



iC*S*SM 2021



**INAUGURAL INTERNATIONAL CONFERENCE ON
SPORTS SCIENCE AND MANAGEMENT**
| *Sports for Excellence* |

CONFERENCE PROCEEDINGS

**Department of Sports Science
Faculty of Applied Sciences
University of Sri Jayewardenepura**

30th NOVEMBER 2021 - 01st DECEMBER 2021

held at

**UNIVERSITY OF SRI JAYEWARDENEPURA
NUGEGODA, SRI LANKA**



iCSSLM 2021

**INAUGURAL INTERNATIONAL CONFERENCE ON
SPORTS SCIENCE AND MANAGEMENT**
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**Department of Sports Science
Faculty of Applied Sciences
University of Sri Jayewardenepura**

30th NOVEMBER 2021 - 01st DECEMBER 2021

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The Inaugural International Conference on Sports Science and Management (iCSSM 2021) is organized by the Department of Sports Science, Faculty of Applied Sciences, University of Sri Jayewardenepura under the theme *Sports for Excellence*.

The main objectives of iCSSM 2021 are to provide a platform for Sports Science and Management undergraduates to publish their research findings and facilitate their research engagement in the Sports Science and Management domains.

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CONFERENCE PROGRAMME

Day 1- 30th November 2021: Inauguration Ceremony

- 15:00 – 15:05 **Inauguration**
University Anthem
- 15:05 – 15:15 **Welcome Address**
Dr. (Ms.) S. Weerasinghe
Co-Chair – iCSSM 2021 / Head, Department of Sports Science
- 15:15 – 15:25 **Address by the Vice-Chancellor, University of Sri Jaywardenepura**
Senior Professor S. S. L. W. Liyanage
- 15:25 – 15:35 **Address by the Dean, Faculty of Applied Sciences, University of Sri Jaywardenepura**
Senior Professor L. Karunanayake
- 15:35 – 15:45 **Documentary Video of the Department of Sports Science**
- 15:45 – 15:48 **Introducing the Chief Guest/Keynote Speaker**
Professor N. M. S. Sirimuthu
Co-Chair – iCSSM 2021
- 15:48 – 16:08 **Keynote Address**
Professor Robert Newton
Professor of Exercise Medicine, Edith Cowan University, Western Australia
- 16:08 – 16:10 **Introducing the Invited Speaker**
Dr. (Ms.) H.P.N. Perera
Co-Chair – iCSSM 2021
- 16:10 – 16:20 **Invited Speech**
Mr. Mahela Jayawardena
Chairman - Sri Lankan National Sports Council
- 16:20 – 16:26 **Vote of Thanks**
Mr. A. L. K. R. Fernando
Convener / Secretary – iCSSM 2021
- 16:26 – 16:30 **National Anthem**

Day 2- 1st December 2021: Technical Sessions

- 09:00 – 13:00 **Technical Sessions**

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Message from the Vice-Chancellor, University of Sri Jayewardenepura



It is with great pleasure that I write this message as the Vice-chancellor to the proceedings of the Inaugural International Conference on Sports Science and Management (iCSSM 2021), organized by the Department of Sports Science, University of Sri Jayewardenepura under the theme of “Sports for Excellence”.

It was personally a great achievement for me to introduce the Sports Science and Management degree programme under the purview of the Faculty of Applied Sciences, University of Sri Jayewardenepura in 2011, which was later converted to a department in 2017 under my tenure as the Dean, Faculty of Applied Sciences. It is indeed a pleasure to see the steady growth of the Department of Sports Science as a young department in the Faculty of Applied Sciences. The Department has gifted great young sports personnel with a sound scholarly background in the country. The students of the Department were highlighted more with their Olympic participation and by achieving medals representing Sri Lanka in the South Asian, Asian, and Commonwealth Games.

The iCSSM 2021 is yet another milestone of the Department’s path to success, which leads the final-year students to publish their research work at an international forum. This conference may lead the young undergraduates not only to explore the theories but also to expand their networking with intellectuals from different continents. This conference is moreover an ideal platform to create dialogues in sports-related multidisciplinary themes, which could be considered a timely requirement. I am delighted to witness that the Department of Sports Science is moving forward with the alignment of the University's vision and mission.

I would like to express my sincere gratitude to the organizing committee of iCSSM 2021. I wish all participants a fruitful conference experience.

Senior Professor S. S. L. W. Liyanage
Vice-Chancellor, University of Sri Jayewardenepura

**Message from the Dean, Faculty of Applied Sciences,
University of Sri Jayewardenepura**



It is a great pleasure to issue this message on the occasion of the Inaugural International Conference on Sports Science and Management (iCSSM 2021), organized by the Department of Sports Science, University of Sri Jayewardenepura.

It is indeed a pleasure to see the opportunity provided by the Department of Sports Science for the undergraduates to showcase their scholarly research work in an international forum. The Department of Sports Science, under the Faculty of Applied Sciences, offers an array of multidisciplinary courses to the students and the scholarly sessions of the symposium witness the multidisciplinary research work of students. I hope the knowledge creation and dissemination with the research work will in turn help to resolve many of the prevailing issues in the Sri Lankan sports sector. I am confident that over these two days of iCSSM 2021, new partnerships, stronger alliances and even more cooperative relationships will result.

I thank the Conference Organizing Committee for their efforts in ensuring a rigorous review process to select high-quality presentations. I thank all the distinguished invited speakers for their presence and contributions to the conference.

I wish all participants a fruitful conference experience and hope that they will be much benefited from iCSSM 2021.

Senior Professor L. Karunanayake

Dean, Faculty of Applied Sciences, University of Sri Jayewardenepura

Message from the Co-Chairs of iCSSM 2021



On behalf of the organizing committee, we are delighted to welcome you to the Inaugural International Conference on Sports Science and Management (iCSSM 2021), organized by the Department of Sports Science, University of Sri Jayewardenepura bearing the theme of “Sports for Excellence”.

The iCSSM 2021 is funded by the AHEAD ELTA-ELSE Development Project and the University of Sri Jayewardenepura to harness the research culture of undergraduates by creating a platform for publishing their scholarly work. The students of the 2014/15 and 2015/16 batches were able to publish their research work in iCSSM 2021.

The Department of Sports Science is gratified to a line of renowned pre-conference, keynote, and invited speakers including Dr. Kabiru Musa (Chief Lecturer, Jigawa State College of Education, Gumel, Nigeria), Professor Robert Newton (Vice-Chancellor’s Professorial Research Fellow; Professor of Exercise Medicine, Exercise Medicine Research Institute, ECU, Western Australia), and Mr. Mahela Jayewardena (Chairman, Sri Lankan National Sports Council) for their immense contribution toward the success of this conference.

We pay our gratitude to all the reviewers, panel members and the conference organizing committee for their immense support rendered during the last few months. We hope that iCSSM 2021 would be a productive experience for all the presenters.

Professor N. M. S. Sirimuthu
Dr. (Mrs.) S. Weerasinghe
Dr. (Mrs.) H. P. N. Perera
Co-Chairs of iCSSM 2021

Message from the Secretary of iCSSM 2021



It is a great pleasure to issue this message at the Inaugural International Conference on Sports Science and Management (iCSSM 2021) organized by the Department of Sports Science (DSS), University of Sri Jayewardenepura.

It is indeed a pleasure to see the opportunity provided by DSS for undergraduates to showcase their scholarly pursuits. The iCSSM 2021 marks a historical millstone of DSS in its journey of pioneering in Sports Science and Management education. On behalf of the Organizing Committee, as the Convener and the Secretary of iCSSM, it is my privilege to welcome all our distinguished guests and delegates from the academia and industry who joined hands with us at this historical occasion.

The iCSSM is an initiation facilitated under the AHEAD ELTA-ELSE Development Project for DSS with a strategic intent to enhance the research and analytical competencies of DSS undergraduates. Adding synergy to this initiation, academia representing foreign universities also enriched iCSSM 2021 in different capacities through multiple collaborations. As Sports Science and Management is an emerging discipline in Sri Lankan academic and industrial domains, the importance of research to excel in sports is highlighted. Sensing this requirement, DSS wishes to develop its undergraduates as trailblazers of the Sri Lankan sports sector through collaborations, research, and innovation. We hope this strategic initiation will continue to develop DSS undergraduates to be effective advocates in transforming the iCSSM 2021 theme of ‘Sports for Excellence’ into a reality both in local and global arenas.

Finally, I thank our keynote speaker, pre-conference speakers, members of review panels, academic, administrative, and non-academic staff members of the university, AHEAD team members, and all other well-wishers who helped us in different ways to make iCSSM 2021 a success.

Mr. A. L. K. R. Fernando
Secretary of iCSSM 2021

Message from the Chief Guest of iCSSM 2021



It was my absolute pleasure to be the Chief Guest and the Keynote Speaker at iCSSM 2021 and I extend my thanks to the organising committee for giving me this opportunity.

The science of sport and its management are critical components of any society for improving the health and happiness of everyone while providing pride in one's country and extending friendships both locally and internationally.

For young children, sports participation is essential for healthy growth and development and equally important it teaches them respect and teamwork, highly valued qualities to apply throughout life. Chronic disease is the greatest burden on a Nation's health and sedentary behaviour and low physical activity are key risk factors. Physical activity is possibly the most effective medicine for reducing the risk and severity of all chronic diseases and the promotion of sports and keeping people active is a very important strategy for the health of the individual and the entire population. Competitive sport at the national and international level galvanises people's spirit and builds national reputation and recognition that spills over into all aspects of relationships between countries and their peoples. Finally, it is now well understood that exercise is truly medicine for not only the prevention of illness and injury but also the treatment of all chronic diseases.

My heartfelt congratulations to the organising committee and speakers of iCSSM 2021 for a very successful and impactful conference.

Professor Robert Newton

Professor of Exercise Medicine, Edith Cowan University, Perth, Western Australia
Chief Guest of iCSSM 2021

SUMMARY OF THE INVITED SPEECH



Sports Science in Cricket

Mr. Mahela Jayawardena

Chairman, Sri Lankan National Sports Council

Science was introduced to Sri Lankan cricket in the late '90s. Since I made my debut in 1997, it has truly revolutionized over the years. Foreign sports professionals played a big part in integrating biomechanical principles, training methods and technology into training and competitions, which has had a positive impact on players. Since then, Sports Science has been evolving rapidly and we must embrace these advances.

Insights of sports professionals have helped me as a coach to understand how each player responds to training, and how and when to peak performance while controlling sleep patterns and recovery cycles. My first exposure to Sports Science came through exploring different training methods in an attempt to discover the most suitable methods to manage my injuries. I think the crucial element for Sri Lanka is to individualize training based on scientific information.

Currently, we are employing the GPRS system to monitor the workload of players. Data generated through this system can be utilized to analyze player performance during training as well as competitions with intense situations. Further, modern technology allows us to continuously monitor sleeping patterns, restlessness, energy expenditure, and the optimal workout time of players. Modern-day Sports Science involves using scientific information to individualize training while minimizing the risk of injuries. Modern-day players hardly have an off-season, and workload management is crucial to maintain the best possible fitness. We must also focus on the diet which is vital for performance.

Sports Science is multi-dimensional. As the Chairman of the National Sports Council, through my interactions with other Sports Bodies, I have discovered that Sports Science knowledge is used to manage different sports differently.

It is important to explore how techniques and methods used in one sport could be used effectively to develop other sports. Such co-existence backed by scientific evidence could always produce positive results. The more we are open to these elements the more flexible we can become. Knowledge is the key to integrating different protocols to improve performance.

Finally, control what you can control, and learning is a part of that journey. Every day is a day for learning and knowledge will always make you a better person.

I would like to wish everyone all the very best!

KEYNOTE ADDRESS

Exercise is Medicine in Oncology

Professor Robert Newton, PhD, DSc, AEP, FACSM, FESSA, FNCSA

Edith Cowan University, Perth, Western Australia.

Exercise medicine is the physical assessment and prescription of exercise specifically for the prevention or treatment of injury or illness. Exercise oncology is the application of exercise medicine specifically to cancer management. Exercise is now recognised as a medicine because it drives the production of endogenous chemicals released in the body that have therapeutic effects. These include hormones and cytokines as well as a vast array of immune system responses that influence every system, facilitating tissue repair and slowing or even reversing the progression of chronic diseases. Exercise also drives direct structural adaptation and repair, increases blood perfusion, and drives vascular adaptations that are highly positive for health in particular for the treatment of various cancers. Exercise medicine has also been demonstrated to facilitate other therapies such as chemotherapy and radiation therapy and in particular, ameliorate the side-effects of these treatments.

Exercise has been proven to improve outcomes for patients with cancer by increasing quality of life, slowing disease progression, and reducing the side effects of cancer treatments. There are more than 10 mechanisms by which exercise influences tumour biology (1) suppressing the growth of cancer cells, reducing the tendency to metastasis, and enhancing the effectiveness of radiation and chemotherapy through changes in tumour vascularisation.

While this research is very encouraging a causal relationship between exercise and cancer survival has not been established. To address this critical gap in our knowledge there is a global clinical trial in men with advanced prostate cancer specifically to establish whether exercise can increase survival. (2) An early finding is that six months of targeted exercise increases the concentration of antitumour myokines systemically in the patient and their exercise-conditioned blood is capable of suppressing the growth of

prostate cancer cells in vitro. While these men have advanced cancer, this trial has also established that the exercise prescription is safe and well tolerated, as well as being feasible to implement. (3)

There is a strong relationship between cancer survival and body composition with high levels of fat and low levels of muscle increasing the risk of mortality. While the restriction of energy intake through diet modification is effective at reducing body fat in people with cancer, such interventions also result in a decline in muscle mass which is highly undesirable. This “side-effect” of dieting can be prevented with the addition of resistance training and it is now recommended that any dietary changes for fat reduction must be accompanied by an effective resistance training program. (4)

In 2019, the Australian position statement on exercise medicine in cancer management was published with the recommendation that people with cancer should be prescribed a tailored exercise program to specifically address the health issues causing the greatest risk of morbidity and mortality. (5) The process commences with an assessment of patient fitness and health to determine deficits and health issues which are then combined and prioritised. This is incorporated with patient capacity and intervention suitability to design the exercise prescription. This commences a forward feedback loop of regular reassessment and subsequent prescription modification. The highest priority is to address mortality and morbidity risks, next is other patient goals, access, and finance. Finally, the target of enhancing primary treatments followed by goals of general health and fitness are considered.

The foundation exercise prescription guideline is that a multimodal approach incorporating both aerobic and resistance training should be developed with emphasis according to priority. (5) The intensity should be moderate to high with the frequency of exercise on most days of the week to spread the dosage and accumulate as much exercise medicine as possible. The program should be progressive to maintain relative intensity and periodised with variation in volume and intensity across the week, month, and around specific events such as chemotherapy infusion or leading up to surgery. The exercise prescription should account for autoregulation whereby intensity and volume are adjusted day by day based on patient capacity and readiness to exercise. (5)

There are numerous acute or chronic health concerns which may require specific exercise prescriptions. For example, cachexia, which is uncontrolled weight loss, requires resistance training potentially with emphasis on eccentric loading, limiting aerobic exercise to avoid excessive energy imbalance, and nutritional support such as protein, energy, and creatine supplementation. Several other examples are provided in the position statement. (5)

Further, the presence of other chronic diseases must be considered, and exercise medicine prescribed accordingly. Depending on treatment-related side effects, as well as other patient considerations, it is possible that the signs, symptoms, and side effects associated with the patient's chronic disease or risk of chronic disease, may supersede cancer as a priority of the exercise prescription. (5)

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ABSTRACTS

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SESSION A
Exercise and Sports Physiology, Sports Biomechanics

Improvement of Ventilatory Function Following Rehabilitation in Chronic Obstructive Pulmonary Disease Patients Attending the Department of Pulmonary Medicine at the National Hospital Kandy, Sri Lanka

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Chronic Obstructive Pulmonary Disease (COPD) is common, preventable, and treatable but not curable. The major objective of this study was to assess the improvement of ventilatory function following rehabilitation in COPD patients attending the Department of Pulmonary Medicine. The study was conducted to assess changes in Forced Expiratory Volume 1 (FEV1) pre- and post-rehabilitation with bronchodilator therapy and to determine improvement in respiratory function assessed by the modified British Medical Research Council (mMRC) Dyspnea Scale and ABCD assessment method following a rehabilitation regime. The study sample consisted of 50 volunteers. Comparing the FEV1-actual with FEV1-predicted, a significant improvement was observed ($P < 0.05$). The mMRC Dyspnea Scale values showed 28 participants having decreased symptoms, none reporting higher stages and 22 showing no changes although the final test statistics showed a significant improvement in the mMRC values after the rehabilitation program ($P < 0.005$; $Z = -5.292$), which indicates an improvement in the condition of patients. According to the Global Initiative for Obstructive Lung Disease (GOLD) Guidelines, in this study, a higher number of patients were reported from Stage B before taking part in the rehabilitation programme and a higher number of patients were reported from Stage A after taking part in the rehabilitation programme. The study findings show a positive effect of the rehabilitation programme on COPD patients.

