

Oral Presentation

12-OA-1

Desirable and Undesirable Behaviours of Coaches Perceived by Japanese Collegiate Students

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Coach-athlete relationship is one of the important factors in effective coaching and has been reported to affect athlete's performance and the sense of well-being. There have been quite a large number of coach's mal-behaviours, including corporal punishments and verbal abuses, reported recently in Japan. When evaluating coach's behaviours, it is important to include athletes' perceptions as well. In the present study, desirable and undesirable behaviours of coaches, perceived by 108 collegiate students in the past (either experienced, heard, or observed) were collected using an on-line questionnaire. This questionnaire was conducted anonymously, in a free response format. The participants were asked to write at least 5 items in each of desirable and undesirable behaviours. As a result, 604 and 599 items were collected for desirable and undesirable behaviours, respectively. These items were then analysed qualitatively to form categories in which items with similar meanings were gathered. These results would be useful for coaches to modify their coaching behaviours. In researches such as systematic observation, the yielded categories can be used to evaluate coaches.

Key words: Mal-behaviours, qualitative analysis, questionnaire

12-OA-2

A Comparison of Expert and Beginner Strength and Conditioning Coaches Behaviour

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Strength and Conditioning (S&C) coach is responsible for improving athlete's athletic performance by various training (e.g. weight training). Most studies conducted in the strength and conditioning domain focus on 'What to do' rather than 'How to do', and not many studies have conducted on how S&C coaches practice their training sessions. Depending on how coaches act, athletes achieve many aspects of outcomes (Cote, 2010; Bartholomew et al., 2009). The purpose of this study was to observe and compare behavioural differences between expert and beginner S&C coaches. In this study, a systematic observation approach was selected to elucidate expert and beginner coaches' behavioural differences. Modified Arizona State University Observation Instrument (ASUOI) developed by Massey et al (2002) was used in this study. Two S&C coaches, 1 expert and 1 beginner coaches, were observed. Three sessions were observed for each coach and 40 minutes fundamental training sessions, excluding warm-up and cool-down part were videotaped for more accurate coding of behaviour. Checks for interobserver agreement were made at the end of the research. There were some behavioural differences between expert and beginner coaches. These findings would help to develop beginner coaches' skills.

Key words: Strength and Conditioning, Coaching, Systematic observation

12-OA-3

Systematize the Physical Fitness Level and Participation in Sports Activities of Selected Prospective Teachers in Sri Lanka

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Irregular participation for physical fitness program is appeared in the most of the teacher trainees in the National college of education in Sri Lanka. It was further revealed and identified that the main reason for this was their lack of understanding about this program. Among them some students had irregular participation while the others shows long term absence. Due to this reason they were very lethargic in studies and it was very difficult to develop their skills & attitudes those students were at a disadvantage of getting low marks in college system. In order to carry out the action research first selected a sample. The sample consisted of 25 prospective teachers. Data were collected through a baseline questionnaire, participant observation, survey on field based physical fitness test (selected test items from National Physical Fitness Test Battery, India). Categorized the trainees into 4 groups by their participation for the sports programs. Group 1 -The trainees who have engaged in physical activities only in the teacher training college, Group 2 -The trainees who have engaged in physical activities from the childhood

and in teacher training college, Group 3 -The trainees who have engaged in physical activities from the childhood and didn't participate in physical fitness program, Group 4 – The trainees who have not engaged in physical activities from the childhood and also didn't participate in physical fitness program. After the first fitness test they participated to a special physical fitness program which have morning conditioning program with minor games for one hour in every day and 2 hours sports activity with lead up games program twice a week. It was revealed that the trainee's physical fitness levels who had been engaged in sport during school or childhood are much talented than the teacher trainees who had only participated in the sports activities done in the college. It can be concluded that the action research support to maximize the participation for physical activities and develop the fitness level of teacher trainees.

Key words: Physical fitness, Teacher training, Education

12-OA-4

Concept Design of New Comprehensive Community Sport Club Using Information and Communication Technology (ICT)

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Comprehensive community sports club is a new type of sport club recommended by the ministry of education. Many sports clubs, however, faces the problems such as lack of working capitals, instructors, sports programs and club participants. The purposes of this study are to design the new concept of comprehensive community sport club using Information, Communication Technology (ICT) and to construct the basis ICT system for this sports club. To perform these purposes, the LAMP (Linux, Apache, MySQL and PHP) system and the client server type network between club manager and club participants were constructed on Internet. The information about sport programs, schedule, training menus (practice) and purpose are offered to participants in advance using systems. Furthermore, various pictures in practice, advices from coaches (Instructors) about practice and scientific data, for example of kinetic and kinematic video analysis, are offered after practice. Additionally, WEB Portfolio is offered as a practice diary. Currently, these systems are running in swimming, ski, tennis, soccer and kin-ball program. Several sports clubs are integrated functionally using these systems and new concept of comprehensive community sport club is designed. This study is supported by the Sumitomo Health Sciences Foundation.

Key words: Concept Design, New Comprehensive Community Sport Club, Information and Communication Technology (ICT)

12-OA-5

The Comparison of the Formulated Optimal Bicycle Seat Height and the Actual Saddle Height for the Elite Cyclists

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Bike Fitting is appropriate bike adjustment according with the body structure of rider. Setting saddle height is the first step. Therefore, the purpose of this study was to explore the difference between saddle height by Greg LeMond method and the actual saddle height for the elite cyclists. Six cyclists volunteered for the study. The Inseam, actual saddle height and the knee angle were measured. The difference between two methods were analysed by pair t-test and significance level set at $P < 0.05$ level. The formulated saddle height (65.1±3.5cm) with Greg LeMond method was significantly lower than the actual saddle height (69.8±4.1cm). The actual ratio of saddle height and the inseam length were 0.93 ± 0.03 (0.91~0.97). The mean of knee angle for both legs were $29.6^\circ \pm 1.9^\circ$. The knee angle derived from the Greg LeMond method and measured inseam length were $49.6^\circ \pm 6.6^\circ$ and about 20° flexion more than the actual knee angle. The actual knee angle only through the elite cyclists experience were in the range of the recommended knee angle 25° - 35° in line with previous research. However, the knee angle derived from the Greg method showed more flexion and out of the recommended range 25° - 35° . It may be due to the formula did not consider the Asian anthropometry difference and did not including the foot size and the crank length variables. It suggests that the bike fitting for Asian cyclists at formulated saddle height may need to consider the recommended range of knee angle and the racial anthropometry difference.

