimens in terms of the contents and methods of shooting-play in Serbian and Croatian women's handball teams. Regular training sessions of those teams during the competition period are selected for comparison with the previous study (Japanese, Danish, and Norwegian teams). As the results of previous study, the Danish and Norwegian training sessions were covered the reaction of the defender and the connections of shooting-play-elements and attack processes. On the other hand, the Japanese training sessions included more time practicing individual techniques, and the women tend to practice separately with regard to shooting-play-elements and attack processes. The researches in Serbia and Croatia will be done until June 2014. So the results of this study will be presented at the conference.
Key words: Handball, training regimen, attack, techniques training, skill training

12-P-44
Development of New Support Implement and Teaching Technique in Gymnastics
Hirota S
Hokusho University, Japan

The characteristic of the pommel horse in gymnastics is that the most movement is performed by the rotational movement of both legs on horizontal plane. However, in recent years, the elements of the Rotational Handstand in vertical plane composing the rotational movement of both legs on horizontal plane are appeared in International competitions. The purpose of this study is to develop new support implement which is able to teach the Rotational Handstand in vertical plane effectively. New Support Implement is made of steel, and most characteristic is that the butt of New Support Implement is able to be adjusted higher than normal one. Using this New Support Implement, gymnasts of university who had not mastered the Rotational Handstand, mastered the Rotational Handstand effectively.
Key words; Gymnastics, New support Implement, Rotational Handstand

13-P-1

Criteria for Defining National Olympic Success: A Delphi Study

Margaret TANG[1], Chin-Long YANG[2]
[1]Department of Exercise and Health Promotion, Chinese Culture University, Taiwan; [2]Department of physical Education, Chinese Culture University, Taiwan

The definition of national Olympic success is a debatable issue. Traditionally, people judge a nation's elite sport achievement by the number of medals won at the Olympic Games. This is despite the fact that using the traditional medal table to judge national Olympic success for countries is neither fair nor legitimate. In order gain insight into alternative definitions, a new attempt was made to probe stakeholders' viewpoints. Data were collected through the Delphi technique and participants included 32 sport experts in Taiwan. A four-round Delphi survey was undertaken using electronic questionnaires. Tweleve issues were identified by Taiwanese stakeholders to be important for Taiwan to define national Olympic success. Specifically, the interviewees ranked i*ncreasing international exposure and building up national reputation, promoting athletes' social status*, and *winning more medals across a number of sports* as the top three priorities. General conclusions based on the Delphi results suggested that the definition of Olympic success can be measured in quantitative terms (traditional values) and qualitative terms (additional values). In discussing the stakeholders' consensus from these perspectives, it is clear that the emphasis on traditional values were still a dominant feature in Taiwan. Notwithstanding, the additional values associated with taking part in the Olympic Games, such as political values, socio-cultural values, educational values, economic values, and organizational values were also noted by the stakeholders.
Key words: high performance sports, environmental influences, organizational theory

13-P-2

The Beneficial Effect of Tai Chi on Muscle Strength, Range of Motion, and Depression of Rheumatoid Arthritis Patients

Ji Sun Oh, On Lee, Bong kil Song, gwi taek Park, young sin Kim, Jung ha Lee, Jae Hee Kim, Jung Jun Lim, Myoung hwee Kim, Joon Sik Kim, Yeon Soo Kim
Health and Exercise Science Laboratory, Seoul National University, Korea

The goal of treating Rheumatoid Arthritis patient is to protect their joint and muscle strength and to regain ability of their daily task function. The exercise Tai-Chi is recommended method to protect range of motion of joint and to maintain muscle strength. The purpose of this study was to find out the effect of Tai-Chi exercise on muscle strength, range of motion, and depression of patients with Rheumatoid Arthritis. Thirty one female patients aged 55-71 with rheumatoid arthritis were recruited from a regional hospital in Korea. Twenty three people were in the experimental group who had been practicing Tai-Chi exercise for 14 week and eight people were in the control group. Before and after the experiment, both groups were tested for lower muscle strength with MMT(Manual Muscle Test), Range of Motion with goniometer, and the level of depression with GDS-K. The collected data were processed with SPSS/WIN 20.0 program and analyzed by the frequency, percentage, chi-square test, and ANOVA with repeated measures. After 14-weeks of Tai-Chi exercise, we found that lower muscle strength was a statistically improved and elbow extension ROM shows significant decrease in experimental group ($p<.05$). Both forearm's supination and pronation and elbow extension ROM were statistically improved. On the other hand, there were no significant improvement in the control group. Lastly, the level of depression was significantly decreased in experimental group. This study shows that the practicing Tai-Chi exercise can be beneficial on improving muscle strength, range of motion, depression of middle aged women. Thus, it can enhance the quality of life of elderly people and Tai-Chi exercise can be effective nursing interventions for rheumatoid arthritis patients.
Key words: Tai Chi, Muscle Strength, Range of motion, Depression, Rheumatoid Arthritis

13-P-3

The Study of Process to Join the Deutschland Table Tennis on Taiwanese Elite Player

Wei-Chin Huang, Han- Dau Yao ,Mei- Hua Tu
National Taiwan Sport University,Taiwan

The purpose of this study was to explore the process of the Taiwanese elite players who had been to the Deutschland table tennis league, inclusive of eight talented players who had been to the Deutschland table tennis league from 2000 to 2011. Qualitative research method was used as the research method, and semi-structured was

used in in-depth interviews. This study found that: 1. The process of the player joining the league: (1) Before the league start, well communication was necessary. (2) During league period, normal training was hold high quality and shorter time in first class club. (3) After the league, renew the contract or not, as well as for the adjustment of home training, each player's situation was different. 2. Preparation process was complicated. It was better to get for professional manager's help. Language ability were the common problem for the players. 3. It encourages the players mentally and become more stable if his skill makes significant progress in continuity. The conclusion was well preparation in advance enhances the Taiwanese elite players who participated in the Deutschland table tennis league technical and mental ability, showing the positive value.

Key words: Deutschland Table Tennis League, Table Tennis Player, Qualitative Research.

13-P-4

A Preliminary Investigation of Current Status on Career Planning Amongst Professional Basketball Players in Taiwan

Wei WEI[1], Margaret TANG[2]

[1]Graduate Institute of Sport Coaching Science, Chinese Culture University, Taiwan; [2]Department of Exercise and Health Promotion, Chinese Culture University, Taiwan

The present study investigated athlete career planning amongst professional basketball active players in *Super Basketball League* (SBL) in Taiwan. Specifically, it probed the topics of professional basketball players' attitudes towards education, training, and future career prospects. This study used a quantitative survey questionnaires developed in consultation with key stakeholders. The registered basketball players (n=115) in the 2014 season from seven teams (namely, Taiwan Mobile, Da-cin Tiger, Taiwan Beer, Taiwan Bank, Yu-lon, Kin-mem Kaoliang Liquor, and Pure-Youth) were invited to participate and the questionnaire survey achieved a response rate of 83.4% (n=96). The data were analyzed using frequency, percentage, t test, and one-way ANOVA. The results of this preliminary investigation showed that the average age of SBL players was 27.38. Over 40% of the respondents played only 1-3 years in SBL. Among all respondents, only 9.4% were connected with aboriginal identity and 84% obtained a university degree. In the respect of current staus on career planning, the majority of SBL players (86.4%) reported that they enjoyed their career as a SBL players. There were 37% of players reported that they would prefer to deal with their post-basketball career when their SBL careers end. The study revealed that the majority of SBL players placed high value on actively preparing for a career after basketball and had high levels of awareness of the need to prepare for a post-baseball career. Based on the results, a number of specific recommendations for SBL players and related sport organizations were given.

Key words: Super Basketball League, professional athletes, career transition

13-P-5

Athletic Career Transition: Ex-Swimmers' Experiences of the Sports System in Taiwan

Sheng-chieh TANG[1] , Margaret TANG[2]

[1]Graduate Institute of Sport Coaching Science, Chinese Culture University, Taiwan; [2] Graduate Institute of Sport Coaching Science, Chinese Culture University, Taiwan

Previous research on athletic career development and/or transition indicated that athletes tend to have difficulty immersing their lifestyle into the societal norm after the termination of their athletic careers. Nevertheless, a review of literature showed that there was a lack of relevant empirical evidence to support these claims. This study made an attempt to explore how the retired elite swimmers in Taiwan perceived the roles of the sports system in assisting their athletic career transition. This study applied a qualitative design. Four retired swimmers (3 males, 1 female) were invited to participate in semi-structured interviews. Four themes emerged from the analysis of qualitative data. Participants reported a lack of support from the system both financially and emotionally as pivotal in their decision to end the athletic career. The continued struggle for direction in their roles as athletes, coupled with recurring disappointment from the system's support, led to early termination. Recommendations were made for future sport system to be more objective in governance to continue attracting talents and promoting the sport.