Keywords: Chronic obstructive pulmonary disease, Ventilatory function, Rehabilitation

A Study on the Energy Expenditure of the Active Student Community of the University of Sri Jayewardenepura During the COVID-19 Quarantine Period

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The government of Sri Lanka imposed a quarantine curfew to prevent the rapid spread of the COVID-19 pandemic. Consequently, the entire university system, gymnasiums, and fitness centres were closed, which could have adversely affected the physical activity level of the university community. This study aimed to determine the changes in energy expenditure (MET-min week⁻¹) of students at the University of Sri Jayewardenepura before and during the COVID-19 quarantine period. The sample consisted of 210 active students. Data were gathered online using a version of the International Physical Activity Questionnaire: short form (IPAQ-SF). The energy expenditure of participants before and during the COVID-19 quarantine period was compared with respect to gender and Body Mass Index (BMI) category (over-weight, normal weight, and under-weight). The Kruskal Wallis test and Mann-Whitney U test were used to determine the significant differences at a 5% level of significance. The mean energy expenditure of participants before and during the COVID-19 quarantine period was 3638.38 MET and 2238.20 MET, respectively. The energy expenditure of participants was lower ($P < 0.001$) during the COVID-19 quarantine period compared to the pre-COVID-19 period. No differences were observed in energy expenditure values between males and females before the quarantine period. In contrast, the energy expenditure of males was greater ($P = 0.029$) than that of females during the quarantine period. No differences were observed in the energy expenditure of participants belonging to BMI categories of over-weight, normal and under-weight. It can be concluded that the COVID-19 quarantine period has contributed to a decrease in the energy expenditure of active university students with females showing a lower physical activity level compared to males. It is recommended to increase the awareness of university students on the importance of maintaining a desirable physical activity level during quarantine periods through home-based activities.

Keywords: COVID-19, Physical activity, Energy expenditure

An Observational Study on Physical Fitness Parameters and Anthropometric Measurements of Elite Karate Kumite Athletes in Sri Lanka

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Most combat sports including karate require a combination of physical fitness components and a favourable anthropometric profile to achieve optimum performance. By identifying anthropometric measurements and physical fitness components, coaches can categorize the most suitable players for specific events and decide on the most suitable workouts to maximize the physical fitness of players, thereby maximizing performance. The objectives of this study were to assess selected anthropometric parameters and physical fitness components of Sri Lankan National level karate Kumite athletes and to determine the relationships between the selected anthropometric and physical fitness parameters. The sample consisted of 43 male and female athletes representing the Sri Lanka National karate team (male=25; female=18; age: 25.9 ± 3.8 years; height: 163.4 ± 8.1 cm; body mass: 61.6 ± 10.9 ; Body Mass Index (BMI): 22.7 ± 3.0). The selected anthropometric measures were taken using a measuring tape. The agility, flexibility, and leg power of participants were measured using the 5-10-5 shuttle run test, sit-and-reach test, and vertical jump test, respectively. The relationships between anthropometric measurements and physical fitness parameters were determined using the Spearman rank correlation at a 5% level of significance. There was a weak positive correlation between leg power and lower leg length ($r=0.335$, $P=0.028$). Further, weak positive correlations existed between flexibility and upper leg length ($r=0.413$, $P=0.002$), and flexibility and calf girth ($r=0.341$, $P=0.025$). A weak positive correlation existed between agility and hand length ($r=0.412$, $P=0.006$) whereas a weak negative correlation was found between agility and forearm length ($r=-0.376$, $P=0.013$). No significant relationships existed among other tested anthropometric parameters and physical fitness components. These findings could serve to improve the training programmes of players and to develop the physical fitness profiles of Sri Lankan national-level karate athletes, thereby improving performance.

Keywords: Karate Kumite athletes, Physical fitness, Anthropometry

The Effect of Lower Extremity Joint Kinematics on Rotational Speed of Elite Male 100 m Sprinters in Sri Lanka

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The term ‘World’s fastest athlete’ is traditionally derived from a world record holder in the 100 m sprint event in athletics. The purpose of this study was to understand the kinematic characteristics in the lower body of a 100 m sprinter and its influence on the maximum speed of the athlete. Therefore, the study investigated the effect of the kinematic characteristics on the variability of running speed parameters in Sri Lankan national-level athletes to find out the main performance-deciding factors. The kinematic characteristics were limited to the moment of inertia, angular acceleration, torque, and rotational speed of the running cycle of each athlete. The sample of the study was limited to 20 male athletes who represented Sri Lanka at international competitions held last year and showed significant differences among them in these performance characteristics. Subjects were divided into three performance groups based on their 100 m performance. A between-measures one-way analysis of variance (ANOVA) revealed differences in the hip angle at the front swing phase ($F_{(2,18)} = 16.0, P < 0.05$), knee angle at ground contact ($F_{(2,18)} = 681.1, P < 0.05$), front swing rotational speed ($F_{(2,18)} = 681.7, P < 0.05$) and angular acceleration in back swinging phase ($F_{(2,18)} = 37.7, P < 0.05$) among the groups. The post-hoc Tukey analysis ($P < 0.05$) showed that each performance group had significant differences in the hip angle at the front swing phase and knee angle at ground contact. Regarding front swing rotational speed and angular acceleration, although ANOVA revealed differences among the groups, the post-hoc Tukey analysis revealed that significant differences can be seen only between the best and least-performance groups. The findings of this study could be used in training national athletes and kinetic analysis is recommended for analysis with the use of an inertial measurement unit or force plate.

Keywords: Angular acceleration, Rotational speed, Moment of inertia

Determination of Somatotype, Body Composition and Skill-Related Physical Fitness Level of National Kabaddi Players in Sri Lanka

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Kabaddi is a team sport that requires speed, power, agility, and a well-built physique. Anthropometric and physical fitness profiles could significantly affect the performance of Kabaddi players. This study aimed to determine the somatotype, body composition and skill-related physical fitness level of Sri Lankan national Kabaddi players and determine the relationships between the anthropometric and physical fitness parameters of the participants. The sample comprised 30 national Kabaddi players (female=15 and male=15). Somatotype was determined using the Heath & Carter equation. Body composition (body fat and skeletal muscle mass) was assessed using bioelectrical impedance. Skill-related physical fitness was assessed by t-test (agility) and vertical jump (lower body power). The Pearson correlation test was used to study the correlations. An independent-sample t-test was used to compare the variables based on gender and player type. The male somatotype category was mesomorph-endomorph (4.3, 4.1, 1.6) and the female somatotype category was mesomorphic-endomorph (5.5, 2.7, 1.7). Body fat levels of male and female athletes were 20.8 ± 2.7 and 28.4 ± 4.6 , respectively. The whole-body skeletal muscle mass percentage of males and females was within the normal range (male: 34.2 ± 1.4 , female: 27.2 ± 1.9). The agility and lower body power of males and females were within the average levels. The mesomorph component was higher ($P < 0.05$) in males whereas the endomorph component was higher ($P < 0.05$) in females. Muscle mass and physical fitness levels were higher ($P < 0.05$) in males compared to females. The mesomorph component was significantly lower in offence players compared to defence players and all-rounders whereas the ectomorph component was significantly lower in defence players compared to offence players and all-rounders. Skeletal muscle mass positively ($P < 0.05$) correlated with skill-related physical fitness levels of participants. The fat level and endomorph component negatively ($P < 0.05$) correlated with the skill-related physical fitness level of the participants.

Keywords: Somatotype, Body composition, Skill-related physical fitness, Kabaddi

The Effect of Arousing and Relaxing Music on the Mood of Competitive Athletes at the University of Sri Jayewardenepura

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The purpose of the present study was to determine the effect of arousing and relaxing music on the mood of competitive athletes at the University of Sri Jayewardenepura. This experimental research study was conducted using 52 male athletes who have five years or more of sporting experience. A purposive sampling technique was used to select the athletes from different sports. Participants were instructed to listen to either arousing or relaxing music for fifteen minutes before filling out a Brunel Mood Scale (BRUMS) self-reported inventory to measure their mood. Each athlete listened to both music types randomly on two consecutive dates. Data were not normally distributed; hence data were analysed using non-parametric tests. Wilcoxon signed-rank test showed that depression and tension mood subscales were significantly higher ($P < 0.05$) among athletes after listening to relaxing music compared to listening to arousing music. In contrast, the vigour mood subscale was significantly higher ($P < 0.05$) among the athletes after listening to arousing music compared to listening to relaxing music. Other variables did not show any significant effects. The findings indicate that there is an acute effect of music type on some mood variables of competitive athletes. Relaxing music could alleviate tension among athletes while arousing music could increase vigour. Since listening to music can rapidly change an athlete's mood, music can be used to increase arousal or to relax athletes during competitions. More research is needed to confirm the outcome of this study.

Keywords: Arousing music, Relaxing music, Mood, Athletes

The Effect of Body Composition, Anthropometric Characteristics and Lower Body Strength on the Performance of National-Level 110 m Hurdles Athletes in Sri Lanka

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Body composition, anthropometric characteristics, and lower body strength have a significant role in sports performance. In Sri Lanka, there is no proper way to select 110 m hurdle athletes based on body composition and anthropometric characteristics. The objective of this study was to identify the relationship between performance and body compositions, anthropometric characteristics, and lower-body strength of national-level hurdles athletes according to 110-m hurdle personal best time. Twenty-eight male athletes aged 20-31 years were selected as the sample. Overall fat, visceral fat, subcutaneous fat, total muscle, trunk fat, trunk muscle, leg fat, leg muscle, arm fat, and arm muscle mass were measured as body composition measures. Anthropometric measurements used in the study were: leg length, foot length, trunk length, arm length, thigh circumference, and calf circumference. Standing long jump was used to evaluate lower-body strength. Pearson correlation was used to determine the relationships among variables. Positive correlations ($P < 0.05$) existed between sprint-time and visceral fat, trunk fat, leg fat, and arm fat. There were negative correlations ($P < 0.05$) between sprint-time and total muscle, trunk muscle, leg muscle, arm muscle, foot length, trunk length, and lower body strength. According to multiple regression, there was no relationship between performance and overall fat, subcutaneous fat, leg length, arm length, thigh circumference, and calf circumference ($P > 0.05$). It can be concluded that lower body strength, leg, trunk, and arm muscle mass, and trunk length significantly influence the performance of national-level 110 m hurdles athletes. It can also be concluded that athletes with greater leg, arm, and trunk muscle mass have a higher performance whereas athletes. Further, the performance of players increased with the increase in lower-body strength.

Keywords: Body composition, Anthropometric characteristic, Lower body strength

Identifying the Effect of Handgrip Strength and Reaction Speed on the Performance of National Table Tennis Players

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Table tennis is an individual and asymmetric sport in which a great number of shots are performed at high velocity and power involving the dominant body side. This study aimed to identify the effect of handgrip strength and reaction speed on national table tennis players' performance. A total of 32 players (16 males and 16 females), aged between 14 and 35 years participated in this study. All subjects performed a handgrip strength test using an isometric handgrip dynamometer and the reaction speed test (drop ruler test) using a one-meter ruler. The performance of national table tennis players was analyzed using a rank system developed by the Sri Lankan Table Tennis Association, which calculates the rank of each player based on the result of matches played in authorized events. The effect of handgrip strength and reaction speed on national table tennis players' performance was analysed by applying the Pearson correlation method. The independent sample t-test was used to identify the gender differences in handgrip strength and reaction speed. Males showed significantly higher levels of grip strength than females (21.13 ± 3.59 kg and 36.43 ± 7.33 kg for female and male players, respectively) and the males showed a significantly lower level of reaction speed than females (6.06 ± 2.08 cm and 7.20 ± 2.45 cm for male and female players, respectively). Furthermore, there was no correlation between handgrip strength and the performance of both male and female players. There was a significant correlation between reaction speed and performance in both female ($P=0.002$) and male ($P=0.005$) players. It can be concluded that reaction speed significantly improves the performance of national-level male and female table tennis players.

Keywords: Table tennis, Handgrip strength, Reaction speed

Identifying the Impact of Wingspan and Height on the Performance of Sri Lankan State University Basketball (Center) Players

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Basketball is the world's fastest ball game. There are three main playing positions in this game. They are the point guard, two forwards, and two Centers. According to the Sri Lankan Basketball context, Centers are the most vulnerable players. Normally, Center players are the highest players in the team, and they are responsible for doing a considerable duty inside the court than the other players. This study has focused on the Center players' performance concerning their wingspan and height. In this study, 44 Center-positioned players from all the state universities who have made their presence in Sri Lanka University Games (SLUG) were tested. Each player's height and wingspan measurements were taken from an especially designed Google form and double-checked throughout the physical measurement test. Their performance was collected using score sheets which have been marked throughout the SLUG tournament. Then the recorded data were analyzed using SPSS software. Scatter plot analysis, spearman's correlation analysis, linear regression analysis, and one-way ANOVA test were done on the analyzing part. According to the gathered data, the Center player's height and wingspan make a huge impact on their performance. Furthermore, this study has shown that players with reasonable height and a wide range of wingspan tend to score more points than the other players on the court.

Keywords: Center players, Height, Wingspan, Player performance

Prevalence of Menstrual Irregularities Among Female University Athletes in Sri Lanka

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The prevalence of menstrual irregularities is higher among athletes than non-athletes due to psychophysiological reasons. Both psychological and physiological thresholds can directly affect their menstrual cycle, causing different menstrual irregularities. Female university athletes could be a potential group who are vulnerable to psychophysiological stress due to the demands of academic work, daily sports training, frequent competitions, and other social interactions. The objective of the current study was to identify the prevalence of menstrual irregularities among female university athletes. A cross-sectional survey was carried out using 167 female athletes from state universities, ages ranging from 20 to 25 years. A stratified random sampling technique was used to select the participants who started sports at an early age and are currently engaged in university sports actively. The modified Rhinessa Women's Questionnaire was used to gather data on the menstrual irregularities among the participants. The questionnaire was translated forward and backwards between English and Sinhala languages and reliability was confirmed through a pilot test before using it in the original study. Data were analysed using SPSS software (version 25.0). Results revealed that 86.8% of the participants were having normal menstrual cycles while 13.2% reported menstrual irregularities. Further, 4.8% of the participants reported primary amenorrhea, 4.8% showed oligomenorrhea, 3.0% showed secondary amenorrhea, and 0.6% showed polymenorrhea. Dysmenorrhea was reported in 5.4% of the participants who had normal menstrual cycles. Moreover, 64.1% of the participants reported abdominal pain, 58.1% anger and irritability, and 40.1% reported difficulty with sleeping during the mensuration period. A considerable percentage (13.2%) of the participants showed menstrual irregularities and primary amenorrhea, oligomenorrhea, and secondary amenorrhea were more prevalent compared to other irregularity types. Higher physical activity levels, stress, and eating disorders may be the reasons for these irregularities.