12-OB-1

Effects of Blood Flow Restriction Exercise on Body Composition and Muscular Strength of Korean Middle Aged Women

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The aim of this study was to examine body composition and muscular strength responses to two types of resistance training protocols in Korean middle aged women. Twenty three healthy middle aged women completed 8 weeks of general resistance exercise (RE, n=7), blood flow restriction exercise (BFR, n=9) and no exercise (CON, n=7) three times per week. Both upper and lower body exercises were performed for with specific intensity for each group. For RE group, subjects were trained with 65~70% load of 1RM. For BFR group, subjects were trained with 30% load of 1RM and the restrictive pressures were applied by 100% and 120% of systolic blood pressure for upper limbs and hind limbs each for each participant. Body composition and muscular strength were measured by dual energy X-ray absorptiometry(DXA) and isokinetic dynamometer before and after the training session. Body weight, muscle mass of upper and lower limbs, fat mass of upper limbs, circumference of upper and lower limbs were detected significant changes in BFR group comparing to RE group. For the muscular strength, upper limbs showed the increased total work and peak torque/weight at 60°/120° of flexor muscle in BFR group. Hind limbs showed that total work and peak torque/weight were increased at 60° of flexor muscle and total work were increased at 60°/180° of extensor muscle, peak torque/weight at 180° of flexor muscle in BFR group. The findings indicated that restrictive pressure applied on limbs with relatively lower load of intensity during BFR exercise significantly affected the changes on body composition and muscle strength in Korean middle aged women.

Key words: blood flow restriction, exercise, body composition, muscular strength for this paper.

12-OB-2

The Effects of Resistance Interval and Constant Training on Muscular Hemodynamic of Different Motion Speed in Health Men

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The purpose of this study was to investigate the effects of resistance interval (RIT) and constant (RCT) training on muscular hemodynamic/metabolic responses to different angular knee velocities isokinetic exercise. Thirty-six health males were randomly divided into RIT and RCT groups. The subjects were trained at alternating 60°-180°/s (RIT, n=18) or constant 120°/s (RCT, n=18) in knee extension/flexion for 6 to 10 sessions for 2 days/week for 6 weeks. A maximum voluntary contraction (MVC) test was performed at isokinetic contraction with five different angular knee velocities including 30°/s, 60°/s, 120°/s, 180°/s, and 240°/s, each velocity for 5 repetitions. A near-infrared light is emitted from an optode in two wavelengths (860 and 784 nm), and was applied to assess dynamic changes of deoxy-hemoglobin (HHb), oxyhemoglobin (O₂Hb) and local blood flow (THb) in vastus lateralis. The results indicated that both groups significantly increased the muscle peak torque in MVC test of all angular knee velocities after training. And the NIRS muscular hemodynamic data showed that both groups has no significantly change in HHb of all angular knee velocities, but in RIT group that showed significantly reduced THb and O₂Hb in 120°/s, 180°/s, and 240°/s. It's means that RIT improved O₂ extraction in fast muscle movements. We conclude that RIT effectively improves hemodynamic/metabolic efficiencies in contracting skeletal muscles compared to RCT.

Key words: NIRS, isokinetic, muscular hemodynamic

12-OB-4

Assessment of a Instructional Improved Integrated Movement Skills Coaching Mode For Junior Students

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The purpose of this study was to prove the hypothesis that it practical to put the development of initiative quickness of moving and speed frequency as top priority to arouse the enhancement of coordination and other initial skills of junior students. and whether it effective to combine the practice of balance position with non-balance position practice for the comprehensive accomplishment of skill acquirement.. The experimental coaching mode selected from 25 coaching means for the subjects undertaken in the experimental group was divided into three stages:

quickness & power unit(U1) in the first period , multiple-dimension components of movement unit(U2) in the second; and balance & coordination unit(U3) in the third stage. After 12-weeks experimental training, the study assessed the movement capabilities level of experimental group and compared the performance with what recorded in the contrasting group using routine coaching methods and contents. The study showed the practice of U1 , U2 play a key role for movement achievements, substantial improvement ($p<0.05$) in maximum constant work rate tests time was noted at 6 to 8 weeks, while no significant inter-group difference of U3 practice although improvements existed. Based on correlated data processing, the study brought forward the assessing contents, methods and standards of coaching mode. After comparing the performance of the students in contrasting group, the study proved effective of suggested U1,U2 and U3 instructional coaching mode for integrated movement skill enhancements of junior students. Three dimensionality movements of U1 , U2 ,and U3 should be included in the coaching in order to achieve a effective integrated movement development. In that case, the study brought forward the assessable contents, methods and standards of a instructional coaching category of U1, U2,and U3 for integrated movement skill improvement of junior students.

Key words: three dimensionality movements, coaching mode, assessment

12-OB-5

Intervention to Take the Body Mass Index of Six School Children, Whose BMI has Exceeded the Risk Level, to Optimal Level through Sports Activities.