Key words: career planning, elite swimmer, sport policies

13-P-6

Parental Support of Physical Activity and Its Effect among College Students– Examination of Physical Exercise Habit –

Konno R, Sakuraba K, Yokoyama K
Juntendo University, Japan

The purpose of the current research was to examine the support of physical activity that college students have received from their parents and to investigate its effect on physical exercise habit. Participants were 322 first year college students who are in college of health and sports science and medical school (male = 186, female = 136; mean age = 18.9, SD = .65, range 18-21) and 492 parents of those students (fathers = 226, mothers = 266; mean age = 50.1, SD = 4.09, range 38-65). For students, their exercise habit was assessed. For parents, the parental support of their children's physical activity and their own exercise habit were examined. The result showed that the support of physical activity was different depending on parental gender and their own exercise habit, and related to students' exercise habit. The study indicated that parental interests on exercise, their actual exercise, their suggestions for children' exercise, and their encouragement were effective to form exercise habit of their children.
Key words; fathers, mothers, regular exercise, gender difference

13-P-7

Morphological Characteristics of Lower Limb in College Track and Field Athletes

Hisano T[1], Kusumoto K[2], Akihara Y[3], Iwasaki M[1], Edamatsu C[2], Ishikawa M[1] ,Oda T[3]
[1] Osaka University of Health and Sport Sciences, Japan; [2] Kurashiki University of Science and The Arts, Japan; [3] Hyogo University of Teacher Education,Japan

The purpose of this study was to investigate morphological characteristics of lower limb in sprinters (SR), long-distance runners (LDR) and throwers (TH), and to compare the differences. Twelve SP (20 ± 1 years, 173.2 ±5.3 cm, 61.5 ± 5.4 kg), 12 LD (19 ± 1.3 years,171.3 ± 6.9 cm,56.3 ± 6.9 kg) and 8 TH(20 ± 0.6 years, 173.1 ± 6.1 cm, 84.6 ± 3.6 kg) participated in this study. The thigh and lower leg length, fascile length and pennation angle of gastrocnemius, length and cross-sectional area (CSA_{AT}) of Achilles tendon were measured. The parameters on length were determinded with a measure. The circumference of lower limb was estimated by elliptical approximation using sagittal and coronal thickness of the segments. The length and cross-sectional area of Achilles tendon, and fascile length and pennation angle of gastrocnemius were measured by B-mode ultrasonography. Also, passive ankle joint torque was measured during passive dorsiflexion of each 10 degree from the 20-degree plantar-flexion position to 10-degree dorsiflexion position. Thigh length and CSA_{AT} were longer and smaller in LDR than in both SR and in TH, respectively. The circumferences at proximal 30% of the lower leg and at ankle were greater in TH than both in SR and in LDR. The morphological characteristics of muscle and tendon are influenced by quality and quantity of training. Thus, the differences in groups would be attributed to different style of high road training in TH and SR and low load but high volume training in LDR.
Key words: B-mode ultrasonography, elliptical approximation

13-P-8

The Changes in the Long Jump Takeoff as Increasing the Number of Step During the Approach Run

Kinomura Y[1], Fujibayashi N [2], and Zushi K [3]
[1]Aichi Toho University, Japan; [2] Ritsumeikan University, Japan; [3]Tsukuba University, Japan

The aim of this study was to investigate the changes in the long jump takeoff as increasing the number of steps at the approach run. Twelve male jumpers participated in the study. They performed the long jump with run-ups of six, twelve and their own strides in the competition. The take-off motions were captured with a high-speed digital camera (300 fps) for two-dimensional motion analysis. Grand reaction forces were also recorded (1 kHz). When athletes increase the number of steps in their approach run, the jump distance and approach velocity at touchdown were increased, the contact time, and the horizontal deceleration during take-off were decreased, and the vertical velocity of the take-off was almost unchanged. Then, first peak value of the vertical and horizontal ground reaction force were increased. However the second peak of the horizontal ground reaction force was unchanged and that of vertical one was smaller in own run-ups at the competition than in the twelve strides. Former impulse of horizontal direction was increased and latter impulses of horizontal and vertical direction were unchanged. So when approach

velocity was increased, the impact of the first half during take-off phase became bigger. Therefore athlete need bear the increased load at first half of take-off phase as increasing run-up steps.
Key words: ground reaction force, long jump,

13-P-9

The Laterality and the Changes of Lower Limb Movement in First and Latter Half of 800m Running

Ohnuma H[1], Hirano Y[2], Kumano A[1], Nishitani N[3], Tachi M[4]
[1]Graduate School, National Institute of Fitness and Sports in Kanoya, Japan; [2]National Institute of Sports Science, Japan; [3]Graduate School, Nara University of Education, Japan; [4]Nara University of Education, Japan

The purpose of this study was to clarify the laterality and the changes of lower limb movement in first and latter half of 800m running. Subjects were 8 male university runners (age 20.0 ± 1.2, height 1.75 ± 0.07m, weight 64.7 ± 6.2kg). The subjects performed 800m running with maximal effort in the 1st lane on an outdoor track. Trials were recorded and the running velocity was calculated for every 100m. The left and right leg movement were analyzed by two-dimensional motion analysis method focusing on 160m (the first half) and 760m (the latter half) section of 800m running. Also, the heart rate for every 100m was calculated using heart rate monitor. The kinematics parameters were averaged for each section and compared between the phases and between the left and right legs. From start to goal, the running velocity gradually decreased and the heart rate gradually increased. The running velocity, the step length and the flight distance decreased significantly in the latter half for both legs. Although, the stance time of the left leg increased significantly in the latter half, the right leg showed no significant change. Form these results, the present study demonstrated that the changes of lower limb movement in first and latter half of 800m running are different between left and right leg.
Key words: middle distance running, kinematics, curved path

13-P-10

The Effects of Change of Hurdle Height and Intervals on Leg Kinematics During Double-Leg Hurdle Jump

Takahashi K[1], Ogata M[2]
[1]Niigata University of Health and Welfare, Japan; [2]University of Tsukuba, Japan

The purpose of this study was to investigate the effects of change of hurdle height and intervals on lower joints kinetics during double leg hurdle jump. Twelve male athletes of track and field performed double-leg hurdle jump that bent legs to jump over the hurdle. The sets of hurdles were changed in height (70% leg length vs 90% leg length with 160% leg length interval) and intervals (170% hurdle height vs 230% hurdle height with 80% leg length hurdle height) , respectively. All trials were recorded using high-speed video camera, and 23 body points were digitized (125Hz). Contact time, flight angle and leg kinematic parameters were calculated. The contact time in each trial was shorter than 200ms and, it means that all trials were plyometric exercise. As hurdles height became higher, contact time decreased, but with no significant difference. Joints of lower limbs showed more remarkable flexion when jumping over the higher hurdles. On the other hand, contact time didn't showed significant changes with the change of interval length. However flight direction became forward when the interval length became long. Displacements of knee joint flexion and hip joint extension during the contact phase increased significantly, and hip joint was extending continually during the contact phase. These results indicate that 1) knee joint plays the role to resist downward movement, 2) hip extension induces leg backward swing, and it moves the body forward.
Key words: forward jumping, plyometric exercise, leg swing

13-P-11

Comparison of Approach Velocity Parameters in Long Jumpers and Triple jumpers at Similar Performance Levels

Kumano A[1], Ohnuma H[1], Ueta Y[2], Hirano Y[3]
[1] Graduate school, National Institute of Fitness and Sports in Kanoya, Japan;[2]Tokai University, Japan;[3] Japan Institute of Sports Sciences,Japan

The purpose of this study was to make comparison of approach velocity parameters in long jumpers and triple jumpers at similar performance levels, and to clarify that which does approach velocity influence more. The

subjects were eight long jumpers and eight triple jumpers. Their jumped distance was converted into points of IAAF Scoring Tables of Athletics. There was no significant difference between points of long jumpers (880±68pt) and points of triple jumpers (907±46pt). Approach velocity parameters (1, maximal velocity; 2, place of maximal velocity; 3, velocity at takeoff touchdown; 4, decrease ratio of velocity) were measured by using a laser velocity measurement device in the university competition. Unpaired t-test was used to test for differences in approach velocity parameters. As a result, there was significant difference ($p<0.01$) between decrease ratio of velocity of long jumpers (3.59±1.41%) and ratio of triple jumpers (1.40±1.31%). There was no significant difference in maximal velocity, place of maximal velocity, velocity at takeoff touchdown among long jumpers and triple jumpers. The results of this study showed that approach velocity in the long jump decreased from place of maximal velocity to takeoff than the triple jump at similar performance levels.
Key words: approach velocity, long jumper, triple jumper