Keywords: Female athletes, Menstrual irregularity types, Menstrual disorders

Case Analysis of Sprint Interval Training for Adolescents with Severe Mental Illness

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Individuals with Severe Mental Illnesses (SMIs) are more likely to develop co-morbid health conditions and have a lower life expectancy. Thus, adjunct health interventions are recommended. By examining case-patient (non-)responders, this study examined factors that might be indicative of treatment responding to bicycle-based Sprint Interval Training (SIT). Across 8 weeks, SIT included 3 sessions/week each with a 20-min duration. SIT sessions included 4 × 30-sec maximum effort intervals interspersed with 4-min recovery. During pre- and post-intervention, a series of health indices were taken. Pre-post intervention, a case-responder reported improvements in total PANSS scores (-5.00 points), WHO-5 well-being total score (+2.00 points), peak sprint capacity (+73.00 watts) and estimated VO_{2max} (+2.95 ml kg⁻¹ min⁻¹), alongside concomitant weight reductions (-1.74 kg) and percentage body fat (-2.50% - DXA measurement). By contrast, a non-responder reported low SIT protocol adherence, did indicate a change in total PANSS scores (-16.00 points), had limited WHO-5 well-being change (+2.00 points); indicated no discernible change in peak sprint capacity and estimated VO_{2max} , and reported weight gain (+0.78 kg). Findings identified several case-related factors possibly indicative of SIT engagement, and the likelihood of attaining SIT-associated health benefits. Such information could determine the case-appropriateness of SIT as an adjunct treatment in adolescent psychiatric settings.

Keywords: Psychiatric treatment, Youth, Exercise, SIT

Exercise Prior to Prostate Surgery: A Randomized Controlled Trial

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Exercise for prostate cancer patients undergoing prostatectomy generally focuses on the post-surgery period to reduce incontinence and improve recovery. However, a more opportune time to intervene may be in the period prior to surgery. Therefore, this study evaluated the efficacy of a pre-surgical exercise program to improve physical function and body composition, reduce psychological distress, and enhance post-surgical recovery. Twenty-three men (50-73 years) with localized prostate cancer scheduled for prostatectomy were randomized to exercise (EX = 13) or usual care (UC = 10). EX trained for 6 weeks prior to surgery undertaking supervised progressive resistance and aerobic exercise thrice weekly at a moderate intensity. Serial measures of muscle strength (1-RM), physical performance (6-m usual and fast walk, 6-m backwards walk, 400-m walk, repeated chair rise, stair climb), lean mass and fat mass (DXA), psychological distress (BSI-18), and urinary incontinence (24-hr pad test) were undertaken at baseline, pre-surgery, within 2 weeks post-surgery and 6 weeks post-surgery. Data were analyzed using two-way repeated-measures ANOVA. There were no differences at baseline between groups. Chest press, leg press, and leg extension strength improved in EX prior to surgery and returned to pre-training values 6 weeks post-surgery (interaction, $P < 0.05$). The BSI-18 subscale of somatization in EX increased 2 weeks post-surgery but also returned to pre-training values 6 weeks post-surgery (interaction, $P < 0.05$). Overall, the 6-m fast walk, 6-m backwards walk, and 400-m walk improved over the study period (time effect, $P < 0.05$) while lean mass was reduced after surgery (time, $P < 0.01$) by ~1.9 kg and ~1.4 kg in EX and UC, respectively. Urinary incontinence was significantly reduced at 6 weeks post-surgery in both groups (time effect, $P < 0.01$) with no difference in length of hospital stay (3 ± 1 days). Combined resistance and aerobic exercise in men prior to prostatectomy enhanced muscle strength and physical function, although psychological distress was not improved. As loss of lean mass was substantial following surgery, a longer period of resistance exercise may prove useful in preparing the patient for the adverse effects of surgery.

Keywords: Prostate cancer, prostatectomy, resistance exercise

Evaluation of the Body Composition and Anthropometric Parameters of Sri Lankan National-Level Sprinters and Their Effects on Performance

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Body composition and anthropometric parameters have been identified as important determinants of the performance of athletes. This study aimed to evaluate the body composition and anthropometric characteristics of Sri Lankan National level sprinters and to establish relationships between these variables and performance. Thirty male athletes (age: 25.3 ± 3.2 years; height: 171.8 ± 4.1 cm; weight: 63.6 ± 5.9 kg; body mass index (BMI): 21.1 ± 3.1 kg m⁻²) and 30 female athletes (age: 24.3 ± 4.0 years, height: 162.5 ± 3.7 cm; weight: 54.7 ± 6.9 kg; BMI: 19.2 ± 3.1 kg m⁻²) representing 100 m, 200 m, and 400 m events participated in the study. The body composition of participants was analysed using bioelectrical impedance analysis. The sprint performance of participants was determined based on the IAAF Scoring Table of Athletics (2017). An independent sample t-test was utilized to distinguish the body composition parameters of male and female sprinters. Pearson correlation analysis was used to analyze the correlation between the variables. Whole-body skeletal muscle mass, trunk muscle mass, leg muscle mass and arm muscle mass were significantly greater in males compared to females. The visceral fat percentage was greater ($P < 0.05$) in males compared to females whereas the sub-cutaneous fat percentage was greater ($P < 0.05$) in females. Trunk fat, leg fat and arm fat percentages were greater ($P < 0.05$) in females compared to males. There was a weak negative correlation between the waist-to-hip ratio and the sprinter performance of athletes ($r = -0.234$; $P = 0.005$). Regarding anthropometric measurements, only upper leg length revealed a moderate positive relationship with performance ($r = 0.409$, $P = 0.001$). However, no statistically significant correlations were observed between the body composition parameters and the performance of athletes. Evaluation of anthropometric parameters and body composition of athletes could be helpful to improve the performance of athletes and minimize health risks.

Keywords: Anthropometric parameters, Body composition, Performance of sprinters

Factors Affecting Social Physique Anxiety of University Students Following Sports Science-related Degree Programmes in Sri Lanka

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Undergraduates with lower physical self-esteem tend to suffer from social physique anxiety (SPA), which could affect their academic performance due to negative consequences such as emotional distress and impaired cognitive function. This study aimed to determine the factors affecting the SPA of university students following Sports Science-related degree programmes in Sri Lanka. Data were examined from a sample of 149 undergraduates (male=74, female=75) of the University of Sri Jayewardenepura and the Sabaragamuwa University of Sri Lanka, who were following Sports Science-related degree programmes. A questionnaire consisting of three standardized self-report scales: the Social Physique Anxiety Scale (SPAS), the Physical Self-Description Questionnaire, and the International Physical Activity Level Questionnaire were utilized to collect data on the SPA, physical self-concept (PSC) and physical activity level of the participants, respectively. Demographic factors such as age, gender, weight, and height of the participants were also recorded. The relationships between SPA and variables such as age, body mass index (BMI) and physical activity level were evaluated using the Spearman rank-order correlation coefficient. Mann-Whitney U test was used to differentiate the SPAS scores of participants based on their gender. All statistical analyses were conducted using SPSS version 22 at a 5% level of significance. SPAS had a moderate negative correlation with PSC ($P<0.001$, $r= -0.471$) and physical activity level ($P<0.001$, $r= -0.421$). The age and BMI of participants did not show a significant correlation with SPAS scores. Further, female students had higher SPA than their male counterparts ($P<0.05$). Results indicate that students having a low overall perception of their physical self are more anxious about their social physique. Further, students engaging in physical activities may be less likely to suffer from social physique anxiety. Females tend to show higher SPAS scores compared to males; hence it is important to encourage female university students to engage in physical activity, which could alleviate the risk of SPA and its negative consequences.

Keywords: Anxiety, Physical self-concept; Physically active undergraduates

The Effect of an Aerobic Gymnastic Programme on Dynamic Balance, Flexibility and Coordination of Children with Intellectual Disability

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Children with intellectual disabilities often present with problems of dynamic balance, flexibility, and coordination. Aerobic gymnastic training has been shown to positively influence body balance, flexibility and coordination, and growing evidence suggests that aerobic gymnastic programmes could be beneficial for children with intellectual disabilities. This study aimed to examine the effect of an aerobic gymnastic programme on the dynamic balance, flexibility, and coordination of differently-abled children. The sample consisted of 30 school children (male=14, female=16; age: 12–15 years) with intellectual disabilities. All participants underwent a 12-week aerobic gymnastic programme consisting of 24 training sessions (two sessions per week). The dynamic balance, flexibility, and coordination of the participants were measured using the one-leg balance test, sit and reach test, and plate taping test, respectively, before and after the 12-week aerobic gymnastic programme. Pre and post-test variables were compared using paired sample t-test at a 5% level of significance. Data were analyzed using SPSS software. Results revealed that dynamic balance, flexibility, and coordination measurements of the participants were significantly greater after the training programme compared to baseline measurements ($P<0.05$). Further, no differences were observed in the mean performance change between male and female participants after the training programme concerning all test parameters. It can be concluded that the 12-week aerobic gymnastic training programme used in this study was effective in improving dynamic balance, flexibility, and coordination of both male and female school children with intellectual disabilities.

Keywords: Intellectual disability, Aerobic gymnastics, Dynamic balance

The Effect of a Three-Month Tai Chi Meditational Session on Perceived Stress and Perceived Stress Reactivity of Adolescent Karate Players

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Perceived stress and perceived stress reactivity could negatively affect sports performance. Tai Chi has been identified as an effective technique to reduce stress in various populations. This study aimed at determining the effectiveness of a 12-week Tai Chi session in reducing perceived stress and perceived stress reactivity of adolescent karate athletes during their pre-competition period. Twenty-four karate athletes aged 12-17 years were randomly assigned to two groups: treatment (n=12) and control (n=12). The treatment group underwent 30-minute sessions of Tai Chi breathing exercises and meditative movements three days per week for 12 weeks whereas the control group did not undergo any relaxation sessions throughout the experiment. All participants undertook intense karate practice schedules throughout the study period. Perceived stress and perceived stress reactivity of participants in both groups were assessed using two validated questionnaires: the perceived stress scale and the perceived stress reactivity scale for adolescent athletes, respectively, before and after the 12-week intervention period. The pre-test and post-test results of the treatment and control groups were compared using the paired sample t-test. In the treatment group, post-test perceived stress and perceived stress reactivity scores were significantly lower ($P<0.05$) compared to pre-test stress scores. In contrast, in the control group, post-test perceived stress and perceived stress reactivity scores were significantly higher ($P<0.05$) compared to baseline. Results indicate that the Tai Chi exercise sessions used in this study were effective in reducing perceived stress and perceived stress reactivity of participants during the pre-competition period. It can be concluded that Tai Chi exercises could be effective in reducing perceived stress and perceived stress reactivity of adolescent karate athletes.

Keywords: Tai Chi, Perceived stress, Perceived stress reactivity

The Effect of Selected Anthropometric Measurements and Physical Fitness Components on the Performance of Sri Lankan Male National Weightlifters

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Anthropometric measurements and physical fitness components are among the factors that significantly affect the performance of weightlifters. The objective of this study was to evaluate the effect of anthropometric measurements and selected physical fitness components on the performance level of Sri Lankan male national weightlifters. Twenty-four Senior National weightlifters (resting metabolic rate: 1730 ± 194 kcal; body mass index (BMI): 27.2 ± 4.7 kg m⁻²) volunteered to participate in the study. Anthropometric measurements that were measured include height, high pull chest-level height, squat position level height, hand length, upper body height, low body height, hip circumference, waist circumference, chest circumference, and waist-to-hip ratio. Physical fitness components including grip strength, leg power (vertical jump), and flexibility (sit-and-stand test) were measured. The performance of players was evaluated using snatch and clean & jerk records at the National Games 2019. The relationships between anthropometric and physical fitness variables and weightlifting performance were evaluated using Pearson correlation and regression analysis. Upper body height had moderate positive relationships with snatch ($r=0.559$, $P=0.004$) and clean & jerk ($r=0.562$, $P=0.004$) of participants. No significant correlations were observed between other tested anthropometric parameters and weightlifting performance. Further, no significant correlations were observed between the tested physical fitness parameters and weightlifting performance. Multiple regression analysis revealed that high pull chest-level height, hand length and upper body height were the only significant predictors of snatch as well as clean & jerk performance ($P<0.05$). The findings of this study could be helpful for coaches to select the most suitable athletes for the game and to predict the performance of weightlifters.

Keywords: Anthropometric measurements, Physical fitness, Weightlifting performance

The Effect of an Eight-Week Exercise Schedule on the Risk of Hyperlipidemia and Obesity of Executive-Level Employees of ABC Company

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Exercises are effective in reducing hyperlipidemia and obesity. Hence, this study aimed to identify the effect of an exercise schedule on hyperlipidemia and obesity of executive-level employees in ABC Company. Twenty executive employees are randomly selected as the sample of this study. Total cholesterol level was determined by drawing a random blood sample from the participants. Further, the obesity risk of the subjects was assessed using the Body Mass Index (BMI), weight and body fat level. Additionally, the beep test, push-ups, and sit and reach test were conducted to measure their fitness level. The exercise prescriptions were designed to improve the main bio-motor abilities of the participants and to reduce cholesterol levels. Each exercise prescription included a 10-minute warm-up, a 20-minute main part and a 10-minute cool-down. The designed exercise programme was carried out for eight weeks (two days per week). All participants maintained the exercises between 60%-80% intensity. The effect of the exercise programme was analyzed based on the risk factors of hyperlipidemia and obesity. Paired sample t-test was used to differentiate the pre-test and the post-test results of participants at a 5% level of significance. According to the results, the blood cholesterol level, body weight and BMI of the participants were significantly lower ($P < 0.05$) after completing the exercise programme compared to baseline values. Results indicate that the exercise programme used in this study could be effective in improving the total cholesterol levels and BMI of participants, thereby reducing the risk of hyperlipidemia and obesity.

Keywords: Exercise, Obesity, Hyperlipidaemia

A Study on the Relationship Between Sleep Quality and Mood of Elite Cricketers during Competition Season

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Sleeping is an important phenomenon of the human daily cycle, and relatively good sleep can restore an individual's mental and physical health. Competitive athletes who engage in vigorous training are vulnerable to the depreciation of their psychophysiological wellbeing due to inadequate sleep, which could ultimately affect their sports performance. This cross-sectional study aimed to examine the effect of sleep quality on the mood of Sri Lankan elite cricketers. Ninety participants (age: 20–29 years) were purposively selected for the current study. Data were gathered during competition season. The sleep quality of participants was measured using the Pittsburgh Sleep Quality Index (PSQI) and mood components were measured using the Brunel Mood Scale. Data were analysed using SPSS statistical software (version 22.0). Data were not normally distributed, hence non-parametric tests were used to analyse data. Spearman correlation test was conducted to find the relationship between sleep quality and mood at a 5% level of significance. According to the results, sleep quality, sleep latency, and global PSQI scores were negatively correlated ($P < 0.005$) with mood variables such as tension, anger, depression, fatigue, and confusion. Furthermore, sleep quality and sleep medication showed a positive correlation with vigour ($P < 0.005$). The findings of this study indicate that the tension, anger, depression, fatigue, and confusion of athletes could be elevated because of a poor sleep index. Further, athletes having better sleep quality show more vigour, which could improve their sports performance.

Keywords: Sleep quality, Mood, Elite cricketers

A Study on Anthropometric and Physical Fitness Characteristics of National Badminton Players in Sri Lanka

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Physical fitness and anthropometric characteristics are important in increasing the performance of athletes. This study aimed to determine the relationship between anthropometric parameters and badminton-specific speed, agility, and arm muscle endurance of badminton players, and to determine the relationship between physical fitness characteristics and badminton-specific speed, agility, and arm muscle endurance of national badminton players in Sri Lanka. The sample comprised 40 players (male=19, female=21) whose ages ranged from 15–35 years. Pearson correlation test was used to determine the relationships between the variables at a 5% level of significance. Results revealed that thigh girth, calf girth and body weight showed a moderate negative correlation with badminton-specific speed while ankle girth and leg length showed a strong negative correlation with badminton-specific speed. Regarding physical fitness characteristics, badminton-specific speed was negatively correlated with leg power and core strength and positively correlated with speed and endurance indicating that the increase in speed and endurance will increase the badminton-specific speed of players. More on, core strength and flexibility showed a moderate negative correlation with sideways agility whereas speed and agility showed a strong positive correlation with sideways agility suggesting that the increase in speed and agility will enhance the sideways agility of players. Arm power showed a moderate positive correlation with arm muscle endurance. The findings of this study could be useful for coaches to select the most suitable players for the games based on anthropometric parameters. Further, when developing training programmes, more focus should be given to speed and endurance to increase badminton-specific speed. Also, the sideways agility of players can be improved via improving speed and agility.