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Health sources state that 20% of the school children in Sri Lanka are running the risk of diabetes due to the fact that the parents direct them to the competitive academic channel forgetting the nutritional needs, leisure and physical activities required, feeding them with instant food items with a view to see them dominate the educational targets which the parents themselves could not reach. Accordingly, this study aims at finding out the ways and means of taking the children's health condition to the optimal level while exposing them simply to the playful and active life letting them have the required nutrition. Objective of this research was to identify the BMI level and food habits of selected school children and to intervene to take the body mass index of six school children whose BMI has exceeded the risk level, to optimal level through sports activities. Action Research method was understood to be the ideal to the above in order for this survey to be carried out in a very stress-free and an attractive manner and also the most suitable for the surveyor in decision making within his perimeter of visibility and audibility. At the same time, this methodology eases the collection of data through first hand observation and preparation of remedial measures. It was observed that the students, having understood their health risk, could lose their body weight to the required level as a result of engaging in various rhythmic sports activities for 30 minutes every morning and afternoon and further, not only they found their body shape remarkably changed but also this process became a part of their daily routine and as a result of which their health problems were gradually getting decreased. At the same time, it was observed that they were compelled to a daily nutritious diet having deviated them from instant food consumption to a minimum level. The pre-status of the target group; the BMI was 27.23 ± 1.2 and after 30 minutes of activities a day for three consecutive weeks the BMI was 26.54 ± 1.1 . Therefore, a long term intervention is felt to be much needed when concerning the prevailing situation and the main target is to get the BMI down to a value of 18 – 23 kg. This study was a golden opportunity to have a first-hand experience as a trainer as well as a teacher not only to know as to how this methodology could be applied in order to maintain body fitness through changing the food habits but also the obesity and the body weight could be reduced with getting the six selected students engaged in the intervention activity.

Key words: BMI, Sports Activities, Nutritional Needs

13-OA-1

What Makes an Ideal Coach for Top-Level Japanese Female Judo Athletes

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The purpose of this study was to reveal an ideal coach for top-level female judo athletes in Japan. Five top-level (international level) female Judo ex-athletes participated in this study. Semi-structured interviews were conducted which lasted between 34 and 72min. Recorded conversations were transcribed verbatim into text data. Steps for Coding and Theorization technique was used to analyze data qualitatively, which yielded a story line for each

informant. The overall hypothetical model of an ideal coach for the ex-athletes was then developed. The ideal coach for them could develop competence of athletes and have interpersonal knowledge and respectful character, who could create positive environments which foster athletes' autonomy and motivation. The ideal coach would pursue winning but not winning at all costs, and use Judo as a vehicle to build good character. These results imply that international level coaches should develop athletes using holistic approach.

Key words: Qualitative analysis, competence, character, autonomy, motivation, holistic

13-OA-2

The Effects of Plyometric Training on the Blocking Agility of Volleyball Players

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The primary objective of the present study was to explore the influence of plyometric training on the blocking agility of volleyball players. A total of 24 male volleyball players in Taiwan were used as the research subjects. The subjects were equally divided into a plyometric training group (PTG) and a control group (CG). An agility T-test, counter movement jump (CMJ) test, and blocking agility test were used to examine the influence of plyometric training on the blocking agility of volleyball players. A single-factor analysis of covariance was applied to obtain the variables for the two groups. The posttest results of the agility T-test (5.7% faster), CMJ test (9.3% improved), and blocking agility test (3.7% faster) indicated that the PTG demonstrated a significantly superior performance compared with that of the CG. Furthermore, the posttest results for the PTG were significantly superior to that of the CG in Positions 2, 3 and 4 (3.7%, 2.5% and 3.0% faster, respectively). Therefore, implementing 6 weeks of plyometric training can effectively increase the movement agility, lower extremity power (peak power output velocity of CMJ), and blocking agility of volleyball players. The results of the present study indicate that appropriate plyometric training can increase the agility applied to horizontal movement, increase the rate of force development for vertical jumps, significantly enhance the combined agility of volleyball players regarding movement and blocking agility, improve lower extremity muscle strength and movement coordination, and enable players to rapidly perform blocking.

Key words: agility T-test, counter movement jumps (CMJ), blocking agility

13-OA-3

The Influence of Physical Fatigue on Balance of Volleyball Players

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This study was aimed to investigate the effects of before and after physical fatigue on static and dynamic equilibrium performance in volleyball players. Twelve inter-colleague elite male volleyball players were recruited in this study to implement static balance (SB), dynamic balance (DB), fatigue static balance (FSB), and fatigue dynamic balance (FDB) and measure the center of pressure (COP) by force plate. Experimental data regarding the force plate were analysed using a computer program written in MATLAB to calculate the radius of Center of Pressure (COP), velocity of Center of Pressure (COP) shifting, and square of Center of Pressure (COP). Two-way ANOVA was conducted to examine differences in the variables. The results revealed that the COP FSB and FDB were significant bigger than the COP of SB and DB at all aspects after the general muscle fatigue protocol. The equilibrium capability might be reduced and affected the athletes' proprioception after muscle fatigue.

Keywords: center of pressure, general muscle fatigue, proprioception

13-OA-4

A Study of the Prescribed Regulation in Japanese Basketball Coaching (from the End of 1910 to 1940)

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In the regulation of Japanese basketball after the 1917, what coach could do was only substitution because giving instruction to the players on the court by coach was prohibited except at the half time. Furthermore, conversation between the players on the court and players who substitute to the players on the court before the resume of the game was prohibited and also limited the number of substitution for each player at that time of regulation. Because of these limitations, the coaching using the substitution was limited. Therefore, the aim of this study is to examine the what kind of coaching methods was utilized in the restriction by the regulation of the Japanese basketball during the end of 1910 to 1940. The regulation of Japanese basketball after the 1917 limited the coaching which utilized the substitution, but coach used the substitution and gave the instruction to him/her players within the regulations. Moreover, player's role in each position was specifically distinguished at that time. Coach utilized the substitution to create the mismatch of the role of each player to develop the offense with advantages. Furthermore, since basketball game got more intense in the middle of the 1920, coach made substitution the player who exhausted for maintaining the strength on the court.

Key words: Substitution, History, Tactic

13-OA-5

The Relationships between Lower Extremities Strength and Jump Performance of Elite Basketball Player.