13-P-12
Mechanical Properties of Triceps Surae Muscle-Tendon Unit in Kenyan and Japanese Distance Runners
Oda T[1,2], Toyoda Y[1], Hisano T[1,3], Akihara Y[1], Kunimasa Y[3], Sano K[3], Kusumoto K[4], Nicol C[5], Komi PV[6], Ishikawa M[3]
[1]Hyogo University of Teacher Education, Japan; [2]RIKEN, Japan; [3]Osaka University of Health and Sport Sciences, Japan; [4]Kurashiki University of Science and the Art, Japan; [5]Aix-Marseille Université, France; [6]University of Jyväskylä, Finland

It has been suggested that superior running economy is one of key factors for the great success of Kenyan distance runners (Saltin et al. 1995). The running economy and performance would be significantly influenced by mechanical properties of muscle and tendon tissues, but detailed information has been limited. In this study, we determined passive joint torque, and indices of stiffness on the both tissues in triceps surae muscle of Kenyan and Japanese distance runners. Eight Kenyan (KDR) and 10 Japanese distance runners with high performance (JHR) as well as 10 Japanese distance runners with normal performance (JNR) were volunteered for this study. Mechanical parameters of triceps surae muscle-tendon unit were measured by the B-mode musculoskeletal ultrasonography. For the measurements of mechanical properties, ankle joint torques and length changes of both muscle and tendon tissues were measured during passive dorsiflexion (from the 20-degree plantar-flexion position to 10-degree dorsiflexion position) and during maximum voluntary plantar flexion at 0-degree. The stiffness index was calculated by the ankle joint torque and length changes of tissues. The passive joint torque at the 10-deg dorsiflexion was 42% and 62% greater in KDR than in JHR and JNR, respectively ($p<0.05$). The muscle stiffness index at 0-deg was 183% and 257% greater in KDR than in JHR and JNR, respectively ($p<0.01$). In addition, grater stiffness on tendon tissues was observed in JNR. Therefore, the higher passive joint torque, stiffer muscle tissues and compliant tendon tissues in KDR would positively contribute to effective joint torque generation and power output required in stance phase of running.
Key words: muscle, tendon, biomechanics

13-P-13
Relationship Between the 15 m Time and the Kinematic Variables of the Swimming Kick Start
Ozeki K[1], Sakurai S[2]
[1]Osaka University Health and Sport Sciences, Japan; [2]Chukyo University, Japan

Starting technique is one of the most important factors for the race performance in competitive swimming. Good performances for the swimming start are characterized by high entry speed, small attitude angle and the small angle of attack. Honda et al. (2010) reported that the horizontal velocity at take-off was significantly improved by the use of kick start. Although there are several studies that focus on the kinematics and kinetics while kicking the block (e.g. Honda et al., 2010), less attention has been attracted to the technique of entry phase. Therefore, the purpose of this study was to examine the relationship between the 15 m time and the kinematic variables of the swimming kick start.
Twelve male Japanese competitive swimmers (Age = 19.8 ± 1.3 years, Height = 174.0 ± 4.6 cm, Weight = 69.4 ± 6.1 kg) participated in this study. Two-dimensional analysis was used to obtain the kinematic variables: velocity at take-off, angle of projection at take-off, attitude angle at take-off, entry angle, attitude angle at entry, the angle of attack at entry and flight distance.A correlation analysis was conducted to examine the relationships between the 15 m time and the kinematic variables for the kick start. There was a significant negative correlation between the

horizontal velocity at take-off and the 15 m time (r=-0.585). At the same time, there was a no significant correlation between the angle of attack and the 15 m time. The result indicates the importance of swimmers accelerating the Horizontal velocity while kicking the block.
Key words: competitive swimming, starting technique,

13-P-14

Effect of Different Breathing Rhythm on Backstroke Swimming

Moriyama S[1],Kanazawa S[1],Yamagata K[2],Kitagawa Y[1],Hara H[3],Shibata Y[4]
[1]Japan Women's College of Physical Education, Japan; [2] Master's Course in Sports Science, Japan Women's College of Physical Education, Japan; [3]Kokugakuin University, Japan; [4]Tokyo Gakugei University, Japan

The present study aimed to clarify the effects of different breathing rhythm (BR) on swimming velocity (V) and stroke indices during maximal backstroke swimming. Participants comprised 10 highly trained female university student swimmers (height, 1.63±0.03 m; weight, 54.4±6.1 kg) who performed maximal backstroke swimming for 20 m using the following two different BRs: Type A, 1 stroke cycle - 1 breath, and Type B, 1 stroke cycle - 2 breaths. In addition, if subjects experienced an unpleasant feeling while attempting either type of BR, they swam freely without remaining conscious of a specific BR three times. Stroke rate (SR) and stroke length (SL) were measured as stroke indices. Intra-nasal pressure (INP) was taken as the difference between minimum and maximum values. No significant differences were observed in V (Type A, 1.33±0.07 $m \cdot s^{-1}$; Type B, 1.34±0.07 $m \cdot s^{-1}$), SR (Type A, 0.70±0.06 Hz; Type B, 0.70±0.06 Hz), SL (Type A, 1.9±0.1 m; Type B, 1.9±0.1 m) or INP (Type A, 1.34±0.58 kPa; Type B, 1.27±0.62 kPa). However, in comparisons between BR subjects who felt good (GR) and those who did not (UGR), significant differences were observed in both V (GR, 1.37±0.07 $m \cdot s^{-1}$; UGR, 1.32±0.06 $m \cdot s^{-1}$) and SR (GR, 0.73±0.05 Hz; UGR, 0.69±0.05 Hz) ($P < 0.05$). These findings suggest that different BRs can affect V and stroke indices. Additionally, if swimmers feel good while performing different BRs, their V and SR are both likely to increase.
Key words; Intra-nasal pressure, swimming velocity, stroke rate, stroke length

13-P-15

Relationship Between Gliding and Swimming Motions During Front Crawl Swimming in Recreational Swimmers

Kanazawa S[1], Moriyama S[1], Yamagata K[2], Kitagawa Y[1]
[1]Japan Women's College of Physical Education, Japan; [2]Master's Course in Sports Science, Japan Women's College of Physical Education

Many technical books and studies have described the importance of gliding in front crawl swimming. Gliding in swimming is defined as stretching horizontally while the surface of the arm moves in the direction of forward motion after entry into the water. However, the effects of gliding on the posture, breathing, and swimming movements of swimmers during front crawl swimming remain unknown. Therefore, the aim of the present study was to examine the relationship between gliding and swimming posture, breathing, and swimming movement (arm strokes and leg kicking) in swimmers during front crawl swimming. A total of 132 female collegiate recreational swimmers were recorded at 30 frames per second by a digital video camera placed poolside, 15 meters from the end wall, while performing front crawl swimming for 25 meters. The videos were then evaluated based on three-step criteria used in previous studies. We found that gliding had a significant relationship with swimming posture, breathing, and swimming movement ($P < 0.05$). These results suggest the importance of gliding in front crawl swimming for stabilizing breathing and the horizontal position of swimmers on the surface of the water, and for improving the efficiency of swimming movement
Key words; swimming posture, breathing, swimming movement, Coaching in Physical Education

13-P-16

An Analysis of Arm Pulls of Butterfly Stroke

Chin-Shan Ho[1], Chun-Hao Chang[1], Ping-Kun Chiu[2], Kuo-Chuan Lin[2]
[1]Graduate Institute of Sports Science, National Taiwan Sport University, Taoyuan, Taiwan; [2]Graduate Institute of Athletics and Coaching Science, National Taiwan Sport University, Taoyuan, Taiwan

The purpose of the study was to analysis the arm pulls of butterfly stroke by using a self-designed inertial measurement unit (IMU). Sixteen swimmers were recruited in this research (eight elite athletes and eight sub-elite athletes) to implement twenty-five meters sprint. The IMU was placed at the right forearm to measure the pull cycles in sprint of butterfly stroke. Experimental data regarding the IMU were computed via a computer program written in MATLAB to calculate the time of pull and divide the pull cycles. One-way analysis of variance method was applied to examine differences between elite and sub-elite swimmers in pull time and the times of pull cycles. The level of significance was set to α =.05. The results showed that elite swimmers were significant faster than sub-elite swimmers in pull time (1.03±0.07 sec vs. 1.11±0.11 sec) and lesser frequency of pull (8.75±1.28 times vs. 10.12±1.25 times). Elite swimmers had a faster pull and lesser frequency that may be indicative of better power and efficiency of them. In this study, the IMU demonstrated that it could apply into swimming and provide kinematics parameters conveniently. In the future, that could be a monitor for the coaches and athletes in training.
Key words: MATLAB, Inertial Measuring Unit, kinematics

13-P-17

The Effects of Breathing on Center of Buoyancy and Buoyancy Torque in Junior Elite Swimmers.