Keywords: Anthropometrics, Badminton-specific speed, Physical fitness

The Impact of Physical Activity on the Quality of Life Among National Baseball League Players in Sri Lanka

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Sports participation has been linked to a variety of psychosocial health advantages, including resilience, improved mental health, a sense of belonging, increased self-efficacy, lower stress, improved coping, and positivity in people of all ages. The goal of this study was to determine the effect of physical activity level on the quality of life of players in Sri Lanka's national baseball league. A cross-sectional study was conducted with 144 National League baseball players who competed in the National League in 2019. The World Health Organization Quality of Life (brief version) questionnaire (WHOQOL-BREF) was used to assess the quality of life. An international physical activity scale was used to assess physical activity. The impact of the data was determined using standard calculations employing point scales for WHOQOL-BREF, transformed scores, and MET values of physical activity, with a cutoff P -value of 0.05. The Spearman rank correlation test was utilized to determine the relationship between physical activity level and quality of life. According to the Spearman rank correlation test, there is a positive relationship ($P < 0.001$) between physical activity level and each of the four domains of quality of life (physical domain, psychological domain, social domain, and environmental domain). These findings suggest that persons who engage in physical activities have a beneficial effect on their quality of life.

Keywords: Quality of life, Physical activity, Baseball players

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SESSION B

Training Methods, Sports Injuries, Sports Nutrition, Doping in Sports

Relationship Between Social Factors and Doping Attitudes of Sri Lankan Professional Badminton Athletes

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Doping in sports is a well-known phenomenon and contemporarily it has become an important topic in the world. Doping is the use of performance-enhancing drugs in competitive sports, and it is banned substances that athletes use to enhance their performances. The use of doping can be varied from athlete to athlete according to their social interaction. Therefore, the main purpose of this study was to determine the relationship between social factors (independent variable) and doping attitudes (dependent variable) among professional badminton athletes in Sri Lanka. The unit of analysis was professional badminton athletes and data was collected from 118 male and female badminton athletes for this cross-sectional study. An online self-administered questionnaire was adopted as the data collection instrument after assessing the internal consistency through a reliability analysis. Data analysis was carried out using SPSS 22.0 version and one hypothesis was established and tested with Pearson correlation to assess the correlation between study variables as data was normally distributed. As per the findings, results revealed that there was a weak positive relationship ($r=0.225$) between social factors and doping attitudes among Sri Lankan professional badminton athletes. According to the findings, social networks, contact with people who use sports drugs and coaches' influence need to be improved to contribute to the fight against doping. Hence, it is recommended to monitor and build up relationships with positive people, create a safe and supportive environment, and provide awareness programmes on performance-enhancing drugs for the athletes as well as for the coaches and trainers regarding doping.

Keywords: Doping, Doping attitudes, Social factors

An Observational Study on Nutrition-Related Attitudes, Food Habits, and Macronutrient Intake of Sri Lankan National-Level Male Basketball Players

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Maintaining an optimum nutritional status could significantly improve athletic performance. A basketball player's diet must meet the energy demands of high-intensity movements along with long-term low-intensity movements. Information on athletes' nutrition-related attitudes, dietary habits and nutrient intake could be useful in introducing effective intervention programmes that improve the health and performance of national-level athletes. The objectives of this study were to examine the nutrition-related attitudes, food habits and macronutrient intake of national basketball athletes. Thirty male athletes of the Sri Lankan National basketball team participated in the study. The nutrition-related attitudes and food habits of participants were assessed using a pre-validated, self-administered questionnaire. The dietary intake was assessed using a 24-hour dietary recall during the competition period. Most athletes (n=22, 75%) believed diet played an important role in enhancing their performance. Forty-two per cent (n=12) of athletes believed that their diet meets their nutritional requirements, whereas 17% (n=5) of athletes reported having trouble deciding what to eat. Fifty-four per cent (n=13) of athletes either agreed or strongly agreed that supplements are necessary to improve performance. Most of the participants (n=23, 86%) consumed breakfast all seven days of the week. Further, most participants consumed home-cooked meals for lunch (n=20, 67%) and dinner (n=18, 60%). Most athletes (n=28, 93%) reported consuming fluids before, during and after exercises. Most participants (n=27, 90%) reported consuming dietary supplements, and mostly consumed supplements were protein supplements and multivitamins. The mean energy intake of participants was 3017.1 kcal d⁻¹. On average, the percentage contribution of energy was 58% from carbohydrates, 19% from proteins, and 23% from fats. It can be concluded that most national-level male basketball players have shown healthy dietary habits and attitudes while maintaining an adequate macronutrient intake.

Keywords: Food habits, Macronutrient intake, Basketball players

Doping and Supplement Knowledge Among Physical Education Teachers of Type 1AB Schools within the Sabaragamuwa Province

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Doping and inappropriate use of supplements have become contemporary ethical issues in the Sri Lankan sports arena. Physical Education (PE) teachers could play a vital role in educating young athletes about doping prevention and the correct use of dietary supplements. This study aimed to evaluate the doping and supplement knowledge of PE teachers of type 1AB schools in the Sabaragamuwa Province and to determine the effect of demographic factors such as age, gender, educational qualifications, and exposure to doping awareness programmes on the doping and supplement knowledge of PE teachers. A cross-sectional survey was conducted using 80 teachers (male=28, female=52) from 60 schools. The age of the participants ranged from 20 to 57 years. Data were gathered using a self-administered questionnaire. Participants' doping/supplement knowledge scores were divided into four categories: excellent, good, average, and poor. Spearman correlation and Chi-square tests were utilized to evaluate the effects of the selected demographic factors on the doping knowledge of subjects. Results revealed that 5% of the participants were in the excellent knowledge category, 13.75% showed good knowledge, 43.75% were in the average category and 37.50% showed poor knowledge. Spearman correlation test revealed that there was no significant correlation between the doping/supplement knowledge scores and the age of participants ($P=0.589$). Further, no significant associations were found between the doping/supplement knowledge level of PE teachers and their gender ($P=0.162$) and highest educational qualification ($P=0.559$). There was a significant association between doping/supplement knowledge of subjects and their participation in doping awareness programmes ($P=0.012$). It can be concluded that the knowledge level of doping and supplements among the PE teachers of type 1AB schools in the Sabaragamuwa Province is inadequate regardless of their age, gender, and educational qualifications. More doping awareness programmes must be conducted to improve the doping knowledge of PE teachers.

Keywords: Doping and supplement knowledge, Physical Education teachers, Doping awareness

A Comparison of Dietary Supplement Intake Among Martial Arts Athletes representing the University of Sri Jayewardenepura and the Sri Lanka Army

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Dietary supplement (DS) consumption has become exceedingly popular among amateur and elite athletes. This cross-sectional survey was conducted to compare the DS intake of martial arts athletes representing the University of Sri Jayewardenepura and Sri Lanka (SL) Army. The sample included 73 martial arts athletes representing the SL Army (n=43) and the University of Sri Jayewardenepura (n=30). The supplement intake and associated factors were assessed using a pre-validated questionnaire during normal training days (from November to December 2020). A Chi-square test was used to determine the significant associations between DS consumption and athlete groups. The prevalence of DS intake was 84% and 40% among SL Army and university athletes, respectively. Significant associations existed between the athlete group (university and Army athletes) and prevalence of DS intake ($P<0.001$), reasons for taking DS ($P<0.001$), types of DS consumed ($P<0.001$), and sources of information regarding DS. SL Army athletes consumed supplements mainly to improve performance (28%), prevent injuries (19%) and boost recovery (14%) while university athletes consumed supplements to improve performance (17%), boost recovery (10%), improve health (10%), and improve physical appearance (3%). The most consumed DS among SL Army athletes included protein supplements (77%), iron supplements (70%) and vitamin C (51%). In contrast, university athletes mostly consumed energy drinks (23%), multivitamins (23%), and protein supplements (20%). Only 7% of Army athletes obtained information from dietitians/nutritionists whereas none of the university athletes obtained information from dietitians/nutritionists. Further, 56% of SL Army athletes obtained information on DS from their coaches. It can be concluded that DS consumption was more common among SL Army athletes compared to university athletes. Most Army athletes sought information from coaches, hence there is a need to educate coaches regarding dietary supplements. Further, athletes should be encouraged to consult a dietitian before consuming DS.

Keywords: Dietary supplement consumption, Martial arts athletes

The Effectiveness of Various Recovery Methods for National-Level Badminton Players

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The present study aimed to assess the effectiveness of aqua therapy, active stretching and passive stretching on the recovery of National badminton players. Thirty National level athletes were randomly divided into three treatment groups: aqua therapy, passive stretching and active stretching. The aqua therapy group underwent the aqua therapy programme, and the other two groups underwent the usual land warm-down programmes. Each programme continued for 60 consecutive days, and data were collected on the 1st day, 30th day and 60th day. Recovery was estimated by measuring the heart rate (HR) at different stages: resting HR, immediately after the training, and 10 min, 20 min, and 30 min after training in all treatment groups. According to the statistical analysis, there was an improvement in the recovery rate in all three treatment groups. As per the comparison of five variables (age, height, weight, body mass index, and resting heart rate), only age and resting HR showed a correlation with the rate of change of HR, while height, weight and BMI did not have any influence. All three therapies increased the rate of change of HR, which implies a quick recovery. Findings suggest that all three treatments are effective in reducing HR. Finally, according to the comparisons at different stages of recovery, the mean rate of change of HR was higher in the aquatic therapy group compared to the passive stretching group. Further, the rate of change of HR of the passive stretching group was higher than that of the active stretching group in all six instances ($P < 0.05$) and the confidence intervals did not include zero. It can be concluded that all three treatments were effective as recovery methods. Moreover, aqua therapy treatment is the best recovery method in terms of reducing HR, followed by passive stretching and active stretching.

Keywords: Aqua therapy, Stretching, Recovery, Badminton players

An Exploration of the Associations among Selected Factors Affecting the Incidence of Injuries in University Rugby Players in Sri Lanka

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Most university-level rugby players have sustained injuries during the Sri Lanka University Games 2019 Rugby competition, mainly due to inexperience and the nature of the game. Hence, this study aimed to identify the factors contributing to the prevalence of injury among university rugby players in Sri Lanka. Data were gathered using a pre-validated, structured, self-administered questionnaire which was distributed among the players who took part in the Sri Lanka University Games (SLUG) 2019 Rugby competition. The months of July and August showed the highest rates of injury incidence. The most prominent injury locations were the head/face (17.1%), shoulder/clavicle (19.7%), knee (25%) and ankle (27.6%). Out of the total injured players, 39 players (51.3%) were forwards, and 37 players (48.7%) were backs. Furthermore, backs (53.8% and 60%) suffered more head/face and shoulder/clavicle injuries than forwards, backs (63.2%) have sustained more knee injuries than forwards and most of the forwards (71.4%) have sustained ankle injuries than backs. A significant association was present between playing position and injury location ($P=0.010$), meaning the position-specific demands during the game influence the incidence of injury. The majority of the injuries were soft tissue injuries (60.3%), but no discernable pattern could be established between the Playing Position and Injury type ($P=0.170$). Although most of the players sustained injuries during the SLUG 2019, a singular cause for injury for a given player position could not be found as multiple factors were affecting the incidence of an injury which can mainly be attributed to the inherent physicality and the unpredictability of the sport. Therefore, it can be stated that physical conditioning, match awareness and development of the knowledge of the sport can be the key areas to minimize the risk of injury at the university level of the sport.

Keywords: Rugby, Injury prevalence, Contact injuries

Lower Body Injuries Among Female Netball and Basketball Players in Sri Lanka: A Three-Year Retrospective Study

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According to the International Olympics Committee (IOC) manual of sports injuries, a sports injury is defined as ‘damage to the tissues of the body that occurs as a result of sport or exercise’. According to body structure, injuries that begin above the level of the lumbar spine are called upper extremity injuries and injuries which begin at the level of the lumbar spine or below are considered lower extremity injuries. This study was designed to assess the proportion of lower-body injuries among Sri Lankan female netball and Basketball players aged 18-30 years. The sample consisted of 79 females including 37 basketball players and 42 netball players who belong to the national netball and basketball pools for the last three years. This study was conducted as an audit utilizing clinical record books at the Institute of Sports Medicine. Descriptive analysis was used to demonstrate the demographic information and comparative analysis was used to demonstrate study variables. The findings show that the most common injuries among netball and basketball were knee (40.5%) and ankle (20.3%) injuries. Out of the two sports, netball players had suffered from soft tissue injuries (54%) more than hard tissue injuries (50%) while the opposite was observed for basketball players. Further, the results show that an equal percentage of players suffered from hard tissue injuries (50%) in both netball and basketball. The most prominent injury sites in both sports are knee and ankle injuries followed by upper leg, lower leg, foot sole, and foot and toes. The findings of this descriptive study can serve as the foundation for further research directed towards the identification of gender-related lower body injuries among Sri Lankan athletes.

Keywords: Netball, Basketball, Lower body injuries

Anterior Cruciate Ligament Surgery Recovery Rates and the Rate of Athletes Returning to Usual Sports Activities After Proper Rehabilitation

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Anterior Cruciate Ligament (ACL) is one of the most common and painful injuries among athletes and others. ACL is a soft tissue structure that connects the femur to the tibia. In this regard, the ACL can be described as a supportive band that supports the stability of the knee. This study was designed to assess the recovery rates among athletes following ACL surgery and the proportion of athletes who have undergone proper rehabilitation after ACL surgery. The sample consisted of 117 athletes between 18-30 years and included the players who represented the National pools, and Sri Lanka Army, and Sri Lanka Police teams of netball, basketball, athletics, wrestling, weightlifting, cricket, badminton, rugby, football, volleyball, and hockey for 3 consecutive years from 2018. The study was conducted as an audit utilizing clinical records from the Institute of Sports Medicine. The data extraction sheet was prepared to acquire demographic and ACL injury-related information which was to be used for analysis. The findings reveal that most athletes with ACL injuries come back to competitive sports in 12-18 months following surgery showing 63 out of 117 (60.58%). In addition, out of 117 athletes, 109 have undergone proper rehabilitation whilst, 8 athletes have failed to attend rehabilitation. This study reveals that a considerable percentage of athletes encounter ACL injuries. Thus, whilst doing rehabilitation, it is worth studying the relevant causes that affect ACL surgeries and accelerate remedies to prevent or minimize the injuries to these elite athletes, as, without such, there is a possibility of a scarcity of athletes of their calibre in the future.

Keywords: Sportspersons, ACL injury, ACL surgery, Recovery rates, Rehabilitation

Relationship Between Assistance Exercises and Snatch and Clean & Jerk Performance of University Weightlifters

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Weightlifting is one of the ancient modes of resistance training. The technical aspects of performing this sport require a high level of physical strength to complete the two main lifts, snatch, and clean & jerk. In performing these major two lifts, the athletes often include exercise as balance snatch, snatch pull, clean pull and front squat as assistance exercises in their training regimes. The study has focused on identifying the relationship between the above-mentioned assistance exercises and snatch and clean performance and focuses on the relationship between the overall performance of snatch and clean exercise and the athlete's body height. Coaches and athletes make less focus on including these assistance exercises in the training regimes because of the hardship of executing these exercises. This study was carried out to show that these assistance exercises will benefit the athletes in performing good totals in their major two lifts. This study was carried out with 20 randomly selected male weightlifters from the University of Sri Jayewardenepura and the University of Kelaniya. The participants performed the snatch, clean & jerk, snatch pull, clean pull, balance snatch and front squat separately. These exercises were done based on a pre and post-test setting. The exercises were done for three and a half months, and each exercise was performed twice a week. According to the post-test results, there was an absolutely strong positive significant relationship between the assistant exercises and the snatch and clean performance. Further, there was a weak relationship between body height and the snatch and a moderate relationship between body height and clean development. The findings suggest that the assistance exercises that were performed as the training regime in this study can bring out overall enhancement in the snatch and clean development.