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The purpose of this study was to evaluate the relationships between lower extremities strength and jump performance. Nineteen collegiate physical education major students (height: 177.5±7.7 cm, mass: 70.8±10.8 kg, age: 20±1.9 yrs) volunteered as participants. Lower extremities strength were measured by Biodex S4 Pro in knee (120°/s, 240°/s & 360°/s) and ankle (60°/s & 120°/s) concentric mode. The jump performance was measured by AMTI force plate for single / feet of Counter Movement Jump (CMJ). Repeated measure *t* test and Pearson analysis were used to analyze the difference and correlation between lower strength and jump performance. Results showed that no significant difference between limbs in knee and ankle strength profiles. The right foot CMJ jumping performance was significantly higher than the left foot CMJ ($p < .05$). Significant correlations were found between peak torque strength and bilateral performance in knee 240°/s & 360°/s ($r = 0.45$ to 0.71 , $p < .05$), and right foot CMJ performance in knee 120°/s, 240°/s & 360°/s ($r = 0.61$ to 0.70 , $p < .05$). In addition, there is no significant correlation between ankle peak torque strength and bilateral performance in ankle 60°/s, 120°/s. It is concluded that the bilateral/unilateral jump performance has very close relationship with knee strength but the knee extension strength might play an important role in it.

Keywords: Muscle strength, Knee flexion/extension, Counter movement jump

13-OA-6

Time and Steps in Sprint Bounding: Their Significant Correlation with Muscle Strength Characteristics

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Sprint bounding, which closely relates to sprinting performance, is commonly evaluated with time and steps. However, studies about what kind of muscle strength characteristics relate to these parameters have yet to be shown. This study aims to demonstrate the relationships between sprint bounding and muscle strength characteristics. We analyzed 14 male college sprinters as subjects (age 19.7 ± 0.7 years; height 173.3 ± 4.6cm; weight 66.2 ± 4.7kg) by measuring time and steps in 100m sprint bounding from natural standing position. Furthermore, we measured isokinetic maximal strength figured by concentric contraction at a knee joint and a hip joint for the purpose of evaluating muscle strength characteristics. It was hip joint isokinetic maximal strength set out at 60 degrees/s (flexion: $r = -0.58$, $p = 0.03$ / extension: $r = -0.56$, $p = 0.04$), as a result, that showed a significant correlation with time in

100m sprint bounding. Also, knee joint isokinetic maximal strength set out at 180 degrees/s ($r=-0.55$, $p=0.04$) resulted in a significant correlation with steps in 100m sprint bounding. Previous studies have shown that isokinetic maximal strength at knee and hip joints relate to maximal running speed in sprinting performance. The results of this study, therefore, indicate that time and steps in sprint bounding can be useful as a measure which evaluates performance at full speed phase. Since the findings show strength of hip joint muscles relate to time and strength of knee joint muscles relate to steps, moreover, measuring time and steps in 100m sprint bounding is greatly helpful to understand muscle strength characteristics at full speed phase.

Key words: 100m sprint bounding, isokinetic maximal strength, knee joint, hip joint

13-OA-7

The Upper Limb Electromyogram Analysis of the World-Class Bowler

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The main purpose of this study was to analyze the muscle recruitment characteristic in spinner release and hook release on national ten-pin bowling player. The responses of electromyogram (EMG) of one subject's upper limb were recorded from 10 times of successful strike in spinner release and hook release. Collected data were analyzed with SPSS 10.0. The results were as follows : 1. The spinner had larger mean amplitude of EMG (AEMG) and integrate EMG (IEMG) in both forward swing and backing swing than the hook. It may relate to that heavier weight recruits deeper muscle fibers first resulting in smaller EMG for hook release. Contrarily, the hook had larger AEMG and IEMG values in extending phase. It may result from the selective recruitment of fast-twitch fibers at the moment of releasing lead to shortening reaction time of neuromuscular. 2. The AEMG and IEMG values were larger in Deltoid than in Biceps, Triceps, Extensor Carpi Ulnaris, and Flexor Carpi Radialis during forward/back swing, releasing and extending motion in both spinner and hook. The results indicate that the stability and muscle recruitment characteristics generated by different bowling techniques can be measured by the study of Sports Biomechanics.

Key words: hook, spinner, case studying, release, biomechanics

13-OA-8

Normative Knee Strength and Contraction Profile in Collegiate Adults

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Knee strength is an important prerequisite not only for excellent sports performance, but also for joint stability and injury prevention of the lower limb. The purpose of this study was to evaluate the knee flexion/extension concentric strength in young colligates adults for understanding and normative values. Thirty-nine young colligate physical education major students (18 males and 21 females) volunteered as participants. Knee flexion/extension concentric strength were measured by Biodex S4 Pro at 60°/s, 120 °/s, and 240 °/s, respectively. Repeated measure *t* tests were used to analyze the differences between limbs at different angular velocities. Results showed that there were no significant differences between limbs in female knee flexion/extension strength profiles at each angular velocity. However, significant differences were found between limbs in male knee flexion strength profiles at 120°/s & 240°/s angular velocity, and knee extension strength profiles at 60°/s & 120°/s angular velocity. Furthermore, the male adults showed shorter time to peak torque than female adults. It is concluded that the knee flexion/extension isokinetic strength and concentration were demonstrated limb discrepancies in male and female adults, might be related to the physical conditioning and gender differences.

Key words: Reference value 、 Strength profile 、 Peak torque

13-OA-9

Effect of a Repeated Bout of Maximal Eccentric Exercise of the Contralateral Elbow Flexors on Repeated Bout Effect

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The purpose of this study tested the hypotheses that whether repeated bout effect conferred by the first bout of maximal eccentric exercise (MAX1) using a dominant (DA) and non-dominant arms (NDA) would be affected against a subsequent bout of eccentric exercise (MAX2). The subjects were twenty-four young men were allocated to NDA, DA or control (CON) group (n=8 per group). NDA group performed MAX2 (i.e., 30 eccentric contractions at the angular velocity of 30°/s) using DA at 4-8 weeks after MAX1 of NDA. DA group performed MAX2 using NDA at 4-8 weeks after MAX1 of DA. The CON group performed MAX2 at 2-4 weeks after MAX1 using the same NDA. Changes in maximal isometric strength (MVC), muscle soreness (SOR), range of motion (ROM) were measured before, immediately after, 2 and 4 days after each bout. Changes in all dependent variables were compared by a two-way of repeated-measures ANOVA. The results of this study showed that MVC, ROM, and SOR following MAX1 for ND, DA, and CON groups showed significantly ($P<0.05$) changed compared to baselines. Changes in the above dependent variables following MAX2 for NDA and CON groups were significantly ($P<0.05$) smaller than DA group. These results suggest that contralateral RBE conferred by MAX1 of NDA against MAX2 of DA, but this was not a case if MAX1 performed by DA followed by NDA. Thus, contralateral RBE conferred by MAX1 against subsequent bout of eccentric exercise-induced muscle damage has order effect.