Watanabe Y[1], Wakayoshi K[2], Nomura T[3], Tachi M[4]
[1]Biwako Seikei Sport College, Doctoral student of Kyoto Institute of Technology, Japan; [2]Biwako Seikei Sport College, Japan; [3]Kyoto Institute of Technology, Japan; [4]Nara University of Education, Japan

This research project will examine the increase and decrease of buoyancy and the migration dynamics of “Center of Buoyancy position” associated with breathing as well as the relationship between the distance of between the center of buoyancy (CB) and mass (CM) (D), buoyancy torque (T_B) and performance based on changes in the force exerted in a vertical direction on hands and feet with changes in lung ventilation while a swimmer maintains a horizontal position in the water. The participants of this study were 14 male (age = 16.9 ±0.7 years) Japanese junior elite competitive swimmers. The body CM positions were measured by means of a reaction board (Hay, 1993). We referred to the measurement method used by McLean & Hinrichs (2000) to measure the CB point. T_B calculations are made using the following equations with D and buoyancy force (B): $T_B = D \cdot B$. We use a glide-swimming test to assess the performance. The result of D was 1.93 ± 0.21 cm in neutral buoyancy situation. The D at full inhalation was 2.28 ± 0.44 cm. Buoyancy increased (at neutral: 606.41 ± 44.21 N, at inhalation: 615.67 ± 42.58 N) due to an increase in ventilation (at neutral: 2366.38 ± 831.67 ml, at inhalation: 3185.26 ± 906.55 ml). A negative correlative relationship was indicated between the T_B and D. A positive correlative relationship was indicated between the velocity decrement rate (VDR) (from [2.5m to 5m] to [5m to 7.5m] beginning from starting point) of the glide-swimming test and D at neutral buoyancy.
Key words: breathing cycle, glide-swimming, streamline posture, submerge

13-P-18

Relationship Between Core Stability and 200 m Front Crawl Swimming Performance

Yamagata K[1], Moriyama S[2], Kanazawa S[2], Sasakura K[2], Kitagawa Y[2]
[1]Master’s Course in Sports Science, Japan Women’s College of Physical Education, Japan; [2]Japan Women’s College of Physical Education, Japan

The aim of the present study was to examine the relationships among core stability, swimming velocity, stroke indices, and indices of movement during maximal front crawl swimming. The participants were 10 highly trained, female, collegiate swimmers (height, 1.60±0.04 m; weight, 54.7±4.1 kg). All participants performed the Sahrmann core stability test using a Stabilizer Pressure Biofeedback Unit on the ground. The test consisted of 5 levels, with each level increasing in difficulty. They also performed maximal front crawl swimming for 200 m, and a video camera was used to record their movements. Stroke rate and stroke length were measured as stroke indices. The average values of swimming velocity, stroke indices, and movement were calculated using one stable front crawl stroke cycle as a swimming performance variable. Rates of decline of 175–200 m (phase 4) for 25–50 m (phase 1)

were calculated for all swimming performance variables. Significant differences were observed in swimming velocity (phase 1, 1.52±0.12 $m \cdot s^{-1}$; phase 4, 1.43±0.09 $m \cdot s^{-1}$) and shoulder movement on the X-axis (phase 1, 1.14±0.03 m; phase 4, 1.13±0.05 m), with phase 4 values lower than those in phase 1 ($P < 0.05$). However, no relationships were observed between Sahrmann's core stability level (2.1±1.4) and swimming performance variables, or between Sahrmann's core stability level and the rates of decline of swimming performance variables. These results indicated that there is no relationship between core stability and 200 m maximal front crawl swimming performance.
Key words; Sahrmann core stability test, swimming velocity, stroke rate, stroke length

13-P-19

Comparison Study of the Underwater Butterfly Kicking Between the Monofin and the Barefoot —About Competitive Swimmers as Novice of the Monofin—

Tanigawa T[1], Kataoka H[2], Matsumoto T[3], Kamiya M[1], Kida N[1], Nomura T[1]
[1] Kyoto Institute of Technology, Japan; [2]Meiji University of Integrative Medicine, Japan; [3]Graduate School of Osaka Kyoiku University, Japan

This study aims to comparison of the underwater butterfly kicking between the monofin (monofin-swimming) and the barefoot (barefoot-swimming). The subjects were 81 high-school swimmers as novice of the monofin (height: 1.70 ± 0.05 m, weight: 58.1 ± 5.6 kg, FINA Points: 412.5 ± 107.2 points). The subjects were swum 25 meters by the monofin-swimming and by the barefoot-swimming at their maximum effort. Images were taken from the swimmer's right side using an underwater video camera. After recording, the videos were transferred to the personal computer and analyzed using a motion analysis software. Displacements were digitized about wrists, elbows, shoulders, hips, knees, ankles and the tip of the monofin. The vertical comports of each body part over time was approximated a sine wave (z=a*sin (b*t+c) +d*t+e). In Formula, "a" indicates amplitude/2, "b" is for frequency, "c" is the starting point of the sine wave. As the result of the amplitude of the ankles, the monofin-swimming (0.23 ± 0.06 m) is significant smaller than the barefoot-swimming (0.35 ± 0.05 m), ($F(1, 80) = 16.864$, $p < .01$). On the other hand, the phase shift of the body from a wrist were not the significant differences between the monofin-swimming (-364.08 ± 67.67 deg.) and the barefoot-swimming (-376.28 ± 52.89 deg.), (Ex. Ankle $(1, 80) = 1.520$, $p > .05$). It was thought that the increase of the load caused the delay of the timing, but the difference was not seen in this study in the timing, and the amplitude became small.
Key words: butterfly kicking, monofin, bare foot, novice

13-P-20

The Kinematic Analysis of the Landing Movement of Vault

YU Jia-bin[1], HAO Wei-ya[2], ZHOU Xing-long[3]
[1]Shanghai University of Sport, China; [2]China Institute of Sport Science, China; [3]Beijing Sport University, China

The purpose of this article was to make the kinematics analysis on the vault landing to reveal the key indicators. The movements were cartwheel straight body swivel 990 ° (10 samples) and cartwheel straight body swivel 810 ° (7 samples) captured in 2011 and 2012 Chinese Gymnastics Championships. Two high-speed cameras (CASIO EX-F1, 300Hz) were used to capture movements in three dimensions with PEAK framework for calibrate before the game. ShiXun three-dimensional kinematic analysis system (Beijing Sports University), Qtools, OriginPro8.1, Excel2007 and Spss13.0 were used to conduct kinematic analysis and data processing. There were significant differences ($P<0.05$) in 10 kinematic indicators between "990" and "810": the vertical velocity of center of gravity (COG), right shoulder angle when leaving the horse and the maximum height of COG in the flight phase and the height of COG, body pitch angle, left and right hip angle, left and right knee angle, right shoulder angle when landing. Conclusions: At the moment of leaving horse, "990" exhibited larger right shoulder angle indicating the right shoulder's effort to push away from horse was stronger to induce the vertical velocity of COG larger when leaving the horse. In the flight phase, "990" exhibited greater maximum COG height and longer flight time to make sure athletes could complete greater angle of twist. At the moment of landing, the different facing directions affected the hip and knee angle of two movements. "990" exhibited greater knee angle and smaller hip angle, representing that the buffer action of hip in the landing phase was weaker, and the buffer action of knee was stronger.
Key words: landing of vault, kinematics

13-P-21

Characteristics of Preparatory and Main Steps During Approach Phase in Volleyball Blocking

Umezaki S[1], Kida N[2], Nomura T[3]
[1]Tenri University, Graduate student of Kyoto Institute of Technology, Japan; [2]Kyoto Institute of Technology, Japan; [3]Kyoto Institute of Technology, Japan

The purpose of this study was to clarify characteristics of preparatory and main steps during approach phase in volleyball blocking. 6 females professional volleyball player (expert group) , 6 females collegiate volleyball player (experienced group) and 4 females collegiate basketball player (novise group) performed blocking tasks initiated from three directions (center attack: first tempo, right and left side attack : second tempo), during which their steps were videotaped at 60 Hz. The steps to right and left side were categorized according to step-types, and their timings were analyzed. Side-thrust, jab-step, kick-back, split-step were used in the preparatory step, while cross-step, side cross-step and running-step were used in the main step. The study found relationship between experience of playing volleyball and step-types. In addition, the experienced group showed significantly faster starting times for preparatory step than the 2 groups. Although there was no significantly difference between the novice group and expert group in the starting times for preparatory step, the novice group showed significantly later starting times for main step than the 2 groups. These finding showed that the expert players waited to start the preparatory step until just before toss contact, and quickly executed that step to catch the spike contact after precisely reading the direction of toss.