Keywords: Assistance exercises, Snatch, Clean & jerk

The Effectiveness of a Six-Week Upper-Body Strength Training Programme on Throwing Velocity of the Baseball Players in Sri Lankan Tri Forces

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Throwing velocity significantly influences optimal baseball performance. A lower throwing velocity could lead to a negative impact on overall performance. Most of the Sri Lankan baseball players are under 130 km h⁻¹ speed velocity range. This study aimed to determine the effectiveness of an upper-body strength training programme to increase the throwing velocity of Tri Forces baseball players in Sri Lanka. Thirty male athletes aged (29±7 years), with a Body Mass Index (BMI) of 24±1 (Mean ± SD) participated in a 6-week upper-body free weight training programme. The training programme included eight exercises and used dumbbells, bars, and free-weight plates. All exercises were performed between 60% - 80% intensity. The throwing velocity was measured using a speed radar gun (Bushnell- model 10191102-13). The upper-body strength of the participants was measured using 1 Repetition Maximum (1RM) of the bench press test. Athletes were randomly divided into two groups: the control group (n=15) and the treatment group (n=15). Only the treatment group performed the upper-body weight training programme. Pre and post-test radar gun and 1RM bench press test results were compared using the paired-sample t-test at a 5% level of significance. In the treatment group, post-test throwing velocity was significantly higher ($P<0.05$) compared to the pre-test. In contrast, no significant differences were observed between pre-test and post-test throwing velocity values in the control group. The upper body strength of participants in both groups significantly increased after the programme compared to baseline, but the magnitude of increase was greater in the treatment group compared to the control group. It can be concluded that the six-week upper-body free weight training programme significantly increased the throwing velocity of the Sri Lanka Tri Forces baseball players. Therefore, the training programme could be recommended for implementation at the national level and the club level to improve the throwing velocity of baseball athletes.

Keywords: 1 RM bench press test, Throwing velocity, Baseball, Upper-body strength

Dietary Intake of National Sevens Rugby Players During Competition Season

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Nutritional status plays a major role in optimizing the performance of elite rugby players. The objectives of this study were to assess the dietary intake and determine the adequacy of macronutrient intake of National Sevens rugby players. The study was conducted as a case study. All National Sevens rugby team players (n=15) were included in the sample. The dietary intake of participants was assessed using a 24-hr dietary recall over three days during the competition season. The daily energy expenditure of the participants was determined using a validated questionnaire. Data were analyzed by the SPSS (22 version) software. The mean carbohydrate, protein and fat intakes of participants were 6.2, 2.7 and 1.1 g kg⁻¹ d⁻¹, respectively. The participants reported a mean energy intake of 3525.7 ± 88.95 kcal d⁻¹ (54.3% from carbohydrates, 23.4% from proteins, and 22.2% from fats) whereas the mean estimated energy requirement (EER) was 3519.4 ± 247.85 kcal d⁻¹. The mean energy intake of participants did not differ from the mean EER ($P > 0.05$). All players (n=15) achieved acceptable macronutrient distribution ranges (AMDR) in carbohydrate and protein intakes. The majority (n=14) achieved AMDR for fats. All players (n=15) met the Recommended Dietary Allowance (RDA) for carbohydrates, proteins, and fats. The energy requirements of the players were fulfilled by the dietary intake. It can be concluded that the majority of National Sevens rugby players consumed adequate amounts of macronutrients in their diet during the competition season.

Keywords: Macronutrient intake, Energy requirement, Rugby players

Total Energy Expenditure and Macronutrient Intake of University Weightlifters in Sri Lanka During the COVID-19 Outbreak

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The objective of the current study is to analyse the physical activity level and nutrient intake of the University of Sri Jayewardenepura weightlifters during the COVID-19 outbreak. A cross-sectional survey was carried out and a purposive sampling technique was used to select the sample. Twenty-one weightlifters (n=21) including eleven females and ten males aged range from 21 to 28 years were selected from the University of Sri Jayewardenepura. Data were collected using a self-reported 24-hour dietary recall and International Physical Activity Questionnaire (IPAQ: long form). Collected data were analyzed through SPSS statistical software version 23.0. The mean value for BMR was 1377 ± 142 kcal day⁻¹ for female subjects which was less than that of males. The results obtained from the dietary evaluation showed that the mean daily macronutrient intake of participants was 261.3 ± 39.1 g (carbohydrate); 68.7 ± 22.0 g (protein) and 44.0 ± 14.7 g (fat). The energy distribution among the macronutrients was 61.2 ± 7.5 % from carbohydrates, 16.1 ± 5.3 % from proteins, and 22.7 ± 4.9 % from fats. No differences were observed in male and female athletes regarding daily macronutrient intake and the energy distribution among macronutrients. Regarding the total energy intake, athletes presented energy intakes below the recommended values irrespective of their high level of physical activity and total energy expenditure. These weightlifters should increase their total energy intake while maintaining the composition of macronutrients in their diet to meet their energy requirements during the COVID-19 outbreak.

Keywords: Physical Activity, Energy expenditure, Macronutrient intake, Weightlifters, COVID-19

An Analysis of Injuries of Premier Level Fast Bowlers in Sri Lanka

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Cricket is a field-based sport in which two teams play with eleven players and try to score runs by hitting a leather ball with a bat and running between two wickets which are 22 yards apart. Players involved in any kind of sport are subjected to injuries, and player management is critical for the success of every sport. Hence, minimizing the level of injuries of players is vital for player management. Cricket is generally considered a limited and low-injury sport. However, fast bowlers are highly subjected to most of the injuries in cricket. In this study, the effect of the bowling action of Sri Lankan Premier level fast bowlers on injuries was assessed using quantitative, explanatory research and a cross-sectional basis survey. Simple random sampling was used as the sampling procedure and primary data were gathered through a structured questionnaire developed through literature. Data were gathered using 30 individuals from Sri Lankan Premier-level fast bowlers who played for the 2019 Premier season. The obtained data were analysed with the Pearson Chi-Square test using SPSS version 21 statistical software. It was observed that variables in bowling actions, bowling speed and the training hours per week significantly influenced the level of injuries ($P < 0.05$). The results indicate that bowling action significantly affects the level of injuries in Sri Lankan fast bowlers. Therefore, it can be recommended that maintaining proper lower body strength, and exercising using the correct techniques can reduce the level of injuries. Further, the training session duration could be monitored to minimize the risk of injuries and burnout.

Keywords: Cricket, Bowling actions, Fast bowlers, Injuries

Non-Steroidal Anti-Inflammatory Drug Use Among Sri Lankan National-Level Athletes

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Athletes tend to consume non-steroidal anti-inflammatory drugs (NSAIDs) as a treatment for injuries and as ergogenic aids despite their various side effects. This study aimed to investigate the prevalence of NSAID use among Sri Lankan national-level athletes. The sample comprised 100 athletes (male=59, female=41) representing sports such as athletics (n=25), boxing (n=8), weightlifting (n=12), wrestling (n=9), basketball (n=10), football (n=13), kabaddi (n=8), and volleyball (n=15), who participated in the 13th South Asian Games 2019. Data were gathered using a pre-validated questionnaire. Descriptive statistics revealed that 93% of the participants used NSAIDs. Sprays (n=52), tablets (n=46), gels (n=38), and creams (n=36) were the most common forms of NSAIDs used by athletes. Sixty-nine per cent of athletes had the habit of using some form of NSAIDs before competitions. Sprays were the most common form of NSAIDs used by athletes before competitions. The most common reasons for athletes using NSAIDs before competitions were to prevent pain (n=39), to relax muscles (n=15), to reduce pain during competitions (n=13), and to prevent upcoming pains (n=12). Most athletes (68%) reported experiencing a reduction in pain when NSAIDs were consumed before competitions. However, only 26% of athletes believed that NSAIDs helped to increase their performance during competitions. In summary, this study revealed that NSAID use is common among Sri Lankan national-level athletes who participated in this study, with sprays, tablets, gels, and creams being the most used NSAIDs. Although the majority of athletes tend to use NSAIDs before competitions, only 26% believed that NSAIDs helped in improving their performance.

Keywords: Non-steroidal anti-inflammatory drugs, Athletes, Pain relief

A Study on Doping Knowledge and Attitudes of University Weightlifters in Sri Lanka

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The use of prohibited performance-enhancing drugs and methods among adolescent athletes has been reported around the world. Numerous studies suggest that athletes' intentions to consume performance-enhancing substances could be influenced by their knowledge and attitudes toward doping. The purpose of this study was to explore the knowledge, attitude, and perception of doping among university weightlifters. The sample included 60 weightlifters (male=37, female=23) representing four state universities in Sri Lanka. Data were gathered using a self-reported questionnaire consisting of four sections focusing on demographic information, doping knowledge, doping attitudes, and perception of participants. Doping knowledge scores were converted to percentages and divided into four categories: excellent (80-100%), good (60-79%), average (40-59%), and poor (0-39%). Spearman correlation was utilized to determine the relationship between doping knowledge and the attitudes of participants. Mann-Whitney U test was used to distinguish between male and female participants regarding doping knowledge and attitude scores. Statistical analysis was carried out using SPSS statistical software (version 22) at a 5% level of significance. Results revealed that 36.6% of participants (n=22) showed an average level of doping knowledge, 46.6% (n=28) had good knowledge, and 16.6% (n=10) showed excellent knowledge. The mean attitude score of participants was 29.4, which indicates less permissible attitudes toward doping. The knowledge and attitude scores of male and female participants did not differ significantly. Regarding the participants' perception of drug testing, 39.1% of athletes felt that they were very well-informed about drug testing procedures. The majority (62.5%) reported having attended workshops on doping, and 43.8% of participants reported that the workshops were very useful. It can be concluded that both male and female weightlifters who participated in this study had adequate knowledge of doping and showed less-permissible attitudes toward doping. Most participants have attended doping awareness workshops, which may have positively influenced their knowledge, attitudes, and perception toward doping.

Keywords: Doping knowledge, Doping attitudes, University weightlifters

A Study on the Relationship Between Coaches' Behaviour and Coping Skills of Elite Volleyball Players

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A coach plays a vital role in an athlete's sports career and a coach can positively or negatively affect an athlete's psychological skills. The objective of this study was to identify the relationship between coaches' behaviour and the coping skills of elite volleyball players. A cross-sectional study was conducted purposively selecting 160 elite volleyball players (males=92, females=68) whose ages ranged from 20 to 35 years. Data were collected during a national volleyball tournament using self-reported inventories. The coaching Behavior Questionnaire was used to gather data regarding players' perception of coaches' behaviour and the Athletes' Coping Skills Inventory was used to gather data on the coping skills of elite volleyball players. Data were analyzed using SPSS statistical software (version 22.0). Data were not normally distributed, thus non-parametric tests were used to analyse data. The Spearman correlation test was used to find the relationship between coaches' behaviour and the coping skills of volleyball players. The results revealed that the supportiveness of coaches has a moderate positive relationship ($P<0.05$) with goal setting/mental preparation ($r=0.25$), coachability ($r=0.27$), and peaking under pressure ($r=0.21$). Furthermore, the supportiveness of coaches showed a negative relationship with freedom from worry ($r=-0.17$) among the volleyball players. Moreover, coaches' negative activation showed negative relationships with goal setting/mental preparation ($r=-0.21$) and coachability ($r=-0.32$) of volleyball players. Mann-Whitney U test results revealed a significant difference in coaches' supportiveness over male and female elite volleyball players ($P<0.005$), where mean rank scores were higher in females compared to males. According to the findings, there is a strong relationship between coaches' behaviour and volleyball players coping skills which could indirectly affect their performance. Thus, coaches should pay more attention to their behaviour and increase their supportiveness towards their players.

Keywords: Volleyball players, Coaching behaviour, Coping skills

The Effect of an Eight-Week Rotator Cuff Muscle Strengthening Programme on Throwing Velocity of School Baseball Players

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This experimental study was done to determine the effect of an 8-week rotator cuff muscle strengthening programme using resistance bands on the throwing velocity of under-19 school baseball players in the Colombo district. The sample consisted of 40 under-19 school baseball players representing three schools in the Colombo district. Players were randomly divided into two groups: the experimental group (n=20) and the control group (n=20). Rotator cuff muscle strength and throwing velocity were measured at baseline. The strength of the rotator cuff muscles was measured by a 10-repetition maximum (10 RM) test and throwing velocity was measured using a hand-held Pro Speed-Professional radar gun. The eight-week rotator cuff muscle strengthening programme was then carried out for the treatment group. The control group underwent normal training procedures during this period. Rotator cuff muscle strength and throwing velocity were measured in both groups after eight weeks. The data were analyzed using the Statistical Package for the Social Sciences (SPSS version 23.0). After eight weeks, subscapularis muscle strength increased from 9.55 kg to 10.10 kg and from 9.45 kg to 9.63 kg in the treatment group and the control group, respectively. Supraspinatus muscle strength increased from 4.55 kg to 5.18 kg in the treatment group and from 4.75 kg to 5.05 kg in the control group. Infraspinatus and teres minor muscle strength increased from 4.35 kg to 5.10 kg and from 4.60 kg to 4.80 kg in the treatment and control groups, respectively. Throwing velocity increased from 78.88 mph to 80.34 mph and from 78.80 mph to 79.43 mph in the treatment and control groups, respectively. The increase in throwing velocity was significantly greater in the treatment group compared to the control group. It is revealed that the eight-week resistance band training programme used in this study has an impact on the rotator cuff muscle strength and throwing velocity of the participants.

Keywords: Baseball, Throwing velocity, Rotator cuff muscle strength

The Effect of a Ladder Training Programme on Speed and Agility of School-Level Rugby Players

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Bio-motor abilities are important in sports performance. Speed and agility are the most important bio-motor abilities in most sports. There is a lack of research conducted on improving the bio-motor abilities of Sri-Lankan athletes. The main objective of this study was to examine the effect of a ladder training programme on the speed and agility of school-level rugby players. The sample consisted of 30 school-level (under-20) male rugby players. Initially, a 30 m sprint was used to measure speed and an Agility T-test was used to measure the agility of the participants. After the pre-test, a 24-session ladder training programme was conducted for the participants for 2 months. After the programme, the agility and speed of the participants were measured using the same test methods. Pre and post-test measures were compared using a paired sample t-test at a 5% level of significance. Mean pre-and post-test 30 m sprint times were 5.38 s and 4.95 s, respectively. Similarly, mean pre- and post-test Agility T-test times were 18.55 s and 7.77 s, respectively. Paired t-test results showed that there was a significant reduction in post-test 30 m sprint timing ($P<0.001$) and Agility T-test timing ($P=0.008$) compared to the pre-test. Results suggest that the 24-session ladder training programme used in this study may have improved the speed and agility of under-20 male school-level rugby players.

Keywords: Ladder training, Speed, Agility, School-level rugby players

The Effect of an Aquatic Plyometric Training Programme on Agility, Speed, and Power of School-Level Volleyball Players

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Sri Lankan school-level volleyball players fail to perform at their best throughout competitions due to their poor fitness level. There is substantial evidence to suggest that aquatic plyometric training significantly increases speed, power, and agility. Hence, this study was aimed at identifying the effect of aquatic plyometric training on the performance of school-level volleyball players. Twenty-eight school-level volleyball players (ages: 11 – 14 years) participated in this study. The participants were randomly assigned to the aquatic plyometric training group (APT, n = 28) and control group (n = 28). The APT group underwent an aquatic plyometric training programme for six weeks. The exercises included squat jump, standing long jump, two-foot ankle hop, tuck jumps and split squat jump. The control group performed their routine training during this period. Participants were assessed during the pre- and post-six-week training period on the shuttle run, 30 m sprint and standing broad jump test. Mann Whitney U-test was utilized to determine the significant differences between pre and post-test agility, speed, and power levels of the participants in both groups at a 5% level of significance. Results showed that post-test shuttle run times and 30 m sprint times were significantly lower in the APT group compared to the pre-test. In contrast, no significant differences were observed between pre- and post-test shuttle run test and sprint test timing in the control group. Further, no significant differences were observed in pre and post-test standing broad jump test results in both groups. Based on these findings, it can be concluded that the six-week aquatic plyometric training programme used in this study was effective in improving the speed and agility of school-level volleyball players.