Key Words: cross transfer, dominant arm, non-dominant arm

13-OA-10

The Effect of FMS-Based Training Program on Pitching Pattern for an Elite Pitcher

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The Functional Movement Screen (FMS) had demonstrated some efficacy in screening and identify physical or functional limitation by capturing fundamental movements, motor control within movement patterns and uncomplicated skills. Therefore, the purpose of the study was to diagnose potential movement's limitation by 3D analysis of pitching movement, FMS test and isokinetic measurement for a 3A minor league pitcher. The pitcher was re-evaluated with pitching movement and FMS after 3 month FMS-based training. We found that the imbalances shoulder flexors/extensors strength ratio at pre-training. In addition, the muscle strength asymmetry was also observed in the subject's knees, hip, and trunk. In FMS test, trunk stability control, coordination and mobility of lower extremities were at weak level, and premature pelvis rotation during pitching. A particular 3 month training program was designed base on the diagnostic results to stress on shoulder, trunk, pelvis stability and agonist/antagonist balance. In the pitching test after training program, the subject had showed greater pelvic rotation, forward trunk tilt and lead knee extension angular velocity at the instant of ball release, greater lead knee extension during the approach to ball release. The result showed that FMS may be an effective diagnostic tool to combine the pitching movement assessment to design the training. Coaches, conditioning coaches, and athletic trainers can use the tool to observe joint motion range and muscle flexibility of athletes. It may help to prevent sport injuries and enhance sport performance.

Key words: Baseball Pitcher, Functional Movement Screen, Movement Diagnosis

13-OA-11

The Risks of Baseball Pitcher's Elbow Injuries

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Among all of baseball pitchers injuries, there are 51.4% for upper extremity, 30.6% for lower extremity and 11.7% for the spine and core musculature and other injuries and illnesses were 6.3%. The most of baseball injuries were upper extremity injuries. However the greater part of upper extremity injuries were shoulder and elbow injuries.

There were approximately 32%-35% baseball players experience shoulder pain and 17%-58% for elbow pain. Any injuries may cause the baseball player decrease baseball performance, prolong time loss from sports, decrease quality of life, increase cost even retirement from baseball. Shoulder injuries can prevent and heal through strength training and surgery, but surgery is necessary to elbow injuries if the pitcher wants to return to pitching baseball. Kuwata Masumi, Igarashi Ryota, Kubo Yuuya and Wei-Yin Chen all had elbow injury and having Tommy John surgery before. Some pitchers even had more than once surgery at the same position, for example, Hong-Chih Kuo had five Tommy John surgery from 2000 to 2011. So the most important thing to decrease occurring injuries is finding the risk of injuries. Elbow valgus torque was be confirmed to occur the elbow injuries. Elbow valgus moment create tension force on medial elbow, compression force on lateral joint and shear force on posterior elbow, these forces may lead to elbow injuries including ulnar collateral ligament(UCL) sprain, medial epicondyle apophysitis, ulnar neuritis, flexor-pronator muscle strain, olecranon impingement, olecranon stress fracture and osteochondritis dissecans of the capitellum. Effect the elbow valgus torque including ball velocity, muscle strength, fatigue, temporal sequencing, pitching type and pitching technique. All of these factors final influence pitching technique, so having proper pitching technique not only can enhance performance but also reduce injuries occur.

Key words: baseball, elbow injuries

13-OA-12

Effect of Acute High-Intensity Intermittent Exercise on Cardiac Biomarkers

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The aim of this study was to determine the responses of creatine kinase-MB (CK-MB), cardiac troponin I (cTnI), and N-terminal proB-type natriuretic peptide (NT-proBNP) following a single bout of high-intensity intermittent exercise (HIIE). Eight healthy, adult males were recruited to the counterbalanced and cross-over study. Participants performed both HIIE trial (Trial I) and moderate-intensity continuous exercise trial (Trial C) by a cycle ergometer. Trial I included 6 bouts of cycling at an average intensity of 85% $\dot{V}O_2\text{max}$ with each bout lasting for 4 min, and separated by 3 min of rest. Trial C included 36 min of continuous cycling at the intensity of ~57% $\dot{V}O_2\text{max}$. The total workout of Trial I was similar to Trial C. Venous blood samples were drawn at pre-exercise, and 30 min, 3 h, and 24 h post-exercise to determine the activities of CK and CK-MB as well as the concentrations of cTnI and NT-proBNP. A two-way ANOVA with repeated measures was used to compare the level of cardiac biomarkers between the trials and time points. No cTnI-positive sample was found before the exercise trials. However, there were 3 individuals in Trial I with a positive cTnI value at 3 h post-exercise. CK-MB levels were significantly increased following both Trial I and Trial C. No changes in CK, CK-MB/CK (%), and NT-proBNP were observed before and after the two trials. HIIE could induce a minor elevation in cTnI as compare to the traditional continuous exercise model but did not cause the myocardial overloading.