Key words: type classification, timing, skill-level

13-P-22

A Study on the Total Defense in Volleyball Game ~Relationship of “Service Courses” and “Setting Distributions”~

Yoshida S[1], Sato H[2], Yamada T[3], Watanabe K[1], Okada M[1]
[1]Senshu University, Japan; [2]Koriyama Women’s University, Japan; [3]Yamagata Johoku High School ,Japan

The purpose of this study is to gain the new knowledge about “Total Defense in Volleyball game”, to construct blocking systems and floor defense systems linked with service skills, by quantitatively analyzing the relationship of service courses and setting distributions in each rotation. Games to be analyzed were 45 men's international matches held in 2009-2012: 24 matches from the World League, 5 matches from Grand Champions Cup, 5 matches from the World championships, 11 matches from the World Cup. After extraction of the 2,055 samples of jumping spike services from the games, we created a cross-tabulation table as "9 service courses" and "4 setting distributions". And then we quantitatively analyzed the “changes of 4 setting distributions” due to “9 service courses” in 6 rotations, using Chi-square Test and Adjusted standardized residual Test. The results are as follows.1) In S1 rotation, services from “zone 5 to zone 1” reduce the expected value of the “Left attack” ($p<.05$). 2) In S2 rotation, services from “zone 1 to zone 5” increase the expected value of the “Quick attack” ($p<.05$). 3) In S3 rotation, services from “zone 5 to zone 1” increase the expected value of the “Quick attack” ($p<.05$). 4) In S4 rotation, services from “zone 1 to zone 1” increase the expected value of the “Pipe attack” ($p<.05$). 5) In S5 rotation, services from “zone 1 to zone 6” reduce the expected value of the “Quick attack” ($p<.05$). 6) In S6 rotation, services from “zone 6 to zone 1” reduce the expected value of the “Left attack” ($p<.05$).

Key words: Volleyball, Total Defense, Service Course, Setting distribution

13-P-23

A Study on Setting Technique in Volleyball－Focusing on Setter’s Movement, Coordinate with Receiver’s Movement－

Nishi H[1], Yoshida Y[2], Hashihara Y[3]
[1]Doctoral Program, Hiroshima University, Japan; [2]Shitennoji University, Japan; [3]Hiroshima University, Japan

The purpose of this study was to analyze the characteristics of the setting technique of setter, during the combination attack in volleyball, in the actual games, focusing on the timing of the start motion to the level point. The subjects were the setters from ARG and POL, who participated in the World Cup 2011 in Osaka. The motions of 43 trials(ARG:23trials, POL:20trials) were chosen and analyzed the combination attack and the setting movements. The three-dimensional coordination from the center of the hip joint was analyzed as the height of vertical position. The time from starting movement of setter to the level point was calculated. Then the movement

of the setter was divided into three phases as follows: at the setter's starting movement, at the time of the received impact, and at the time of the setter's stepping to the level point. The three-dimensional coordination was normalized and standardized. The setters showed the action of "the split step" at the moment of the receiver's impact. The total time of motion from start to the stepping to the level point was showed as 100%. The lowest position of the vertical direction of the hip joint was produced at the time of about 10% before the received impact, and the "split jump" action was followed. From these results, it will be able to understand that, the setter should be kept in mind as the following matters:1) The best performance of the setter will be able to get from the precise watching to the movement of receivers.2) The precise watching the position of arms for example, angle, direction of movement, and position of impct the ball etc., are the mostly important for prediction of the characteristic of the movement and the position of the ball.
Key words: setting technique, normalization, standardization

13-P-24

About Change of the Average Height by the Introduction of Libero-rule in Volleyball
- With Junior High School, High School, and All-Japan, Representative Players in Japan as a Target -

Nagatani M[1], Yamada K[2], Takanashi Y[3]
[1]Hokusho University,Japan; [2]Aichi Universitiy of Education, Japan; [3]Chukyo University, Japan

Libero-rule was introduced in 1998 through the move season in 1996 years and 1997. It is conceivable that a low height player is able to take an active part as the libero player by this rule. The purpose of this study how average height is changing in each categry of the junior high school (n=408), high school (n=552), and all-Japan representative (n=880) of Japan. And, libero-rule introduction before dividing it in 3 period after 1998, 1996 and 1997, before 1995, average height is compared. After introduction of libero-rule more than before the introduction it were high, Men's junior high school representative players were high +1.55 cm ($p<0.05$), and Women's all-Japan representative players were hight +2.94 cm ($p<0.01$). Other categories were high with all, but not a significant difference. Also, as for the standard deviation of the mean value the back where introduces all except for the junior high school representative men and women, was big. Although the average height by the introduction of libero-rule is high from these, the obvious significant change was not seen. However, it is conceivable that it has a tendency to elect a low height player as libero-player.
Key words: libero-rule, volleyball, average height, change

13-P-25

A Study of Collegiate Women Tennis Players Examines Reasons and Causes for Errors

Hirata D[1.5], Sato S[2], Murakami K[3], Sato M[1], Morii D[4], Saijo O[4]
[1]Senshu University,Japan; [2]Aoyama University,Japan; [3]Tokyo University of Science,Japan; [4]Nippon Sport Science University,Japan; [5]Graduate school of Nippon Sport Science University,Japan

Hirata et al. (2014) revealed that more than 50% of collegiate women athletes' tennis matched ended due to their errors. Forehand strokes, cross-court, return, and double-faults were often found to be the most prevalent sources of their errors. In addition, two mistakes in a row and consecutive errors were seen at the end of their game when they lost their games. As a result of interviewing collegiate women tennis players regarding their errors and information processing system, emotions and feelings were the main reasons why errors were made. However, the relationship among unforced-error, its count, and the types of shots are important to be revealed. The purpose of this research was to examine the relationship among the reasons for the errors, its count, and the types of shots by using IC recorder to reveal the cause of their errors. Participants were two collegiate women tennis players (20-years-old). One had played tennis for 12 years and the other one played for 14 years. Results indicated that position, place of hitting point, and awareness of the ball caused them to make errors on their forehand. Additionally, the internal thoughts "to aim too carefully" and "I thought that I must get the ball in the court" were also revealed as psychological aspects. In backhand, the causality of errors was similar to the causality of forehand errors, and the recognition of the ball was not as accurate. Because the causality of making errors is due to many reasons, it is important for coaches to figure out the specific reason for errors.
Key words: collegiate women tennis player, error, qualitative research

13-P-26

The Effects of Tennis Training on the Acquisition of Forehand Ground Strokes Ball Spin

Murakami S[1], Kitamura T[2], Takahashi H[3] , Nishizono H[3], Maeda A[3]
[1]Graduate school of Physical Education, National Institute of Fitness and Sports in Kanoya, Japan;[2] Biwako Seikei Sport College, Japan; [3]National Institute of Fitness and Sports in Kanoya, Japan

This study aimed to clarify the effects of tennis training in order to learn forehand ground strokes ball spin skill. The participants were two women tennis players (Player A and B) who belonged to the tennis team of a local university. They performed a specific training program on the acquisition of ball spin for forehand ground strokes for 9 months. The content of training program was learning forehand ground strokes ball spin in seven situations which was of different ball bounds height and depth. After the training program, hitting test score was improved and forehand ground strokes form was also changed. This research showed that the participants improved hitting performance on the acquisition of forehand ground strokes ball spin. The result of verbal reports revealed the process of skill acquisition. Ball placement was improved for Player A by a decrease error of out and net. Player A referred about the acquisition of tips of “Brushing wrist work” and “Hitting on higher hitting point and more quickly timing”. About player B, some effective advice was “Go into the backswing shorter, swing a racket longer” and “Don’t slap, push the ball”. Swing form was changed as body turn and swing work smoothly. Besides, ball speed was also improved. Consequently, the present findings indicated that tennis practice on the acquisition of forehand ground strokes ball spin contributes to improvement of tennis performance.
Key words: hitting test, ball speed, ball placement, amount of spin, swing motion, verbal reports

13-P-27

An Evaluate Tennis Player’s Offensive Ability by Offensive Phase Incidence

Kitamura T[1], Takahashi H[2], Murakami S[3]
[1]Biwako seikei sport college, Japan; [2]National Institute of Fitness and Sports in Kanoya, Japan; [3]Graduate school of National Institute of Fitness and Sports in Kanoya,Janapn

In coaching process, it is important that the coach evaluates player’s performance with clear target value. However, the study of the tennis player’s offensive ability has been superficial.The purpose of this study was to investigate the tennis player’s offensive ability with offensive phase incidence (OPA incidence). OPA incidence was one of the performance indicators to evaluate tennis player’s offensive ability. We analyzed 522 shots from 207 points. Those shots were played by 8 male players ranked in the world top 20th. We judged each rally phases as offensive or defensive and also we investigated the high effective shots incidence in each phase. The effectiveness of each shots was evaluated by the next phase of opponent’s shots. When a phase of opponent’s shot was defensive, the shot was defined as the high effective shot.As a result, in top male tennis players, OPA incidence was 65.9% of all shots phases. In addition, there were 48.2% of the high effective shots in offensive phases, and 16.3% in defensive phases. Those results suggested that world top male tennis players showed high incidence of offensive phases and leaded to effective shots in this phase. Additionally, they rated effective almost 20% even in defensive phases.
Key words: evaluate performance, target value, top male tennis player’s offensive ability

3-P-28

The Relationships Between Actual Performance and Objective Feedback with Computerized Scorebook for Tennis

Hiroo Takahashi [1], Shunsuke Murakami [2], Tetsu Kitamura [3]
[1] National Institute of Fitness and Sports in Kanoya, Japan; [2] Graduate school of National Institute of Fitness and Sports in Kanoya, Japan; [3] Biwako Seikei Sports College,Japan

The purpose of this study was to clarify the relationships between actual performance and objective feedback with computerized scorebook for tennis (Takahashi *et al.*, 2006). A woman collegiate tennis player’s performance was analyzed in 5 months. She participated five tournaments in this period. Those matches were analyzed by computerized scorebook for tennis. We analyzed the relationships between results of the matches and qualitative data, such as training (technical, tactical, physical, mental, and so on) and her impressions in each tournament or in training periods. In this training period, she mainly trained aggressive play. She trained drive-volley in technically and net-play in tactically. Those training was affected the results of last shot of rallies. The ratio of aggressive play showed almost 20% in all tournaments. It was almost same ratio as female top class players (Takahashi et al., 2009).