Keywords: Volleyball, Aquatic plyometric training, Agility, Speed, Power

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SESSION C
Sports Facility Design, Sports Marketing, Sports Tourism

A Study on Adventure Sports Tourism Entrepreneurs in Sri Lanka During COVID-19 Pandemic

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The rapid spread of COVID-19 has impacted the tourism industry internationally as well as domestically. Various psychological problems and important consequences in terms of mental well-being including fatigue, anxiety, depression, anger, and confusion emerged progressively. Thus, following the adverse impacts on the tourism industry, this research aims to review the perception of hope of adventure sports tourism entrepreneurs in Sri Lanka towards their positive, future-oriented construct namely optimism through the COVID-19 Pandemic. The survey data required for the study was gathered from a total of 44 male and female adventure sports tourism entrepreneurs representing various districts of Sri Lanka and the sample was selected based on the snowball sampling technique. The research aim was investigated with the aid of quantitative research executed via a structured questionnaire. Frequency, Distribution, Descriptive statistics, Regression analysis and Multivariate analysis were used to analyse the data. Upon investigation, it was discovered that hope has a negative relationship with optimism ($P=0.032$). Since an increasing number of studies in the entrepreneurship literature demonstrate that entrepreneurs' mental health has an impact on their activities, as well as the growth and sustainability of their businesses, this study is important and timely in that it examines the psychological impact of the pandemic. Providing policymakers, with the right information to help revive the tourism industry in Sri Lanka

Keywords: COVID-19 pandemic, Hope, Optimism, Adventure sports tourism

Relationship between Prior Knowledge, Destination Reputation and Loyalty among Sports Tourists with Special Reference to Unawatuna Coastal Tourist Area in Sri Lanka

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Tourism has become an important sectorial contribution to the Sri Lankan development process from different perspectives including social, economic, and political perceptions. Hence, many stakeholders including the government, regulatory authorities, and industry practitioners continuously attempt to increase the standards of the industry on par with regional and global yardsticks. Most of such strategic initiations are focusing to increase tourist arrivals to Sri Lanka as an exclusive tourist destination. This research focuses to explore the relationships between tourists' prior knowledge of the destination, destination reputation, and destination loyalty. Prior knowledge is operationalized using tourists' familiarity and expertise about the destination. The data was collected from 160 local tourists who visited Unawatuna recreational beach in January-March 2021. Data analysis was carried out using SPSS version 23.0 and tests were performed for missing value analysis, demographic data, reliability, and correlation. The relationships between study variables were tested using Spearman correlation. The results revealed a positive relationship between each of the independent variables (prior knowledge and destination reputation) and the dependent variable (loyalty). Accordingly, it is recommended that the government, regulatory authorities and industry practitioners implement different strategic and operational activities including Sri Lankan tourism promotional activities, awareness-increasing sessions, enhancing the cyber presence of tourism-related activities, etc. to increase the number and the frequency of tourism arrivals to Sri Lanka.

Keywords: Prior knowledge, Destination reputation, Destination loyalty

Determinants of Active Sport Tourists' Revisit Intention to Sri Lanka

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Tourism is one of the fastest-growing industries across the world and contemporarily, the relationship between sports and tourism is vastly discussed in both the industry and academic paradigms. With the emerging trends and potentials in world tourism, Sri Lanka is in a need of redefining its strategies to increase sports tourism. The purpose of this study is to examine the relationship between sports tourists' travel motivation, past travel experience, perceived constraints, and sports tourists' intention of revisiting Sri Lanka. The unit of analysis was a foreign active sports tourist, who engaged in sporting and leisure activities like water rafting, surfing, snorkelling, cycling etc. A Likert scale questionnaire developed based on past studies was adopted as the survey instrument after assessing the internal consistency through a reliability analysis of the pilot test for this cross-sectional study. Travel motivation is operationalized using seven dimensions namely, novelty, culture, adventure, social contact, escape, relaxation, and destination attraction. Past travel experience has operationalized under the satisfaction while the perceived constraints variable was operationalized under dimensions namely structural, interpersonal and disinterest. Data was collected from 250 foreign tourists using the purposive sampling method and analyzed using Statistical Package for Social Sciences 23.0 version. The relationships between travel motivation, past travel experience, perceived constraints and revisit intention were hypothesized and tested with Spearman correlation. Travel motivation and past travel experiences of tourists showed moderate positive relationships towards the revisit intention of tourists while perceived constraints were not correlated with revisit intention. According to the findings, Sri Lankan cultural events and festivals under travel motivation and past travel variables were popular among the tourists; especially, Sri Lankan food and natural resources-based adventure sports have a massive attraction among foreigners. If the tourism industry is capable of increasing the areas like local food, cultural events and natural resources-based sports activities, Sri Lanka will find it easy to attract more tourists.

Keywords: Revisit intention, Active sports tourist, Travel motivation, Past travel experience, Perceived constraints

A Comparative Study of Facilities Available for Spectators with a Disability at International Cricket Stadiums in Sri Lanka and Australia

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Cricket is the most successful sport and has earned fame internationally in Sri Lanka. This success has created a huge fan base for Sri Lankan Cricket. Hence, it is necessary to provide adequate facilities to these fans in the sports arenas. Especially to spectators with a disability. Accordingly, the main aim of the study is to identify the differences between facilities available for spectators with a disability at international cricket stadiums in Sri Lanka as compared with Australia. The specific aims of the study were to identify facilities available for spectators with a disability at two research sites separately. To successfully explore the differences, the study was conducted using a qualitative research approach. Data were gathered primarily through interviews and observations. Seven managerial-level interviewees were contacted to collect information for the study. Photo elicitation and interview analysis techniques were utilized as the sources of data analysis technique of the two sites: Optus Stadium in Western Australia and R. Premadasa Cricket Stadium in Sri Lanka. Analysis revealed that at Optus Stadium, there are special washroom facilities, ramp paths, special seating space (wheelchair viewing areas) and lift facilities to all tiers. At R. Premadasa Cricket Stadium, the washroom facilities were not designed to facilitate spectators with a disability. Moreover, there were neither ramp paths nor seating areas designed for a spectator in a wheelchair. Findings revealed that there is a lack of attention given to providing facilities for spectators with a disability at R. Premadasa Cricket Stadium and it reflects a massive gap between facilities available for spectators with a disability at International Cricket Stadiums in Sri Lanka and Australia.

Keywords: R. Premadasa Cricket Stadium, Optus Stadium, Disability

The Impact of Service Quality on Male Aquatic Sports Tourists' Behaviour with the Mediating Effect of Visitors' Satisfaction

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Tourism is one of the major industries in the world economy as well as in the Sri Lankan economy. This research is intended to investigate how service quality impacts on behavioural intentions of male aquatic sports tourists in the Kithulgala area with the mediating effect of visitor satisfaction. It is important to study how tourist behaviour intentions impact destination loyalty and the intention to visit/re-visit a particular tourist destination. A cross-sectional survey was carried out by using tourists who visited the Kithulgala tourist destination between the 1st of January and the 1st of March 2021. A pre-validated questionnaire developed based on empirical studies was administered via online platforms to collect data from the study sample. Accordingly, data were collected from 109 male tourists using a convenient sampling method and data analysis was carried out using SPSS 23 version. Since data were not normally distributed, the Spearman correlation test was used to analyze data. Data analysis results revealed that there are strong positive significant correlation relationships between SERVQUAL and tourist satisfaction; and between tourist satisfaction and tourist behaviour ($p=0.753$). Furthermore, there was a moderate positive significant correlation relationship between service quality and tourist behaviour. Therefore, as a tourist destination, Kithulgala needs to consider developing its quality of service providers and infrastructure to improve tourist satisfaction, so that it will increase destination loyalty and the intention to visit/re-visit Kithulgala.

Keywords: SERVQUAL, Tourist satisfaction, Tourist behaviour

An Analysis of Antecedents Leading to Player's Satisfaction with Artificial Turfs Versus Natural Turfs

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The global popularity of soccer has led to a widespread tendency towards this sport. Because of the convenience of using artificial surfaces, the rapid growth of using these surfaces has led to concerns about the declining performances of the players in the international context. However, as a developing country majority of available turfs in Sri Lanka are natural. Furthermore, studies comparing player satisfaction with artificial turfs and natural turfs are not available in the Sri Lankan context. Therefore, the current study aims to determine the effect of natural and artificial turfs towards player satisfaction. Player satisfaction was determined by two major causal factors of player satisfaction which are player safety and sporting features. The current study was conducted with the participation of 55 elite players in Sri Lanka. A purposive sampling technique was used to gather data for the study. Standard questionnaires were utilized to identify the antecedents. SPSS version 26.0 was used for data analysis. Methods used to analyze data were bivariate data analysis techniques considering the regression weights. The study revealed that in the Sri Lankan context, player satisfaction is higher with artificial turfs when compared to natural turfs. However, the conclusion driven by the current study opposes the international opinion which may have been caused by the extremely contextualized nature of the current study where Sri Lanka has owned only one artificial turf currently. Therefore, development policies should be implemented to enhance the player experience at natural turfs.

Keywords: Artificial turf, Football, Safety, Sporting features, Player satisfaction

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SESSION D

Sports Leadership, Sports Organisational Behaviour, Sports Psychology

Injury Incidence and Patterns Sustained by the Sri Lankan Premier Level Cricketers in the 2018/2019 Season

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Injuries can be ruined the sports career of players. Hence, it is important to identify the actual injury burden, underlying injury mechanisms and aspects related to injuries to develop and implement successful injury prevention strategies. However, despite being Test Cricket playing nation for over three decades, limited efforts have been taken to identify injuries and injuries-related factors among Sri Lankan cricketers at any level. Therefore, this study aimed to identify the proportion of injury incidence and patterns of Premier level cricketers in Sri Lanka during the 2018/19 season. Required data were collected through a questionnaire by distributing a Google form among the cricket players who participated 2018/2019 premier cricket season. The study was conducted as a cross-sectional study in a non-contrived environment. The data collected from the questionnaires were administered through a customized Microsoft Excel spreadsheet and descriptive analysis was used to analyze the data. The results of the study indicated that more than half of the players (71.7%) within the sample were injured, and the Upper limb was more likely to be injured (36%) than any other body region while Fast bowlers were more prone to become injured (26.7%) during the season. Also, the majority of all-rounders were found with Upper limb region injuries (52.9%). This study revealed some of the major information regarding injuries related to playing roles that will assist to establish effective injury prevention strategies to reduce the risk of injuries. According to findings, Fast bowlers were more prone to injuries and Upper limb injuries were more prevalent during the season.

Keywords: Cricket injuries, Playing roles, Body region

The Aggression of Football Players and its Influence on Sports Performance in Eastern Province, Sri Lanka

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Sports psychology as an interdisciplinary science has gifted arrays of reasons and outcomes of psychological disorders and perspectives which may obstruct or raise athlete performance. The psychological perspectives act as critical for athletes when dealing with their emotions during practice and competition. Aggressiveness is a trait that can have both upright and depraved effects on performance in sports. Aggressive behaviour of an individual is considered hostile behaviour towards another creature which ultimately resulted in physical and/or emotional harm. Therefore, the main objective of this research was to determine whether there is a relationship between physical aggressiveness and sports performance of male and female football players who took part in the last football tournament in 2019 in the Eastern Province of Sri Lanka. 115 soccer players (80 men and 35 women) were randomly selected as study samples. Subjects were instructed to complete the Buss-Perry Aggression Questionnaire (BPAQ) and Sports Performance Questionnaire. Regression weights were used to identify the significant differences and the coefficient test was used to examine relationships. The level of significance for this investigation was set at 0.05. The results of this study show that there is no significant relationship between physical aggression and athletic performance. It is recommended to extend this study to the other provinces with a wider sample to gain more accurate predictions of the variables.

Keywords: Aggression, Physical aggression, Sports performance

An Empirical Study on Achievements Goal Leading to Performance with Special Reference to Baseball Players in Sri Lanka

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Although Baseball is one of the world-famous games, it is an emerging game in Sri Lanka. There are several facets leading to sports performance and achievement goal orientation is considered one of the prominent factors. The present study aimed to access the impact of achievement goal orientation leading to sports performance with special reference to baseball players in Sri Lanka. A cross-sectional survey was carried out with Sri Lankan club-level baseball players with a sample of 81 (n=81). A convenient sampling method was used who are vested in Central and Western provinces due to the persistence of the COVID-19 pandemic during the data collection period. A modified questionnaire was used to gather information on goal orientation and athlete performance. Data were analyzed using SPSS software (version 26.0). Since data were not normally distributed, non-parametric tests were employed to analyze data. Results revealed that there was a positive significant relationship between goal orientation and sports performance ($P<0.005$). Therefore, sports organizations, coaches and other relevant parties should need to consider drafting programmes and modelling their behaviour while dealing with players to develop and enhance achievement goal orientation of players to enhance their performance. Due to various limitations faced by the researcher due to the pandemic, it is suggested to extend the current research among different provinces with a wider sample to validate the current results.

Keywords: Baseball, Goal orientation, Sports performance

Sports Participation and Parental Support of National-Level Athletes in Sri Lanka

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Sports participation is important for a student to be healthy and simultaneously fit to succeed academically. Parental support leads children to sense that they are accepted and cared for by their parents. Consecutively, parents must pay considerable attention to the development of their children's sports and physical activity experiences and psychosocial development associated with such interventions for the development of elite athletes. Encouragement and parental support towards academic development are not visible for sports participation in many instances. Therefore, the purpose of this study is to examine the relationship between sports participation and parental support of athletes and to access whether more participation leads to receiving more parental support. The data were collected from 34 athletes who had participated in the National Sports Festival in 2019, representing the Kandy District. A census sampling technique was administered, and the study was a cross-sectional study. SPSS software (version 25) was used for data analysis. The results revealed that there is a positive relationship between sports participation and parental support ($r=0.647$, $P<0.001$), which concludes that more sports participation leads to more parental support.

Keywords: Sports participation, Parental support, Athletes, Academic performance

The Effect of Coaching Styles on Athlete Motivation of Track Event Athletes in State Universities

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Successful coaching helps to achieve good performance of athletes. Coaches should have to use different coaching styles for each athlete. This study aimed to identify the relationship between the existing five perceived coaching styles and athlete's motivation among track event athletes in the western province government universities. In this descriptive study design, using random sampling technique was used. The sample included 91 athletes (45 men, and 46 women) who participated in the Sri Lanka University Games in 2019. The athlete's motivation Questionnaire of the sport motivation scale (SMS-28) and the Leadership Scale for Sport were used to examine the coaching styles which university track event athletes preferred, and their perceived motivation Data were analyzed using SPSS software (version 23). Since data were not normally distributed, non-parametric tests were employed to analyse data. Results revealed that the overall correlation was moderate and positive, indicating a substantial relationship between the variables. The level of motivation was set at $P < 0.05$. It was revealed that female athletes preferred the positive feedback coaching style ($M = 2.30$) while the highest of male athletes preferred the autocratic coaching style ($M = 2.28$). Furthermore, athlete extrinsic motivation was the most important factor influencing athlete motivation in Track events. Further, there were no significant differences in factors that affected motivation between male and female athletes ($P > 0.05$). Therefore, when coaches train athletes, they should use their coaching styles to awaken the athletes' positive stimulation and thinking.