Key words: creatine kinase-MB, cardiac troponin, N-terminal proB-type natriuretic peptide

13-OB-1

The Effect of Continuous Rugby Matches on Oxidative Damage and Antioxidant Enzymes in Youth Players

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The purpose of this study was to investigate the effect of continuous rugby matches on oxidative stress and antioxidant enzymes in youth players. Thirteen healthy senior high school male rugby players (age 17 ± 1 yr, height 171.7 ± 7.4 cm, weight 73.7 ± 10.5 kg, mean \pm SD) participated in this study. The subjects engaged rugby match once a day for three days. Plasma levels of thiobarbituric acid reactive substances (TBARS), superoxide dismutase activity (SOD), catalase activity (CAT) were measured at pre-match and 20 hrs post every match. One-way ANOVA with repeated measures was adopted and statistical significance was considered at $p < .05$. The results of this study showed that the TBARS levels at 20 hrs post first match and 20 hrs post second match were significantly higher than pre-match, whereas the TBARS levels at 20 hrs post third match were significantly lower than 20 hrs post second match but not different compared to pre-match. A trend was found that SOD activity was increased with time, but only the levels at 20 hrs post third match were significantly higher than pre-match. There were no differences in CAT activity throughout this study. The findings of this study suggest that the continuous rugby

matches increased the lipid oxidative damage from the first match and subsequently induced antioxidant capacity to recover oxidative damage.

Key words: thiobarbituric acid reactive substances (TBARS), superoxide dismutase (SOD), catalase (CAT)

13-OB-2

Fuoidan Supplementation Improves Exercise Performance and Anti-Fatigue in Mice

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Laminaria Japonica Fuoidan (FCD) is a well-known bioactive constituent of seaweed extract which possess a wide spectrum of activities in biological systems including anti-cancer, anti-inflammation and modulation of immune systems. However, there are few studies for the use of FCD as supplement for exercise performance and physical fatigue. We aimed to evaluate the potential beneficial effects of FCD on ergogenic and anti-fatigue functions following physiological challenge. Male ICR mice from 3 groups ($n = 8$ per group) were orally administered FCD for 4 weeks at 0, 310 and 620 mg/kg/day, which were respectively designated the Vehicle, FCD-1X and FCD-2X groups. A trend analysis revealed that FCD supplementations increased the grip strength ($p=0.0002$) and endurance swimming time ($p=0.0195$) in a dose-depend manner. FCD treatments also produced dose-dependent decreases in serum levels of lactate ($p<0.0001$) and ammonia ($p=0.0025$), and also an increase in glucose level ($p<0.0001$) after the 15-min swimming test. The mechanism was related to the increased energy utilization (as blood glucose), and decreased serum lactate, ammonia and CK levels. Therefore, FCD could be a potential agent with an anti-fatigue pharmacological effect.

Key words: **Brown seaweed extract, Exercise performance, Forelimb grip strength**

13-OB-3

***Epimedium Brevicornum* Supplementation Improves Exercise Performance and Exhibits Anti-Fatigue Action in Mice**

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Epimedium is a well-known yang-invigorating agent in traditional Chinese medicine which can invigorate blood circulation, function as an anti-inflammatory agent and treat male reproductive problems. However, there is limited evidence for the effects of *Epimedium* on exercise performance and physical fatigue. We aimed to evaluate the potential beneficial effects of *Epimedium brevicornum* L. leaves water extract (EP) on ergogenic and anti-fatigue functions following physiological challenge. Male ICR mice from 4 groups ($n = 8$ per group) were orally administered EP for 2 weeks at 0, 2054 and 4108 mg/kg/day, which were respectively designated the Vehicle, EP-1X and EP-2X groups. The grip strength and exhaustive swimming time of the EP-2X group was significantly increased by 1.14- and 2.77-fold, respectively, than that of vehicle group. As well, after a 15-min swimming test, blood lactate was significantly lower with the 2 doses of EP than with vehicle alone. In addition, the activity of serum creatine kinase (CK), a marker of muscular damage, was significantly lower with the EP-1X than with vehicle alone post a 15-min swimming exercise. On trend analysis, grip strength and endurance swimming time dose-dependently increased with EP dose. Moreover, EP treatments significantly decreased lactate levels and slightly decreased serum CK activity in a dose-independent manner. Therefore, EP could be a potential agent with an anti-fatigue pharmacological effect. With its ergogenic and anti-fatigue functions, EP may have potential as an ergogenic aid in relevant fields.

Key words: Horny goat weed, Exercise performance, Forelimb grip strength

13-OB-4

Correlations Between Physical Performance and Biochemical Profile of Born Endurance Swimming Mice

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The purpose of this study was to investigate the potential biomarkers that determined the congenital aerobic exercise performance in experimental mouse model. Seventy-five male ICR mice (5-week-old) were raised one week for adaptation. Firstly, the mice were carried out on a non-loading and exhaustive swimming test, and assigned into three groups according to exhaustive swimming time without loading: (1) low exercise capacity between 1-3 hrs (LEC), (2) medium exercise capacity between 3-5 hrs (MEC), and (3) high exercise capacity over 5 hrs (HEC). After one-week resting, these three group mice was performed exhaustive swimming with 5% and 7.5% weight load at following weeks, respectively. All animals were sacrificed after one week rest. Blood samples were collected and the tissues were carefully excised, weighted and fixed with 10% formalin. The physical activity, including exhaustive swimming and grip strength, of the HEC was significantly higher than other groups. The swimming performance and grip strength between groups showed moderate correlation with significance ($p < 0.05$). In the correlations of biochemical variables, the sedentary condition of serum ammonium and glucose levels of HEC group showed significant moderate correlation with 7.5% weight load performance ($p < 0.05$). Furthermore, the pulmonary morphology of HEC group also seems to provide benefits for aerobic exercise. According to these results, we found that the congenital exercise performance exists in population and it exhibited significant correlations with different physical challenges and biochemical variables. We believed this study could provide different inspection to researchers interested in sport science to realize the possible interference on intrinsic differences in born aerobic exercise capacity.

