

(ISO 3297)

LATVIAN ACADEMY OF SPORT EDUCATION

6th Baltic Scientific Conference

Sport Science for Sustainable Society

ABSTRACTS

**April 23 – 25, 2013
Riga, Latvia**

Riga, 2013

Editor

Juris Grants

Latvian Academy of Sport Education
Brivibas street 333
Riga, LV-1006, Latvia

Scientific Committee

Assoc. Prof. A. Fernāte

Latvian Academy of Sports Education

Prof. J. Grants

Latvian Academy of Sports Education

Prof. I. Pontaga

Latvian Academy of Sports Education

Prof. J. Žīdens

Latvian Academy of Sports Education

Assoc. Prof. V. Hein

Tartu University, Estonia

Prof. J. Jürimäe

Tartu University, Estonia

Assoc. Prof. A. Koka

Tartu University, Estonia

Prof. M. Pääsuke

Tartu University, Estonia

Prof. K. Milašius

Lithuanian University of Educational Sciences

Prof. A. Raslanas

Lithuanian University of Educational Sciences

Prof. A. Vilkas

Lithuanian University of Educational Sciences

Prof. A. Skarbalius

Lithuanian Sports University

Prof. A. Skurvydas

Lithuanian Sports University

Prof. A. Stasiulis

Lithuanian Sports University

Organizing Committee

Latvian Academy of Sport Education

J.Grants (Chairman)

I.Boge

I.Bula-Biteniece

U.Ciematnieks

A.Gulbe

M.Jakovļeva

I.Kravalis

T.Krilovs

S.Luika

M.Lesčinskis

T.Ņikiforova

I.Rudzinska

I.Smukā

Technical and language edition and computer composition of text:

I. Bula-Biteniece

I. Boge

I. Rudzinska

ISBN 978-9984-9204-6-7

ISSN 1691-6220

© Latvian Academy of Sport Education, 2013

Website: www.lspa.lv

Dear Friends,

You are welcome to participate in the 6th Baltic Scientific Conference “Sport Science for Sustainable Society”. The Conference theme involves sustainable society where knowledge and skills are shared in the sport, health and active leisure sector.

Within the framework of the Baltic Sport Science Society a new scientific journal *Baltic Journal of Sport Sciences* has been created. The first issue of the Journal will be published in 2013. The publisher is Lithuanian Sport University (Lithuania) with its publishing partners: the University of Tartu (Estonia), Latvian Academy of Sport Education (Latvia) and Lithuanian University of Educational Sciences (Lithuania). The aim of the new Journal is to improve and strengthen sport science in the Baltic States, Europe and the world, as well as to promote better cooperation among sport universities in the Baltic region.

The Abstract Book includes both oral and poster presentations. The editors would like to use the opportunity and thank all authors who have contributed to this Conference.

On behalf of the Scientific and
Organization Committees
of the BSSS Conference

Vice President of BSSS
Prof. Juris Grants

BALTIC SPORT SCIENCE SOCIETY

BALTIC SPORT SCIENCE SOCIETY (BSSS) is a non-profit organization founded in Vilnius (the Republic of Lithuania) during the Second Baltic State Sport Science Conference (April 23-25, 2009) with the objectives:

- a) to promote study and development of sport sciences in the Baltic States (the Republic of Estonia, Republic of Latvia, Republic of Lithuania);
- b) to enhance the quality of doctoral studies (PhD) in the Baltic States;
- c) to organize scientific meetings and courses in the field of sport sciences;
- d) to cooperate with national and international organizations in sport sciences and related fields.

The leading organizations of the BSSS are:

- Faculty of Exercise and Sport Science, University of Tartu, Tartu, Estonia,
- Latvian Academy of Sport Education, Riga, Latvia,
- Lithuania Academy of Physical Education, Kaunas, Lithuania (*at present Lithuanian Sports University*) and Faculty of Sports and Health Education, Vilnius Pedagogical University, Vilnius, Lithuania (*at present Lithuanian University of Educational Sciences*).

The membership of BSSS includes individual members from the Baltic States (the Republic of Estonia, Republic of Latvia, and Republic of Lithuania) who have a PhD degree in sport or related sciences. Doctoral (PhD) students are on the status of junior members. Membership is open for scholars and doctoral students from other countries as well.

The presidents of the BSSS:

- 2009 – 2012 Prof. T. Jürimäe (University of Tartu, Estonia),
- 2012 and at present Prof. A. Skurvydas (Lithuanian Sports University).