Keywords: Coaching style, Motivation, Extrinsic motivation, Positive feedback

The Pattern of Mobile Phone Usage and its Effects on Sleep and Academic Performance in Sports Science Undergraduates of the University of Sri Jayewardenepura

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Mobile phone usage has become increasingly popular in past decades, especially among the young generation and young people are getting increasingly more subject to them which leads to subside their educational performance and other psychological functions. Thus, this study was designed to analyze the pattern of mobile phone usage and its effects on sleep, and academic performance in sports science undergraduates in Sri Lanka. A descriptive study was conducted on a total of 196 (100 men, 96 women) sports science undergraduates who used a mobile phone for at least 1 year and utilize census sampling. To collect the data used the self-administrated questionnaire via a google form. Among the sample, most of the respondents (71.9%) used smartphones to coordinate day-to-day activities, share thoughts (66.8%), and for education purposes (62.2%). The greatest of them is using a mobile phone at night (69.4%) and most (49%) used to keep their phone on the bed. Nighttime usage of mobile phones was affected by waking time tiredness (70.9%), and difficulty in waking up (54.1%). The highest number of respondents (60.7%) agreed that they have been suffering from ringxiety while the majority of (65.3%) respondents threw the phone owing to an angry conversation. Further, there is a significant negative relationship ($P < 0.05$) between mobile phone usage and effective sleeping time while there is a significant relationship ($P < 0.005$) between mobile phone usage and academic performance. Besides the positive factors of mobile phone usage, there are negative effects also, therefore, need to educate students about the pros and cons of mobile usage.

Keywords: Mobile phone usage, Academic performance, Sleep

A Psychological Study of the Impact of Sports-related Mental Stress on Women

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External factors that affect women involved in sports in the field of sports can be explored as an important factor influencing psychological stress. In the field of sports, there is an increase in the psychological value of female athletes as a result of personal, environmental, leadership and coaching influences as well as sociocultural myths. The present study aims to compare the stress of married and unmarried women who represent the sport and to identify the main factors that contribute to the stress of female athletes. A cross-sectional survey was carried out using the main factors that contribute to the stress of females of twenty married athletes and twenty unmarried athletes. A Snowball sampling method was used to select the participants data who are Married and unmarried female Athletes. There was a questionnaire for calculating the study variables. The results concluded that married women had a higher level of stress due to their influences than unmarried women. That the influence of leadership and coaching has affected mentality. The study also found that the myth of society influenced the stress of female athletes. This field of exploration will benefit all female athletes. They have the opportunity to identify the causes of stress and manage it to advance further in the field of sports.

Keywords: Psychological value, Stress, Female married and unmarried athletes

Emotional Intelligence, Servant Leadership, and Development Goal Orientation of Athletics Coaches

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This study aims to investigate the impact of emotional intelligence and servant leadership on the development goal orientation among coaches in Sri Lankan state universities. The coach's behaviours can be considered an influential factor for players to reach their goals. There are 14 state universities which are under the direct purview of the University Grants Commission, Sri Lanka. The population of this study included the 127 registered coaches in the 14 state universities' Physical Education Divisions in 2019. The study sample was selected using a stratified sampling method to collect data and data gathering was conducted through a pre-tested Likert scale questionnaire administered via Google forms. Emotional intelligence and servant leadership were considered the independent variables and the development goal orientation of coaches was considered the dependent variable. Data were analysed by using SPSS version 23. After establishing the reliability of the study, a normality test was performed. Since data was not normality distributed, Spearman's Correlation Coefficient test was used to measure the correlation between independent and dependent variables. The result revealed that there were moderate positive relationships between servant leadership and development goal orientation ($P < 0.05$) as well as emotional intelligence and development goal orientation ($P < 0.05$). Accordingly, it is suggested to introduce different training and development programmes including on-the-job training sessions which will be instrumental to enhance servant leadership traits and emotional intelligence competencies of coaches.

Keywords: Emotional intelligence, Servant leadership, Development goal orientation

A Study on the Relationship Between Personality Traits and Exercise Motivation of Users of Registered Fitness Centers Under the 12 Divisional Secretariats in the Gampaha District

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In this exploration, the researcher analysed the relationship between personality traits and exercise motivation of users of registered fitness centres under the 12 Divisional Secretariats in Gampaha District who participated in workouts to lose weight and gain weight. The sample for this study was extracted from 546 users of registered fitness centres under the 12 Divisional Secretariats in Gampaha District in Sri Lanka. A proportionate stratified random sampling method was administered to gather data. The study sample represented 4.73% of the study population. A comprehensive model was developed, based on an extensive literature review, and empirically tested using members of fitness centres from the Gampaha District. The results indicated that individuals with a positive personality lead to having higher levels of exercise motivation ($P < 0.05$). Personality and exercise motivation have also impacted an individual's quality of life, in terms of physical health improvement and psychological health improvement. The study results offer valuable suggestions not only to instructors of fitness centres but also to government officers to promote health and quality of life through stimulating exercise motivation and exercise participation. Recommendations were made for each of the five personality traits as well as a general recommendation to utilize more psychological research professionals to develop more psychological approaches to enhance exercise motivation. Future researchers also can apply this same concept to other Sri Lankan fitness centres as well. It is recommended to follow more efficient and effective health and fitness practices and physical activities when developing fitness centre training programmes.

Keywords: Personality traits, Exercise motivation, Fitness centres

Effect of Motivation on Sri Lankan Football Players' Participation Level; Special Reference to Northern Province and North Central Province

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The Football Federation of Sri Lanka (FFSL) is the governing body of football in Sri Lanka. The database in the Football Federation of Sri Lanka showed that different provinces have significant differences in football participation levels. When reviewing international achievements and rankings, it showed that the Sri Lanka men's national team is in the 200th position in FIFA (Fédération Internationale de Football Association) ranking. The differences in participation levels in different provinces showed that there was an issue regarding the participation level of players. The purpose of the present study was to identify the relationship between motivation and sport participation (football) in selected provinces in Sri Lanka. Based on the comprehensive literature review, the author decided to study the effect of motivation on football participation level in Sri Lanka with special reference to the Northern province and North Central provinces. To accomplish this task, the author used a disproportionate stratified sampling method and a multistage sampling method. Measurement scales were developed based on past studies. Questionnaires were distributed among 455 players. A descriptive analysis, reliability analysis, normality test and correlation were performed using SPSS software version 23.0. Scatter Plot and Spearman's Correlation Coefficient were used to test hypotheses established in the conceptual framework. Data analysis showed that the motivation of the players positively affects their participation level ($P < 0.05$). Based on the findings, football coaches, managers, and the governing body can implement programs to develop the motivation level of players internally (intrinsic motivation) as well as externally (extrinsic motivation) to increase the participation level island-wide.

Keywords: Football, Motivation, Participation, Intrinsic motivation, Extrinsic motivation

The Influence of Anxiety on the Sports Performance in Sri Lanka Army

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Psychological variables critically affect the competitive sports performance of players. To date, the progression of knowledge in the field of sports psychology has led the pathway to improve player performance. Anxiety is one of the major psychological components that should be managed to enhance sports performance. Anxiety is a negative emotional state which ultimately affects the sports performance of athletes. The multidimensional approach to the study of anxiety includes three sub-elements of anxiety namely, cognitive anxiety, somatic anxiety, and self-confidence. The major objective of this research was to identify the effect of anxiety on the performances of the players and to find out the effect of each sub-element: cognitive anxiety, somatic anxiety, and self-confidence on sports performances. This study was carried out as a cross-sectional survey research study. A sample of 290 male and female Sri Lanka Army athletic soldiers who participated in the Inter Regiment, Defense Meet and National Army Meet in 2019 was taken into consideration. The data were collected through a validated questionnaire. The sports performances were measured by allocating marks for the heats, semifinals, and finals. The sample comprised a low male proportion (31.72%) and a higher female (68.28%) proportion. Means comparison was the data analysis technique which was administered to analyse collected data. It was revealed that there was no significant difference in the mean level of anxiety states and self-confidence among male/female athletes in the Sri Lanka Army. There were no significant mean differences between individual events and group events. This research highlights the fact that it is very important to observe the influence between somatic anxiety, cognitive anxiety, self-confidence, and sports performance, as they have a direct impact on the performance of the athletes.

Keywords: Cognitive anxiety, Somatic anxiety, Self-confidence

Understanding How Motivation Affects Participation in Sports Among Undergraduates of the University of Sri Jayewardenepura

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In today's context, there is an increasing trend in obesity among students in Sri Lanka. Lack of physical activity and unhealthy food patterns due to busy schedules have been identified as the main causes of this obesity situation. A significant amount of research has been conducted on motivation in sports to understand why some people show an enduring desire to pursue their sport, whereas others quit or lose interest. The purpose of this cross-sectional study is to determine how motivation affects the sports participation level of undergraduates at the University of Sri Jayewardenepura. From the perspective of self-determination theory, motivation for sport is a complex occurrence with several regulators, with most people having numerous thought processes in commitment. Accordingly, motivation is considered the independent variable in this study and operationalized with intrinsic regulation, integrated regulation, identified regulation, introjected regulation, external regulation and amotivated regulation. Sport participation, the dependent variable is operationalized with the level of participation. Data was collected from 500 undergraduates representing all the faculties through a questionnaire which is tested for internal consistency after carrying out a pilot test. SPSS 23.0 version was used for descriptive analysis and six hypothesis testing. Spearman Correlation Coefficient showed that intrinsic regulation, integrated regulation, identified regulation and introjected regulation have strong positive relationships with sports participation. Extrinsic regulation has a weak positive relationship while amotivated regulation has a strong negative relationship. It has been postulated that motivation does not need a combination of all the variables to occur, as strong motivation can occur through a single variable itself. Therefore, enhancement of motivation towards sports participation through different programmes and strategies by administrators and undergraduates themselves will be beneficial for a healthy and balanced career of future graduates.

Keywords: Motivation, Sports participation, Undergraduates

Perceived Impact of Parental Involvement in Sports Achievement of School Cricketers of Jaffna, Sri Lanka

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The interaction of parents plays a significant part in socializing young athletes into the sport. It affects the psychosocial development of young athletes when participating in sports. In the past years, interest among scientists in the study of parental involvement in sports has increased. Since Sri Lanka has a family-oriented culture, parents play a vital role in the learning of children. Therefore, it is essential to identify the involvement of parents to increase the sports performance of young athletes. Therefore, this present study focuses on assessing parental involvement in school cricketers in Jaffna town. The evaluation of the impact of parental involvement in athlete achievement in terms of intrinsic motivation, self-efficacy, and self-regulation in school cricketers is assessed in this study. Measurement status (four-point Likert scale) obtained from previous studies was adopted to assess the athlete's perspective on their parent's involvement which is operationalized with encouragement, reinforcement and instruction. The impact of perceived parental involvement on the psychological variables (intrinsic motivation, self-efficacy, self-regulation) which influence sports performance was analyzed using Statistical Package for the Social Sciences. The relationship between the athlete's perceptions of parental involvement and the athlete's psychological variables is significant ($P=0.001$). Encouragement (3.2) and reinforcement (3.4) received from the parents were higher than the instruction (2.9). Correlation analysis showed a significant correlation between athletes' perception of parental involvement and intrinsic motivation ($P=0.004$) and self-regulation ($P<0.005$), where self-efficacy ($P=0.067$) did not show a significant correlation. Regression analysis showed a positive correlation for intrinsic motivation, self-regulation, and self-efficacy at 10%, 14%, and 4%, respectively. Since athletes' perception of parental involvement has a significant association with intrinsic motivation and self-regulation, these findings are beneficial to improve the performance of the athletes. In further studies, the number and the diversity of the study population needed to be increased, and many independent and dependent variables needed to be analyzed.

Keywords: Parental involvement, Psychosocial development, Young athlete, Intrinsic motivation, Self-regulation

Factors Affecting Career Development of Women Who are at the Executive Level in Sports Organizations in Sri Lanka

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The purpose of this study is to identify the factors affecting the career development of women who are at the executive level in sports organizations in Sri Lanka. The overall study was carried out based on a conceptual framework built up and hypotheses were developed to find out whether there is an effect of educational qualifications (EQ), professional qualifications (PQ), sources of support (SS) and balancing family and work responsibilities (BFWR) on women career development (WCD). The survey was conducted using a semi-structured questionnaire and the sample consisted of 51 women executives of whom 32 responded. For analysing data, Statistical Package for the Social Sciences (SPSS) version 22. Accordingly, the missing value test, outlier checking, demographic data analysis, reliability test, normality test and correlations were performed, and tables and graphs were used in the data presented. The findings revealed that there is a positive correlation coefficient between EQ and WCD, PQ and WCD, SS and WCD and BFWR and WCD. In conclusion, EQ, PQ, SS and BFWR have significant relationships with WCD. Therefore, these four variables are considered factors affecting WCD. Accordingly, organisations can develop relevant policies, training programmes, work norms, and work procedures which are essential in facilitating women's career development.

Keywords: Women's career development, Educational qualifications, Professional qualifications, Sources of support, Balancing family and work responsibilities

Impact of Perceptual Expectation of Event Cancellation on Stress of Sri Lankan National-Level Athletes During COVID-19 Pandemic

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The COVID-19 pandemic has become a global issue and all the fields and industries of the world have been severely impacted including the sports sector. This has led to many sports event cancellations across all scales from local to international levels. Under the prevailing situation, the present study aims to examine the impact of perception expectation of event cancellation on the stress level of Sri Lankan national-level athletes during the COVID-19 pandemic. A cross-sectional survey was carried out on the perception expectation of event cancellation and perceived stress using Sri Lankan national-level athletes 150 (n=150). A convenient sampling method was used to select the participants who are paid, national-level athletes. The Perceived Stress Scale was used to identify the stress among participants while a separate modified questionnaire was used to identify the perceived expectation of event cancellation of the participants during the COVID-19 pandemic period. Data were analyzed using SPSS software (version 22.0). Since data were not normally distributed, non-parametric tests were employed to analyze data. Results revealed that there is a positive significant relationship between perception expectation on event cancellation and stress ($P < 0.005$). Therefore, sports organizations need to consider proper schedules and programmes to minimize and/or avoid the impact of event cancellation including but not limited to introducing the bio-bubble concept and conducting sports events, facilitating vaccination programmes and initiating motivational programmes for national-level athletes to overcome unhealthy stress situations and achieve higher performance levels.

Keywords: COVID-19, Stress, Perception expectation of event cancellation

Sports Enjoyment and Sports Commitment of Partially Disabled Soldiers in Sri Lanka

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Sri Lanka's decades-long civil war ended leaving many soldiers suffering from permanent injuries during the conflict. Acquiring a physical disability can be considered a devastating and traumatic event in comparison to the borne disabilities, resulting in significant life changes. To shed light on this, extensive research has been done on the positive implications of physical activity, and sports on mental health and psychological well-being. The engagement of disabled persons in sports activities has been acknowledged as an indispensable procedure in the protocol of rehabilitation. The significance of physical fitness and its causes and effects have been a popular research field related to physical sciences. The discussions on the determination of physical fitness of partially disabled people, especially partially disabled soldiers do not get subjected to discussion more often. In Sri Lanka, the commitment to sports by veteran soldiers is at a considerable level. But research on the psychological aspect and sport commitment of partially disabled soldiers have not been given sufficient attention in Sri Lanka. Therefore, this research aims to examine the in-depth relationship of psychological influences with special reference to the enjoyment and commitment of disabled soldiers. The survey data required for the research was gathered from 60 partially disabled soldiers in Ranaviru Sewana, Ragama and Abhimansala, Anuradhapura. The sample was selected based on the snowball sampling technique and the data analysis was carried out using both descriptive and inferential statistics using SPSS version 26.0. Research findings revealed that there is a relationship between sports enjoyment and sports commitment ($P < 0.05$). The findings of the study may help the administrators to draft programmes and policies to enhance sports activities among partially disabled soldiers considering the gravity of the disability and make their lives happier.