And point-winning rate in aggressive play was improved through this period. Finally, the ratio of point winning in aggressive play showed over 50%. Generally, because of unique scoring system of tennis, player-winning probability showed relatively high when player's point winning rate showed over 50%. The improvement of point winning rate in aggressive play through this period was one of the effective change for her. Average rally numbers was 6.0 in all tournaments. This result was almost same with Schornborn (2000). However, It became longer in the matches that were important for her career. She reported that she played more carefully in the matches qualified for intercollegiate tournament than usual.
Key words: match analysis, coaching, tactical training

13-P-29

Structural Relationships Between Passing and Dribbling Plays Under Various Conditions and Results of Transitions During Basketball Game

Sakuragi K[1],Aoyagi O[1],Komure I[1],Tagata S[2]
[1]Fukuoka University Faculty of Sports and Health Science, Japan; [2]General Incorporated Association Cultivative Sports Club, Pro Basketball Team TOKYO EXCELLENCE, Japan

This study aimed to investigate the presence of structural relationships between passing and dribbling plays, various conditions, and results of transitions during basketball games. Types of dribbling and passing plays (146 total transitions) conducted by the Japan National Team during six games at the 16th FIBA Women's World Championships were recorded. The 14 passing plays and 7 dribbling plays were examined. We also assessed 10 situations that start transitions, 10 results of transitions in which offensive strategies were applied, whether players could score, whether players could generate scoring opportunities regardless of a successful or failed shot, and whether fouls were committed. A cross-table comprising passing and dribbling plays, conditions, and results was tabulated, and correspondence analysis was subsequently applied.Among starting conditions, rebounds, stealing, and intercepts were located at the upper left of the configuration. Offensive rebounds and throw-ins at the end line in the frontcourt were located on the lower right side. Among the results of transitions, various misplays were located on the upper right side. Among offensive tactics, fast breaks were located at the far upper-left, early offenses were at the near upper-left, and half court set-offenses were located in the center. Effective passes leading to shots were located on the lower left side. Dribbling in the backcourt was located on the far upper left side, and offensive dribbling before assists was on the far lower side. These positions of passing and dribbling, the starting conditions, and the transition results indicated that the direction from the upper left to the lower right could be interpreted as "moving the ball from the backcourt to the frontcourt," and the direction from the upper right to the lower left could be seen as "effective performance for shots from misplays", respectively.
Key words: fast break, game analysis, cross-table

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Key words: fast break, game analysis, cross-table

13-P-30

Regarding the Present State of the Training System for Basketball Player in China

Huang Y[1],Kameyama I[2],Kuroiwa J[2]
[1]Ryutsukeizai University Graduate School, Japan; [2]Ryutsukeizai University, Japan

The purpose of this study is to examine the current training system for basketball players in China by comparing it with the systems of Japan and other countries in order to obtain the data for the future development of basketball in China.
Recently, basketball in Asia has become more competitive with the globalization of sports business. Especially, China and Japan have produced outstanding basketball players, making a contribution to the development of basketball in Asia. Thus, this study further explores the training systems of these countries for the development of basketball in Asia. Comparing the training system of basketball in China with that of Japan. Though some basket players are from youth clubs of professional teams founded in the 1990s, a majority of basketball players are from local sports schools. Sports schools in China are intended for students from 13 to 18 years old. They have limited the field of sports exclusively and have not provided general education. In Japan, education and sports are related with each other. Sports themselves do not become independent from other educational systems. The training system of basketball in Japan is based on each school's extracurricular activity and also contributes to the development of local sports. Junior and senior high school students (from 13 to 18 years old) play basketball as extracurricular activities. Among them, talented players can go to college in order to further continue playing basketball.
A broader perspective that integrates sports and education is required. It is important to investigate the sports training systems of other countries. A new training system of basketball in China that is based on the integration of local sports clubs and normal education.
Key words: basketball, training system, China Japan

13-P-31

A Rresearch of the Fast Break After Taking the Ball in the UEFA EURO 2012 - In Comparison with the Possession Play -

Tamura T[1], Horino H[2], Tsuchiya J[2]
[1]Graduate school of Sport Sciences, Waseda University, Japan; [2]Faculty of Sport Sciences, Waseda University, Japan

The purpose of this study was to quantitatively investigate the fast break after taking the ball in comparison with the possession play. The subjects were 432 shooting scenes (except for set play) of 31 games in the UEFA EURO 2012. "Fast break" was shooting scene within 5 seconds after taking the ball, and "possession play" was the play other than "Fast break". "Fast break" was 107 plays, and "possession play" was 325 plays. Items for testing were the pass number, the point to take the ball (distance from own goal line), the point to take the ball (distance from virtual line connecting the center of the own goal and opponent goal), total moving distance of the ball, distance of the first pass after taking the ball, speed of the first pass after taking the ball, and angle of the first pass after taking the ball. All tests were evaluated by t-test. Statistical significance was set at $p<.05$ in all tests. The results were as follows:1) "Fast break" was less the pass number than "possession play" ($p<.01$). 2) "Fast break" took the ball nearer the opponent goal than "possession play" ($p<.01$). 3) "Fast break" was shorter the total moving distance of the ball than "possession play" ($p<.01$). 4) "Fast break" was shorter distance of the first pass after taking the ball than "possession play" ($p<.05$).These results suggest important and quantitative factors of basic tactics in the "Fast break".
Key words: football, tactics, attack, fast break, match analysis

13-P-32

The Trend Analysis of Shooting in Women's National Football Tournaments JAPAN 2013

Mori M[1], Tamura T[2], Horino H[3], Nakayama M[1], Asai T[1]
[1]University of Tsukuba, Japan; [2]Graduate school of sport science Waseda University , Japan; [3]Faculty of sport science Waseda University, Japan

The purpose of this study was to investigate the trend analysis of shooting in Women's National Football Tournaments JAPAN 2013. Target game was Empress's Cup 2013 is top level of women's football in Japan. The

subjects were 79 shooting scene of 3 games in final and semi-final. This study was divided into three pieces of soccer pitch. The name of the area of classification was attacking third, middle third, and defending third from the area close to the opponent goal. Target scene of analysis of the this study is the point to get the ball, the number to touch the ball by assist, the point was assisted, the variety to the pass of the last, the number of to touch the ball by shooter, the point to shoot, the variety to the shoot, the result to shoot, the number of the pass, the variety to attacking, the number of player in attacking, the time to shoot. This study explained a part of the shoot trend of top level women's football in Japan.
Key words: soccer, strategy, tactics, technical, match analysis, shooting,

13-P-33
Teaching Program of Soccer for Physical Education in Junior High School
Sato R[1], Takeda T[2], Kondo Y[1], Yamada Y[3]
[1]Graduate School of Hokkaido University, Japan; [2] Hokusho University, Japan; [3]Graduate School of Hokusho University, Japan

Soccer is one of the popular sports played in all over the world. Soccer is taught at physical education in junior high schools in Japan. There are many previous studies on teaching soccer in Japan. Japan Football Association has proposed M-T-M (Match-Training-Match pattern) method. M-T-M method not make clear the teaching content. It is depend on abilities of each teachers. Matsumoto et al.(2001) proposed the structure of techniques-tactics in soccer, analyzed games of U-12 and world cup. The problem of Matsumoto et al.(2001) theory is that; he focused on only attacking tactics without defensive tactics. In government guidelines for teaching of physical education in japan, the method of teaching soccer is described. But, teaching content and teaching materials are not enough to detail the teaching plan. Therefore, it is not possible to be taught well by every teacher. This study proposed teaching program of soccer in physical education in junior high school, which every physical educational teachers is able to use . Method is described below as; 1) Tchniques and Tactics of soccer were structured from the point of view of historical development of soccer. 2) Teaching theory is organized; teaching goals, teaching content, teaching materials, teaching method and assessment.
Key words: Soccer, physical education, teaching method, junior high school