The main event of BSSS is an annual conference. Each spring the host organization arranges the Baltic State Sport Science Conference:

- the first Baltic Conference in Exercise and Sport Sciences – Tartu, May 7-10, 2008.
- the second Baltic Conference in Exercise and Sport Sciences – Vilnius, April 23-25, 2009.
- 2010 – Latvia
- 2011 – Estonia
- 2012 – Lithuania
- 2013 – Latvia,
- 2014 – Estonia, etc.

The aims of the conferences are:

- to enhance the quality of sport sciences in the Baltic States;
- to organize a young scientist section during the conference in order to promote PhD studies;
- to invite leading scientists all over the world as key-note speakers.

CONTENTS

INVITED SPEAKERS

1. THE DEVELOPMENT OF EU DIMENSION IN SPORT 19
B. Ooijen
2. SPORT PSYCHOLOGY – NEEDS AND PERSPECTIVES FOR RESEARCH,
EDUCATION, AND APPLICATION 19
R. Seiler
3. EFFECT OF DANCE INTERVENTIONS ON PHYSICAL AND MENTAL
FITNESS IN ELDERLY, AGED FROM 65 TO 80 YEARS..... 20
A. Hökelmann, K. Rehfeld, P. Blaser, W. Lehmann
4. SPORT BIOMECHANICS RESEARCH IN ITALY AND AT BOLOGNA
UNIVERSITY 21
A. Cicchella
5. METHODS FOR MONITORING TRAINING STATUS AND THEIR EFFECTS
ON PERFORMANCE IN ROWING 22
J. Jürimäe
6. ANAEROBIC POWER AND MUSCLE WORK CAPACITY OF LITHUANIAN
BASKETBALL PLAYERS 22
R. Paulauskas
7. MECHANOTHERAPY IN REHABILITATION PROCESS
A. Kaupužs..... 23

YOUNG SCIENTISTS PRESENTATIONS

8. PSYCHOMETRIC INDICATORS OF GENERAL HEALTH QUESTIONNAIRE
IN LATVIA
*I. Zelča, Ž.Vazne, A. Čuprika, I. Amantova, Z. Galeja, L. Ozoliņa, O. Vaisjūns,
L. Ozola*..... 26
9. INDIVIDUAL COMPLEX PREPARING OF HOCKEY PLAYERS
A. S. Pavlov 27
10. QUESTIONS IN MODELING TRAINING PROCESSES FOR HOCKEY
A. Petrov..... 28
11. E- PLANNER FOR THE SUBJECT OF SPORTS IN GENERAL SECONDARY
EDUCATION
A. Piļkevičs, R. Jansone, I. Bula-Biteniece 28
12. PHYSICAL EDUCATION TEACHERS' ATTITUDE TOWARD TEACHING
STUDENTS WITH SEVERE AND MULTIPLE DISABILITIES
N. Strazdiņa, A. Kļaviņa 29
13. SOME ASPECTS OF INDIVIDUAL SPORTS ATHLETES' PSYCHOLOGICAL
PREPARATION FOR LONDON OLYMPIC GAMES
R. Žilinskienė, I. Girčytė..... 30
14. THE CONTENTS OF PHYSICAL ACTIVITIES, THE HEART RATE
FREQUENCY AND THE AMOUNT OF STEPS MEASUREMENTS OF 4 TO 5
YEAR-OLD CHILDREN, IN THE KINDERGARTEN'S DAILY REGIME
(THE RESULTS OF PILOT STUDIES)
S. Lisovska, R. Jansone..... 30