Key words: Congenital, Exercise performance, Exhaustive swim, Forelimb grip, Ammonia

13-OB-5

Effects of Long-Term Progressive Strength Training on Muscle Functional and Functional Physical Fitness in Old Men

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The purpose of this study was to compare the changes in lower limb muscle function and functional fitness in response to progressive eccentric- and concentric-only training in old men. Twenty-four old men were recruited in the study, and then were randomly assigned into progressive eccentric- (ET, n=8) and concentric-only groups (CT, n=8), or a control group (CON, n=8). The subjects in the ET and CT groups were completed a 12-week training program using a leg extension machine. Maximal voluntary isokinetic contraction at 30°/s and 210°/s (MVC-30 & MVC-210), rate of velocity development at 30°/s and 210°/s (RVD-30 & RVD-210), 8 feet up and go, 30s chair stand up, and 6-min go were measured before, and after 12-week training. Data were analyzed by a two-way mixed design of analysis of variance. After 12 weeks progressive strength training, there were significantly greater improvement in the performance of MVC, RVD, 8 feet up and go, and 30s chair stand up in the ET and CT groups ($p < 0.05$), without significant difference in all measures between the ET and CT groups was observed. Compared to baseline, there was not a significant changes in all measures after 12-week of observation for the CON group. The results of this study showed that ET and CON progressive strength training in old men could be effectively produced the same extent of improvements of MVC, RVD, and functional physical fitness. Furthermore, muscle soreness was not induce during the 12-week of ET regardless of progressive increased in training intensity. Therefore, progressive ET can be used one of effective and safe training programmes for old individuals or the results of this study can be provided as the reference for old individuals when they pursuit to promote their healthy or anti-aging.

Key words: aging, muscle mass, muscle soreness

13-OB-6

An Assessment of ECG R-R Intervals and Walking Abilities During Walking Under Dual-tasks

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Recently, the dual-task literature is varied and includes a number of different gait and cognitive tasks to assess “attention while walking.” The extent to which these different gait or different cognitive resources, or test batteries, require additional tasks is unclear.

This study was carried out to investigate the effects of ECG R-R intervals, psychological stress and walking abilities while walking and doing cognitive tasks. The participants were fifteen healthy persons with a mean (SD) of 28.6 (7.4) years. Participants were instructed to walk 20m, turn around, and walk back 20m to the starting point at their preferred speed (single-task). The dual-tasks were a 40m walking test while announcing 4 and 5-digit numbers backwards. The test battery included gait speed, psychological stress scale, the number of all answers and correct answers, coefficient of variation (CV) and frequency analysis of RR intervals by electrocardiograph while walking under both cognitive tasks. Single-task walking and the two cognitive task performances were compared across groups using repeated measures analysis of variance. The values of CV and the ratio between low and high frequencies (LF/HF) among ECG, the number of correct answers, and psychological stress values in the 5-digit number condition were significantly more than that of the 4-digit number condition. There were no differences in walking speed, cadence and heart rates between the two dual-task conditions. The changes in CV and LF/HF among ECG while walking under a difficult cognitive task shows mainly in the facilitation of sympathetic nerve function. These results suggest that test batteries should add not only walking abilities but also ECG and psychological stress to evaluate the dual-task gait.

Key words: Dual-task gait, Test batteries, Electrocardiograph (ECG)

13-OB-7

The Comparison of Physiological and Biochemical Responses Between Acute Aquatic-Fitness Exercise and Treadmill Running on Land in Postmenopausal Women

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The aim of this study was to compare physiological and biochemical responses to low-impact aquatic-fitness exercises with running trails on treadmill. Eight postmenopausal women (59.1±4.1 years) conducted graded exercises by a bicycle ergometer to measure their maximum heart rate (HR_{max}) and peak oxygen uptake (VO_{2max}), and then each participant randomly performed 40-min exercise trials of either treadmill running on land or aquatic-fitness exercise. Each exercise trial included 5-min warm up, 30-min aerobic exercise, and 5min-cool down. Both aerobic exercises were conducted at three different intensity levels of low, moderate, and high intensities at 50%, 65%, and 80% heart rate reserve (HRR) respectively. After completing each trial, we recorded physiological and biochemical responses. These results showed that rating of perceived exertion (RPE) of aquatic fitness was significantly higher than treadmill running in high intensity stages ($p<0.05$). Blood pressure and lactate following aquatic fitness exercise were greater than following treadmill running trial within resemble HRR ranges. After 40-min exercise trial, the lactate of aquatic fitness exercise was 2.0-fold higher than the baseline, but was only 1.1-fold higher in treadmill running trail. Our results indicated subjective feelings and objective physiological and biochemical responses in aquatic fitness exercise were higher than in treadmill running on land. We concluded that for getting resemble target HR, postmenopausal women had more strenuous physical activity during aquatic aerobic course than treadmill running trial. Thus, this study could serve as a reference for the curriculum design of cardiorespiratory fitness between these two modal exercises.

Key words: aerobic exercise, heart rate reserve, rating of perceived exertion, blood pressure, lactate

13-OB-8

Blood Lactate Responses to Different Configurations of Hang Clean

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The capacity of lactate tolerance and power production simultaneously can be an important determinant of sport performance. The role of explosive hang clean in lactate production still needs further elucidation. The aim of the present study was to clarify the blood lactate responses to completing two different modes of hang clean: traditional and intermittent cluster. Fifteen intercollegiate men's basketball players (19.29 ± 1.30 years old) were randomly distributed to undergo two different configurations of hang clean: 1. traditional power clean (TPC): 8 sets x 5 repetitions x 80% of 1 RM with intra-set rest: 240 seconds and inter-repetition rest interval: 0 seconds; 2. interval cluster power clean (CPC): 8 sets x 5/1 repetitions x 80% of 1RM with intra-set rest: 120 seconds and inter-repetition rest interval: 30 seconds. Blood samples for lactate concentration were obtained after immediately, and at 3, 5, 7, as well as 10 minutes after exercise. Repeated measures two-way ANOVA, mixed design was used to examine the difference between two configurations. **Results:** The blood lactate differed between TPC and CPC ($F=1179.29$, $p<.05$) and the peak value of TPC appeared at 3 minutes (9.87 ± 1.98 mmol/L) but CPC at immediately (6.53 ± 0.62 mmol/L) after exercise. Otherwise, the values of heart rate, systolic and diastolic blood pressure were significantly affected by TPC and CPC. **Conclusions:** The present findings showed that the effects of TPC and CPC on lactate accumulation largely associated with intervening different rest interval between sets. TPC may impose greater lactate accumulation than CPC.