13-P-34
Quantification of Defense Performance in Soccer by Using Location Information
Hayashi Y[1], Yamada H[2]
[1]Biwako Seikei Sport College, Japan;[2]Biwako Seikei Sport College,Japan

It is fact that we often assess performance in a soccer game subjectively. And we need multidimensional analyses that can measure many items quantitatively to increase objectivity. Firstly, in this study, I analyzed component factors of defense using delphi method, and I decided measurement items. We performed 4vs4 soccer games at about 28 meters wide and 15meters long court. Twelve male students who play soccer well participated in this experiment. During this experiment we recorded them by using a video camera locating at second floor in a gym. Secondly, I imported this data to a computer and I calculated two dimensions coordinate point of players and a ball location by using two dimensions image analysis (DLT) method. This location information made it possible to quantify defense performance in a soccer game. These results indicated that defense tactics consists of pressure to a soccer ball, compactness, limitation of shoot course, and line control in a soccer game. We can find out four criterion-related validity within eight measurement items belongs to these subordinate domains.
Key words: team sport, performance in a soccer game, criterion-related validity

13-P-35
The Injury Prediction in High-School Baseball Players through Functional Movement Screen(FMS)
SeungSeok W, JaeHee K, YeonSoo K, TaeWon J
Seoul National University, Korea

Nowadays, the popularity of physical activity has been increasing more than ever before, and sports or exercise-related injuries are occurring more commonly. The occurrence of injury in youth elite players is more catastrophic than in general public due to its detrimental effects on their athletic career, from the loss of time,

the establishment of game strategy and so on. Thus, the purpose of this study is to figure out the relationship between high school baseball players' injury and Functional Movement Screen (FMS), that is prediction of injury by examining 7 functional movements. In this study, 40 male high school baseball players from Seoul and 32 male high school baseball players from Gyeonggi providence were recruited to participate. The frequency, location and reason of injury of the subjects were analyzed with sports injury questionnaire 3 months after examining FMS. As a result, 60% of the total injuries occurred from overuse and the injury of shoulder and elbow joint, which are related to throwing, was resulted most frequently. A positive relationship was found between Active Straight Leg Raise-related injury frequency and Active Straight Leg raise score ($r=.23$, $p<.001$) and a negative relationship was found between Deep Squat test-related injury frequency and In-Line Lunge test score ($r=-.24$, $p<.05$). Moreover, a group of FMS score of under 14 was more frequently injured than that of over 14, but there was no statistical significance found. Though the low relationship and no significant difference, FMS showed potential power of injury prediction. Further investigation of these potential factors (extension of research, severity of injury, characteristics of a sport and participants, and game exposure time) would be suggested in the future research.
Key words: baseball, injury, functional movement screen

13-P-36
The Immediate Effect of Hip-abductor Muscles Exercises on Knee Valgus Angle During Single-Legged Squatting
Nakamine Y[1],Yoshida M[2],Yoshida M[2]
[1] Long-Term Care Health Facilities Gura-ne Kitanosawa, Japan; [2] Department of sport education, School of lifelong sport ,Hokusho University,Japan

The anterior cruciate ligament (ACL) injury is sports injury to occur in activities that landing or cutting motions. It is thought that the ACL injury is related to the knee valgus position which is called knee-in. Some researchers suggested that the hip abductors muscles play a significant role in avoidance of the knee-in position. The purpose of this study was to investigate the immediate effects of the hip abductor exercise on the knee valgus angle during the single leg squat.The 14 female subjects participated in this study. The knee valgus angle during the single leg squat was measured using video camera and the analysis software (Dartfish Software) . The single legged squat was repeated 5 times and the angle of the knee valgus was measured at the 60° knee flexion. The subjects prformed the excercise for the hip joint abductor 20 times as an intervention. After the intervention, knee valgus angle during a single leg squat was measured again. A paired t-test was used to compare the difference in knee valgus angle of the dominant and non-dominant leg for the angle before versus after the intervention.A dominant leg demonstrated that a knee valgus angle during the single leg squat after the intervention significantly decreased compared the angle before the intervention ($p <0.05$). It is thought that the gluteus medius muscle was immediately stimulated after the exercises for the hip abductor. An immediate effect of the exercise for the hip abductor might reduce the knee-in posture as a risk factor for the ACL injury.
Key words: gluteus medius, anterior cruciate ligament (ACL), Knee-in

13-P-37
Core Stability and Hip/Knee Muscles Strength for Female Athletes with Dynamic Knee Valgus

Hsiao-Yun Chang[1], Shih-Chung Cheng[2], Chun-Yu Yeh[1]
[1]Chung Shan Medical University, Taiwan; [2]National Taiwan Sports University, Taiwan

Excessive knee valgus might be associates with the occurrence of knee injuries in female athletes. Previous studies had proved that gluteus maximus weakness would increase the angle of knee valgus for female athletes. However, others muscles surrounding the trunk and knee might play a critical role in controlling the hip and knee motion during dynamic movements. Hence, the purpose of this study was to determinate the hip/knee muscles strength and core stability for female athletes with dynamic knee valgus. Twelve female athletes were participated in this study (age: 19.6±0.9 years, height: 162.6±5.4 cm, weight: 57.1±7.7 kg) and divided into control group and dynamic knee valgus (DKV) group. Double-leg lowering test was used to assess the core muscle stability. The FET3 hand-held dynamometer was used to evaluate isometric strength of quadriceps, hamstring, hip adductors, and hip abductors. Then, the strength of hamstring/quadriceps ratio (H/Q ratio) and hip adductors/hip abductors ratio (Hadd/Habd ratio) also were calculated. The independent T-test was used to analyze the hip/knee muscles strength and core

stability. The results were showed significant increase in quadriceps strength for DVK group than control group (DVK=32.92±6.09N, CON=24.36±5.62N, p=.031). The Hadd/Habd ratio were showed significant higher in DVK group than control group (DVK=1.29±0.42, CON=0.87±0.23, p = .048). Others had no significantly difference between DKV and control group. In conclusion, the female athletes with DVK had stronger quadriceps and Hadd/Habd ratio.
Key words: Knee valgus, core muscle strength, knee injury

13-P-38
Application of Kinesio Taping on Basketball Sport Injuries
Yang Y, Liu C, Yan R, Jiang M
MingDao University, Department of Recreation and Holistic Wellness, Taiwan

This study explored the application of kinesio taping on basketball sport injuries to learn about whether there is any substantial improvement toward sports injury and muscle fatigue effect. Questionnaires were distributed between April 10-20, 2014 for data collection to 102 school year collegiate first grade male basketball players. Results showed ankle injury shared the highest proportion of basketball injuries, followed by knee injury. These injuries caused by muscle fatigue after strenuous exercise. This study suggests that basketball coach may use kinesio taping for prevention and treatment to improve muscle fatigue effect and reduce sports injuries.
Key Words: kinesio taping, sports injuries, basketball

13-P-39
Effect of Ketogenic Diet on Athletic Fitness Factors and Antioxidant Status in Taekwondo Athletes
Sang Rae Kim[1], Jae Kyung Byeon[1], Hyun Seung Rhyu[2], Keun Su Kim[3], Sun Hee Park[1]
[1]Chungbuk National University, Korea; [2]Jungwon University, Korea; [3]Air Force Academy, Korea

This study was conducted over a period of three weeks in order to analyze the effects of the Ketogenic Diet on stamina and antioxidant enzyme reactions in Taekwondo athletes in order to determine whether the Ketogenic Diet is effective in weight loss of the athletes.
The experiment was conducted on two groups of high school Taekwondo Athletes over the course of three weeks (Ketogenic Diet: n=12/ control group: n=12) for the purpose of weight loss. We have measured cardiopulmonary endurance(Harvard step test, 2 kilometer run), muscular strength(grip strength), muscular endurance(sit up) and power(standing long jump), as well as Superoxide dismutase(SOD) and malondialdehyde(MDA) levels. We also employed SPSS 22.0 statistical analysis software and performed a two-way repeated Analysis of Variance(ANOVA) on the data. We have calculated a significance level of α=.05, and results as detailed below. First, in the group placed on the Ketogenic Diet, cardiopulmonary endurance and muscular endurance significantly increased, and muscular strength and power significantly decreased. Second, in the antioxidant enzyme reaction, SOD significantly decreased, whereas MDA did not show any significant change during the experiment. In conclusion, this study seems to prove that the Ketogenic Diet improves stamina of Taekwondo athletes and does not induce oxidative stress. This study also confirms that the Ketogenic diet is effective in terms of weight loss for Taekwondo athletes.
Key words: Ketogenic Diet, Taekwondo athletes, Athletic fitness factors, antioxidant enzyme reactions