Keywords: Disabled soldiers, Sports commitment, Sports enjoyment

The Impact of Power Bases on Perceived Job Satisfaction Among the Coaches in the Sri Lankan University System

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Recruiting dynamically competent and well-experienced coaches have become a visionary strategy in most sports-related organizations including universities and other related institutions to improve athletes' sports performance levels. To achieve this aim, institutional administrators adopt power on different bases over coaches to reach institutional sports excellence. Exercise of power by the administrators influences the coaches' job satisfaction which has a significant impact on athletes' sports performance levels. Accordingly, the present study investigates the impact of power bases on perceived job satisfaction among coaches in the Sri Lankan university system. All the registered sports coaches under the Physical Education Divisions of all fourteen state universities in 2019 were considered as the study population for this cross-sectional study. Using a stratified sampling technique, a sample of one hundred and twenty-seven coaches was selected as the study sample. Data was collected through a pre-validated Likert scale questionnaire based on previous empirical studies. Reward, coercive, legitimate, expert and referent power bases were considered as dimensions of power bases which are considered the independent variables of the present study. Furthermore, perceived job satisfaction which is the dependent variable of the present study was operationalized as intrinsic and extrinsic job satisfaction. Accordingly, five hypotheses were developed between each of the independent variables and the dependent variable. Internal consistency of the survey instrument was established after conducting a pilot test. Data analysis was performed using SPSS version 23.0 version and performed outlier checking, normality test and Spearman correlation. As per the analysis results, all five hypotheses were accepted and showed moderate-level positive correlations. Therefore, it is recommended to university administrators facilitate coaches' career growth by providing different benefits including but not limited to financial/non-financial benefits, career growth training and development opportunities, and directions towards goal orientation to assure the achievement of institutional sports excellence through a motivated and engaged team of institutional coaches.

Keywords: Job satisfaction, Power bases, University coaches

Perceived Impact of Coaches' Role on Mental Toughness of Athletes During Post-COVID-19 Pandemic Period

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The sports industry is one of the major and unique industries affected by COVID-19. Mental health problems are also common during an epidemic and the athletes' mental health is another area that has been severely affected by the COVID-19 pandemic. Athletes' mental health is considered an essential factor for efficient training and competition. When it comes to mental health, one of the most important characteristics is mental toughness. Hence, this study investigated the perceived impact of coaches' role on the mental toughness of athletes during the post-COVID-19 pandemic period. The unit of analysis was athletes of the University of Sri Jayewardenepura, and the convenience sampling technique was adopted in selecting the study sample of 137 athletes. The research was conducted as a correlation study and used the quantitative approach. The coaches' role was operationalized using cultural setting, identification and referral, and treatment adherence. A five-point Likert scale was adopted in the survey questionnaire which was developed based on previous empirical studies. SPSS version 23.0 was used to assess the correlation between the variables. Based on the results, it can be concluded that there was a significant moderate positive relationship between each of the independent variables (cultural setting, identification and referral and treatment adherence) and the dependent variable (mental toughness). Finally, this study will serve to improve the coaches' role and to improve the mental toughness characteristics of university athletes.

Keywords: COVID-19, Mental toughness, Coaches' role

Gender Equality in Sport: In National Sports Federation Participating at South Asian Games from Sri Lanka

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The purpose of this research is to investigate gender equality in sports in national sports federations participating in South Asian Games from Sri Lanka. Accordingly, it was selected a study sample of male and female executive committee members in 27 national sports federations. The selected methodology is based on a quantitative research design and used to questionnaire to collect data. According to past empirical studies, five factors which affect gender equality were identified and such identified factors were employed as the independent variables of the present study. The identified factors are education level, workload, family commitment, human resource management policy, and environmental influence. After excluding the existing interring committees, data were collected from relevant national sports federations. Missing value test, demographic analysis, reliability test, normality test, and correlational analysis were performed using SPSS 23.0 version. Data analysis revealed that there are moderate-level relationships between each of the above independent variables and dependent variables. Accordingly, it is recommended to all relevant national sports federations develop relevant policies, organize training and development programs, develop, and maintain workload norms, develop work-family balance policies and programmes, and encourage a participatory policy-making process, especially regarding their human resources.

Keywords: Gender equality, Women participation, National Sports Federations

A Study on the Determinants of Athletes' Perceived Sports Performance in Sri Lanka Athletics Programme

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Athletics include human competitive sports and games where physical skills and the systems of the training play essential roles to prepare athletes for competitive sports performance. Athletic events are the most specialized sports category in the Olympic Games. Sri Lanka participated in the Olympic Games for the first time in 1948 but still has two Olympic silver medals until 2020. The major objective of this study was to determine the factors affecting the perceived sports performance of athletes in Sri Lanka's national athletics pool, where a comprehensive athletic programme is conducted to enhance players' performance. The study sample consisted of 99 national pool athletes selected based on a convenient sampling method. Relevant data were collected by using a questionnaire which was developed based on past studies in the study area. Accordingly, sports facilities and equipment, sports nutrition support and sports coaches' relationship were identified as the independent variables and the dependent variable was the perceived sport performance. Data analysis was conducted using SPSS software version 23.0. The reliability test was conducted using Cronbach's alpha and established the consistency and stability of the study variables. Cronbach's alpha values of each variable exceeded 0.7. Data were not normally distributed, and Spearman's Correlation Coefficient was used to test the correlations between independent and dependent variables. According to the results, it was established that there was a relationship between sports nutrition and perceived sports performance ($P < 0.05$). Furthermore, it further established a relationship between sports coaches' support and perceived sports performance ($P < 0.05$). However, there was no relationship between sports facilities and equipment and perceived sports performance ($P > 0.05$). From this study, it is identified that coaches' support is more important for higher levels of sports achievement of the athletes. Accordingly, continuous counselling and mentoring programmes with coaches are essential to enhance sports performance. The provision of regular nutritional meals with effective diet plans will ensure continuous improvements in athletes' performance.

Keywords: Sports facilities and equipment, Sport nutritional support, Sports coaches' relationship, Perceived sport performance

Effect of Selected Physical Parameters and Hurdle Clearance Time on 400 m Hurdle Athletes' Performance

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This research is conducted to find out the effect of selected physical parameters and hurdle clearance time affecting 400 m hurdles athletes' performance in Sri Lanka. The population of this study was all the 400 m hurdles athletes in Sri Lanka. The selected sample is the best twenty 400 m hurdles athletes. Their leg power, agility, flexibility, balance, speed endurance, hurdle clearance time and selected anthropometric measures are considered independent variables, and performance is considered the dependent variable. The study was conducted in a survey-type research design. The standing long jump test was used to measure leg power. The 5-0-5 agility test was used for agility, sit, and reach test was used to measure flexibility; the Y balance test was used to measure balance. 300m run test was used to measure speed endurance. To measure the height and length of the lower limb, it is used steel tape and the data was used to investigate the relationship between independent and dependent variables and analyzed by using descriptive analysis, correlation analysis, and multiple regression analysis. The study shows that there is a positive relationship between leg power, speed endurance, agility, balance, flexibility, and length of the lower limb, with performance. Also, hurdle clearance time, height and weight have a negative relationship with performance. Furthermore, according to the Pearson correlation analysis, leg power ($P < 0.005$), speed endurance ($P < 0.005$) and agility ($P < 0.005$) were highly correlated with performance.

Keywords: Physical fitness parameters, Hurdle clearance time, Speed endurance

A Biomechanical Analysis of Upper Body Anthropometries involved in Forehand Overhead Smash in Badminton

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This study examines the effect of upper body anthropometries on forehand overhead smash in badminton. The number of studies has increased with technologies in biomechanics; however, none has focused on changing smash speeds due to the relationship between height and upper body anthropometries. The primary motivation of the paper, therefore, is to observe possible upper limb dynamics influencing the speed of forehand overhead smash and statistically assess their level of impact. Average smash speed and racket movement angle were measured by smart racket sensors. Player height, upper limb length, and elbow angle at shuttle contact were measured manually. Fifty-four Sri Lankan university-level players representing the top nine university badminton teams took part in the study. Data were collected using racket sensors, video captures and other standard measurements. Relationships were assessed using correlation analysis. Multi-level modelling for repeated measures was applied in analyzing the level of impact. The relationship of two independent variables resulted in multicollinearity, hence, leading to principal component analysis. All observed upper body anthropometries showed significant levels of impact on smash speed. Observations except racket movement angle showed positive correlations with smash speed. A slower smash is created by an increased racket movement angle, and players with a reduced racket movement angle are more benefited. The impact created on smash speed by racket movement angle and average force was a significant finding. A considerable difference in smash speed was observed depending on gender. It could also be concluded that a faster smash stroke requires a better height, longer upper limb length, and an extended elbow angle. This study would provide an opportunity for players to learn about the involvement and variations of upper limb dynamics in performing a smash. This would benefit the authorities to explore Sri Lankan badminton players' performances and accommodate the players tactfully.

Keywords: Smash speed, Multi-level modelling, Multicollinearity

The Effect of Warm-up Protocols with Static and Dynamic Stretching Sequences on Agility, Speed, and Leg Power of Netball Players

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Several recent studies have questioned the effectiveness of static stretching as an element in the pre-event warm-up. In contrast, dynamic stretching is becoming more popular among sports professionals as an effective way to prepare athletes for their events. This study aimed to determine the effect of warm-up sequences comprising static and dynamic stretching combinations on the agility, speed, and leg power of netball players. Thirty school-level female netball players (age: 16.5 ± 2.47 years; height: 164.9 ± 6.9 cm; body mass: 60.1 ± 6.6 kg) voluntarily participated in the study. Written consent was obtained from all participants before experimental procedures. The participants underwent four warm-up protocols: static stretching followed by dynamic stretching (SD), dynamic stretching followed by static stretching (DS), dynamic stretching combinations (DD), and control warm-up without stretching (CC), in random order. The warm-up protocols were counterbalanced, and the participants completed the training sessions over eight consecutive days with 48 hours separating two consecutive training sessions. After each experimental session, the agility, speed, and leg power of the participants were measured using the Agility T-test, 30 m sprint, and the standing broad jump test, respectively. Statistical analysis was conducted using two-way ANOVA (warm-up protocol \times sequence) at a 5% level of significance. Results revealed no significant effect of warm-up protocol on the Agility T-test time, sprint time and jump test distance. It can be concluded that the warm-up protocols with static and dynamic stretching sequences (SD, DS, and DD) used in this study were not effective in improving the agility, speed and leg power of school-level netball players compared to a warm-up routine without stretching.

Keywords: Warm-up sequence, Static and dynamic stretching, Netball players

A Biomechanical Study of Lower Body Power on Push Start in Swimming

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This study examined the biomechanical properties of push start in swimming. Sri Lanka has only one swimming pool which is up to the International Swimming Federation standards. The rest of the available standard pools in Sri Lanka do not allow for block starts from both ends, hence, a study on push start is appealing. In this study, a sample of 30 out of 105 National level male swimmers (under 19) was randomly selected. The performance of the start has been measured by the time taken to reach the first 15 meters underwater with the use of the butterfly kick. The timings of the start were broken down to 5 m (ST5), 10 m (ST10) and 15 m (ST15). The other measurements of this study have been the vertical jump, standing broad jump, upper limb length, lower limb length, height, weight, body fat percentage, lower body fat percentage and body mass index. For the analysis of the collected set of data, correlation analysis was used. Multilevel modelling was used to analyze repeated time measures at ST5, ST10, and ST15. As per the findings, there has been a negative impact on the start times with the vertical jump, standing broad jump, and body mass index. In short-distance events in swimming, better starts are important, hence coaches and swimmers can incorporate the findings in the study on scheduling exercises in the off-season to improve leg power and hence the overall start. Furthermore, swimmers can undergo certain fitness programmes to maintain their body weight and fat levels so that when the training cycle starts again, their bodies are in the best condition possible.

Keywords: Push start, Underwater, Lower body power

The Effect of the Ball Type on the Batting Performance of Domestic-Level Cricket Players in Sri Lanka

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Sri Lankan domestic cricket decided to change the ball type of the tournament for the second time in 2018. The physical properties of the ball could alter the ball's aerodynamics and could affect the batting performance. Limited studies have been carried out on the effect of the ball type on batting performance. This study aimed to identify the effect of ball type on the batting performance of domestic-level cricket players in Sri Lanka. Batting performance measures were collected from 32 domestic cricket players who played in the Sri Lanka Premier League tournament in the 2018/19 and 2019/20 seasons ($n=84$ games), which incorporated Kookaburra™ (KB) ($n=42$ games) and Sanspareils Greenlands™ (SG) ($n=42$ games) cricket balls. Batting performance was evaluated using the average number of runs scored, the average number of balls faced, the average number of boundaries 4s and boundary 6s, and the average strike rate per 100 balls. Statistical analysis was conducted using a two-way ANOVA (ball type \times innings) at a 5% level of significance. The average runs scored with KB and SG were 41.21 ± 30.49 and 35.87 ± 23.88 , respectively. The average number of boundaries 4s scored (KB: 4.08 ± 2.26 ; SG: 3.72 ± 2.39), the average number of boundaries 6s scored (KB: 0.52 ± 0.63 ; SG: 0.53 ± 0.80), and the strike rate (KB: 60.38 ± 22.75 ; SG: 64.90 ± 22.00) were comparable for both ball types. Statistical analysis showed no significant effect of ball type on batting performance regarding the average number of runs scored, the number of balls faced, the number of boundaries 4s and 6s scored, and the strike rate. However, the batting performance of the first innings was significantly better compared to the second innings irrespective of the ball type. Results indicate that the domestic-level cricket batters were able to transfer their batting performance from the KB ball to the SG ball without significantly influencing their batting performance.

Keywords: Ball type, Innings, Domestic cricket batters

Analysis of Attacking Game Patterns of Top and Bottom Teams in Dialog Rugby League

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In Rugby, to be effective for attacking purposes, kicks, and lineouts must be executed to create and exploit undefended gaps. This study aimed to provide a look at the attacking game patterns used by the top two and bottom two teams in the Sri Lanka Dialog Rugby League 2019/20 season and to study the differences between the top and bottom teams' attacking game patterns. The importance of this part falls mainly on coaches and players. Thirty-seven matches were analyzed. Kicks and lineouts were the indicators of this study. Pre-determined performance indicators were used to create a hand notation system which was used to analyze the teams. The results of the study showed several significant differences between the top two teams and the bottom two teams, with the main findings showing that the top two teams produced a higher amount of effective kick types and lineouts than the bottom two teams. The most used kick type by each team was the kick to touch. Chip kicks, cross-kicks, and clearance to corner kicks were used more by the top two teams. The bottom two teams used clearance to downfield kicks compared to the top two teams. Regarding the top two teams, the box kick has been utilized more by the Kandy team. The police team utilized chip kicks more than other teams. According to the analysis of lineouts, seven-man lineouts are commonly used by both top and bottom teams and are at a higher rate compared to other player combinations at lineouts. Top teams have used four-man, five-man and six-man lineout combinations evenly at all zones. The recent findings suggest that the greater amount of effective attacking patterns produced more positive outcomes and will be leading to greater success and more likely a team to win a match.

Keywords: Rugby, Kick, Lineouts

Classifying Sri Lankan Premier League Soccer Players for Suitable Playing Positions Based on Their Physical Fitness and Technical Skill Level

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Football is the most popular sport in the world. Sri Lanka, however, is not in the first 200 countries according to the Federation Internationale de Football Association (FIFA) ranking. To improve in-game tactics as well as player performance, it is important to optimize player positioning based on physical fitness and sport-specific technical skills of players. The aim of this study was to classify Sri Lankan Premier League soccer players into four main playing positions: forward player, midfielder, defender, and goalkeeper. The study was carried out with 150 Sri Lankan Premier League soccer players by testing four basic technical skills (passing, shooting, dribbling, and kicking) and four main fitness factors (aerobic capacity, agility, speed, and flexibility). The descriptive statistical analysis was done using SPSS 22 software. The classification was carried out using the Naive Bayes algorithm which is a supervised machine-learning technique that requires the Bayes Theorem under the assumption of conditional independence. The descriptive statistical analysis showed higher passing accuracy in midfielders, higher shooting accuracy and dribbling speed in forwards, and higher kicking distance in goalkeepers. Also, midfielders had a greater aerobic capacity, forwards had a higher agility level and speed, and goalkeepers had a higher flexibility level. Further, the defenders had a moderate level of physical fitness and technical skills. Classification based on predictive modelling showed satisfactory results of 78.12% in overall accuracy when using fitness level and technical skill level. This study may be beneficial for Sri Lankan football coaches to make better decisions in player positioning in football.

Keywords: Naive Bayes algorithm, Soccer, Player position, Bayes' Theorem



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