Key words: cluster training, intra-set rest, inter-repetition rest

13-OB-9

Effect of Plyometric Training on Dynamic Balance Performance in High School Basketball Players

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The purpose of this study was to evaluate the effect of 7-week plyometric training (PT) on dynamic balance (DB) performance in basketball players. Twenty-eight high school basketball players volunteered as participants. High school basketball players were assigned into PT or control groups by S method (jumping height) equally. All the players were underwent regular basketball practicing, 5 times per week for 7 weeks, but the PT group underwent extra PT (180 ~ 228 jumps) 3 times per week during this period. The DB was evaluated by the 8-direction limits of stability (LOS) test. A two-way mixed analysis of variance (ANOVA) was used to compare the differences between groups before and after training for each parameter. The results showed that 7 weeks PT can significantly improved the LOS performance level 6 overall, right, left-front, and left-back directions ($F=56, 19.95, 42.3, 19.24$, $p<.05$). The reason may be the improvement of lower limb neuromuscular control, and increase the overall performance of the dynamic stability limits. The results of this project will contribute to the development of basketball coaches application of plyometric training program and reduce the happening of lower limb injuries during practicing or competition.

Key words: Limits of stability, Postural control, Exercise training

13-OB-10

The Study of Swing Stability on Whole Body and Head-Neck by 3D Vestibular Training

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The purpose of this study was to compare the effects of stability on HN and WB swing area between pre-post 3D rotation motion. There are thirty healthy male subjects participated in this study. 3D rotation vestibular training strategy used FPZ™ multi-axis trainer was similar astronauts whole body rotation motion. Subjects received the training for 15 minutes or until they asked to stop within this training period. The measure of swing stability of HN used iTarget™ eye-wearing glasses with laser and camera instrument to collect the eye tracking pre-post training. Hereafter, the raw image data digitizing analysed by SigmaScan™ medical image software, to evaluate the object

shape area (OSA) parameter of HN stability assessment. Furthermore, this study synchronization experiment on the swing stability of BW used Prokin™ static balance assessment was measured pre-post training, to evaluate static balance of COP. All subjects stood above the balance platform to measure 1 minute for COP swing parameter collected. The swing area of HN parameter and COP of WB parameter statistics analysed by SPSS™ software make use of pair-t analysis for pre-post training. The human body get involved 3D vestibular training, from study result showed pre-post training on swing area of HN was 13.90 cm² and 18.42 cm² respectively. The swing area of BW was 27.06 cm² and 21.75 cm² respectively. From this study was found the HN swing stability was not significant difference ($p=0.14$) but the BW swing stability was significant difference ($p=0.01$). According to this result, 3D rotation training can effectively make induced the vestibular nerve reaction, in the future will provide an assessment of BW stability parameters and to develop vestibular training program.

Key words: astronauts, area, COP

13-OB-11

The Effects of Core Stability Training on Dynamic Balance in Healthy Young Students

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Postural stability has been defined as the ability to maintain an upright posture and to keep the center of gravity (COG) within the limits of the base of support. Core stability training (CST) is a kind of exercise drill to improve the coordination and performance in sports. The purpose of this study was to evaluate the effects of core training on dynamic balance in healthy young students. Twenty-four healthy collegiate female students (height: 162.3 ± 6.0 cm, weight: 54.1 ± 16.3kg, age: 20.1 ± 1.4 yrs) volunteered and underwent a series of CST exercise. The dynamic balance postural stability was evaluated by the 8-direction limits of stability (LOS) test. The CST was combined with the core stability and pilates training, ninety minutes, once per week, for six weeks. Repeated-measured *t* test was used to analyses the differences in each parameter before and after training. The LOS performance in right and backward-right directions at level 3 was significant improved in post-training than pre-training. Furthermore, The LOS performance in overall, forward, right, forward-left, backward-right, and backward-left directions at level 6 were significant improved in post-training than pre-training. It is concluded that regular CST can improve the dynamic postural stability in healthy young students.

Key words: Balance control, Center of gravity, Postural stability

13-OB-12

Test-retest Reliability of the Specific Fitness Test in Table Tennis Players

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The purpose of this study was to assess the reliability of aerobic fitness evaluation in table tennis players using specific fitness test. Twenty-three table-tennis athletes participated in the present study. (6 female, 17male; age: 18.18 ± 2.38 yr; playing experience: 9.55 ± 3.51 yr; height: 169.45 ± 6.19 cm; weigh: 62.98 ± 9.84 kg). The specific fitness test was executed by using a mechanical table tennis ball thrower (SMART-PONG) to control the exercise intensity. Each participant forehand topspin three position rally table tennis trials at frequency of 60 balls/min. The test was ended when there is voluntary exhaustion of the participants. The Polar heart rate (HR) monitor was used to record heart rate and duration of exercise. The test-retest interval was 3 days in between. Cronbach's α was used to examine the internal consistency, and intra-class correlation coefficient (ICC) was used to assess the level of agreement between test and retest data. The specific fitness test in table tennis athletes showed high internal consistency with a Cronbach's α coefficients of 0.91. Test-retest reliability of the sport specific test relating exercise time showed a excellent overall reliability with ICC of 0.91 ($p < .0001$). As for HR_{max}, there was a good test-retest reliability with ICC of 0.83 ($p < .0001$). The results show that the table tennis specific fitness test had high internal consistency and good-excellent test-retest reliability. The specific test is a reliable test and is recommended to be used to measure the sports related aerobic ability of table tennis players.

Key words: Fitness test, Forehand topspin, Aerobic capacity, Intraclass correlation coefficient