13-P-40
Cuscuta Chinensis Seed Extract Improves Exercise Performance and Ameliorates Muscular Injury After Exercise
Wen-Chyuan Chen[1], Wen-Ching Huang[2],Chi-Chang Huang[2], Mei-Chich Hsu[3]
[1] Chang Gung University of Science and Technology, Taiwan; [2] National Taiwan Sport University, Taiwan;
[3] Kaohsiung Medical University in Taiwan, Taiwan

The seed of *Cuscuta chinensis* (Dodder seed, DS) is one of well-known yang-invigorating agents with anti-inflammatory and multifunctional pharmacological activities. DS is also a traditional medicinal herb commonly used in Asia, however, there is limited evidence for the effect of DS on exercise performance and physical fatigue. We aimed to evaluate the potential beneficial effects of DS water extract on ergogenic and anti-fatigue functions following physiological challenge. Male ICR mice from 3 groups (n = 8 per group) were orally administered DS

for 2 weeks at 0, 2054 and 4108 mg/kg/day, which were respectively designated the Vehicle, DS-1X and DS-2X groups. The exercise performance was evaluated by physical activities including grip strength and exhaustive swimming post DS supplementation for 2 weeks. The results showed that the grip strength was significantly increased for 1.15 to 1.28 as compared to vehicle control, but the endurance was not significantly different between treatments. As well, after a 15-min swimming test, the activity of serum creatine kinase (CK), a marker of muscular damage, was significantly lower with the DS-1X than with vehicle alone. On trend analysis, grip strength and endurance swimming time dose-dependently increased with DS supplementation. Therefore, DS supplementation alone improved exercise performance.
Key words: yang-invigorating agent, Exercise performance, Forelimb grip, muscular injury

13-P-41

Cytoprotective Effects of American Ginseng in a Human Submaximal Exercise-Induced Muscle Damage and Rat Ethanol Gastric Ulcer Model

Mei-Chich Hsu[1, 2],Li-Chin Lin[3]
[1]Department of Sports Medicine, Kaohsiung Medical University, Kaohsiung, Taiwan;[2]Graduate Institute of Sports Science, National Taiwan Sports University, Taoyuan, Taiwan; [3]Taiwan Biotec Co., Ltd, Taoyuan, Taiwan

American ginseng (AG, *Panax quinquefolium* L.) is one of the most popular herbal medicines and a top-selling herbal supplement in the World. We aimed to investigate whether a 4-wk supplementation with AG could improve endurance exercise performance and protect against ethanol-induced ulcer in gastric tissue. In the first experiment, 13 physically active male college students were divided into two groups (AG or placebo) and received supplementation for 4 wk, before the exhaustive running exercise. Treadmill speed was increased to a pace equivalent to 80% VO2max of the subject. In a second experiment, 32 male Wistar rats were randomized into four groups for treatment (n=8/group): supplementation with water (vehicle) and AG-1X, AG-2X and AG-5X at 0, 250, 500, and 1250 mg/kg, respectively, for 4 weeks. At day 29, 75% ethanol was given orally to each animal at 10 mL/kg to induce gastric ulceration for 2 h. We also investigated the possible mechanisms leading to AG-mediated gastric mucosal protection. The major findings of these two experiments were as following: (1) AG supplementation protected high-intensity treadmill running induced skeletal muscle damage; (2) AG treatments dose-dependently decreased the pro-inflammatory mediators and the expression of pro-apoptotic proteins level, increased the levels of anti-apoptotic proteins. Therefore, AG could have pharmacological potential to be a sports supplement and for treating gastric ulcer.
Key words: American ginseng, exercise performance, gastric ulcer; inflammation; apoptosis

13-P-42

Comparison of Colonic Transit Time With Physical Activity Amount in Mental Illness Unit Patients

Bong Kil Song , Yeon Soo Kim, On Lee, Hyun Jin Kwon
Health and Exercise Science Laboratory, Institute of Sports Science, Seoul National University, Korea

Physical activity (PA) is associated with a reduced risk of colorectal cancer. we examined the colon transit time (CTT) according to the physical activity amount in mental illness unit patients. The study subjects included 67 adults, with a mean age of 49.8 years. The subjects used an accelerometer for seven days to measure their one-week total energy expenditure (TEE). The subjects took a capsule containing 20 radio-opaque markers for three days. On the fourth day and seventh day, a supine abdominal radiography was performed. According to the TEE of all study subjects, the upper 30%, middle 30%, and lower 40% were classified into groups according to high (H), moderate (M), and low (L) PA. The mean total CTT was 52.0 hours. The segmental CTT for the right, left, and recto-sigmoid colon were, 15.3 hours, 19.2 hours, and 17.4 hours. TCTT in the H group was significantly shorter than in the L group ($P = 0.010$). A comparison of the segmental CTT between the L, M, and H groups showed that the right CTT ($P = 0.010$) of the H group was significantly shorter than that of the M group. The left CTT of the M group ($P = 0.028$) and H group ($P = 0.004$) was significantly shorter than that of the L group. The recto-sigmoid CTT ($P = 0.016$) of the M group was significantly shorter than that of the L group. The study showed that moderate and high TEE was assisted with reduced colon transit time.
Key words: Physical activity; Colonic transit time; Accelerometer; Radio-opaque marker; Total energy expenditure

13-P-43

The Effect of Exercise on Expression of Myokines in Colon Cancer-induced Mice

JuneHong Kim, EuHyo Cho, DongSuk Han, YoungSin Kim, HeeJae Lee, SoHyeon Jeong, ByungGul Yim, JaeHwan Kim, TaeWon Jun
Seoul National University, Korea

Recently accumulating evidence indicated that exercise induces the release of cytokines from contracting muscles. These myokines are known as a role in metabolism, also in cancer protection. It was shown that muscle-induced OSM and SPARC can inhibit cancer cell proliferation and induce cancer cell apoptosis in vitro.The purpose of the present study was to investigate whether exercise release SPARC and OSM from contracting muscles and other tissues according to exercise intensity. ICR mice(n=60) at 6-wk old were injected AOM and were treated 3 cycles of DSS solution in drinking water to induce colon cancer. Then at 17-wk old, mice were divided into four groups: Control group(CON), Low intensity exercise group(LIE), Moderate Intensity Exercise group(MIE), High Intensity Exercise group(HIE). All exercise groups performed treadmill exercise at different intensity for 30 minutes, 5 days per week, during 12 weeks. OSM and SPARC was evaluated in muscle, serum, and tumor tissue. We used Elisa assay kit for analysis of OSM and SPARC. The OSM expression was significantly different among exercise groups by exercise intensity in muscle tissue (p=.000); LIE (p= .014), MIE (p=.000), HIE (p=.000), in tumor tissue (p=.000); LIE (p= .000), MIE (p=.000), HIE (p=.000). Also the expression of SPARC were significantly different in muscle tissue (p=.001); LIE (p= .035), MIE (p=.001), HIE (p=.007), in tumor tissue (p=.000); MIE (p=.000), HIE (p=.000). In conclusion, this study showed that exercise induced the expression of OSM and SPARC in several tissues by exercise stimulus, which is associated with apoptosis in tumor cells. And the magnitude of OSM and SPARC induction in muscle and tumor tissue was relatively higher in moderate and high intensity exercise groups than low intensity exercise group.

Key words: Exercise, colon, myokine, OSM, SPARC(ON)

13-P-44

Case study of training of 2012 Paralympics swimming medalist
—Relationship between changes in performance and changes in the training program of the 2012-2013 Season—

Noguchi T[1], Suzuki J[2]
[1]Nihon University, Japan; [2]Tamagawa University, Japan

There are many reports that resistance training (RT) can help improve swimming performance. In 2011, we arranged a program of RT for a blind swimmer on the Japanese national team that competed in the 2012 London Paralympic Games. We were able to assess the training effect by observing the change in stroke parameters during the race. In the breaststroke and butterfly strokes, an increase in stroke frequency was the main indicator of performance improvement; it is possible that an increase in fist strength due to RT contributed towards this improvement (Noguchi, et al. 2013). However, it has been presumed that much RT program were ipsilateral, that makes difficult to clearly improvement of performance in crawl sprint events (Noguchi et al, 2012). It has been assumed that RT also requires upper arm and forearms muscle strength improvement(Noguchi et al, 2013). Based on these results, we restructured the RT and swim training program from 2012, in preparation for the 2013 season. The new training program was designed to increase stroke length. As a result of this training, we observed an increase in stroke length in both 100 m breaststroke and the 50 m freestyle races during the 2013 World Championships. In this presentation, we explore these training techniques in detail, and discuss the outlook for the future.

Key words: Swimming, Blind swimmer, Training program, Stroke Parameter,