15. EDUCATIONAL PREREQUISITES FOR PHYSICAL ACTIVITY AND SPORT ORIENTATION OF ADOLESCENTS FROM VARIOUS AGE GROUPS <i>R. Mėlinis, A. Vilkas</i>	31
16. SELF-APPRAISAL AND ITS IMPACT ON THE EMOTIONAL STATE OF THE ATHLETES <i>S. Saulite, N. Vysochina</i>	32
17. SPORT ACTIVITY IN THE FAMILY FROM THE PERSPECTIVE OF THE PEOPLE OF THE "THIRD AGE" <i>P. S. Tsonkova, D. G. Tsonkova</i>	33
18. EMOTIONAL INTELLIGENCE AMONG LITHUANIAN AND LATVIAN STUDENTS OF SENIOR HIGH SCHOOL AGE IN PHYSICAL EDUCATION CLASSES <i>A. Akelaitis, R. Malinauskas</i>	34
19. GENDER DIFFERENCES IN PHYSICAL BODY IMAGE PERCEPTION AMONG 8 th GRADE PUPILS <i>S. Derkintienė</i>	34
20. PECULIARITIES OF SOCIAL RESPONSIBILITY AMONG LITHUANIAN AND LATVIAN SPORTS SCHOOLS STUDENTS <i>D. Juodsnukis, R. Malinauskas</i>	35
21. DEVELOPMENT OF PHYSICAL AND SELF-CONTROL ABILITIES OF JUNIOR SCHOOL CHILDREN (10 – 11 YEARS OLD) <i>V. Kontautienė, A. Vilkas</i>	36
22. ADOLESCENT ATHLETES PROSOCIAL BEHAVIOR AND VALUES RELATIONS IN SPORT <i>T. Stupuris, S. Šukys, I. Tilindienė</i>	37
23. THE WAYS OF WORD KNOWLEDGE BROADENING IN THE LESSONS OF SPORT OF THE FIRST FORM PUPILS WITH SPEECH DISORDERS <i>I. Tihomirova</i>	38
24. ANALYSIS OF LITHUANIAN YOUNG SOCCER PLAYERS' GAME PERFORMANCE <i>D. Gražulis, D. Radžiukynas</i>	39
25. DEVELOPMENT OF A BODY CONTACT IMPROVEMENT MODEL FOR STANDARD SPORT DANCES <i>A. Kļonova, L. Žilinskis, A. Cicchella, J. Kļonovs</i>	40
26. A LONG -TERM ATHLETE DEVELOPMENT: THE SENSITIVE PERIODS <i>A. Lazauskas, A. Skarbalius</i>	41
27. ABILITIES CHARACTERIZING HIGH QUALITY OFFICIALS OF SPORT GAMES <i>R. Līcis, A. Rudzītis, L. Žilinskis</i>	41
28. CHANGES IN PHYSICAL FITNESS OF 9 – 10 YEARS OLD SPORT DANCERS DURING A TEN-MONTH TRAINING CYCLE <i>A. B. Ušpurienė, A. Čepulėnas</i>	42
29. HIGH-MASTERIES KAYAKER PREPARATION FOR WORLD CHAMPIONSHIPS CHARACTERISTICS <i>V. Vaicikonis E. Balčiūnas, K. Milašius</i>	43

30.TOTAL TIME AND HEART RATE CHANGES OF YOUTH GOLFERS DURING PRE-SHOT ROUTINES ON-COURSE CONDITIONS <i>M. Zienius, A. Skarbalius, A. K. Zuoza, K. Pukēnas</i>	44
31.FOREHAND TECHNIQUE TIME PARAMETER GROUP AND INTERGROUP VARIATION IN TENNIS <i>A. Zuša, J. Lanka, A. Vagin</i>	44
32.SHOULDER MUSCLE ACTIVATION DURING SUCCESSFUL AND UNSUCCESSFUL SHOTS	
33.IN more AND LESS SKILLED NOVUS PLAYERS <i>V. Talts, J. Ereline, H. Gapeyeva, T. Kums, M. Pääsuke</i>	45
34.DEVELOPMENT OF THE BACK MUSKLE STRENGTH EXPRESSIONS (WOMEN AGED 23 – 25) <i>A. Lajevska, A. Čuprika, L. Čupriks</i>	46
35.DEVELOPEMENT OF RAPID FORCE AND POWER WITH SPECIAL EXERCISES OF KETTLEBELL SPORT <i>M. Lesčinskis, S. Saulīte</i>	47
36.MODERN REALITIESSELECTION ANDPREDICTIONIN SPORTS <i>E.V. Gorina, E.G.Pritkova</i>	47
37.DEVELOPMENT OF KAYAK ROWERS’ AEROBIC CAPACITY <i>E. Balčiūnas, R. Nekrošiuz, R. Dadeliē, J. Skernevičius</i>	48
38.RELATIONSHIP BETWEEN BETA ENDORPHINS AND WELL-BEING FOR FURTHER OUTDOOR ACTIVITIES IN 45 TO 55 – YEARS-OLD PEOPLE (pilot study) <i>I. Kundzina, J. Grants</i>	49
39.THE IMPROVEMENT OF MANAGEMENT FACILITIES OF SPORTS ORGANIZATIONS IN LATVIA <i>Ģ. Jansons, J. Ošeniēks</i>	50
40.ENTREPRENEURSHIP AND NEEDS OF TOURISM SERVICE USERS <i>R. Navickiene</i>	50
41.FITNESS IN THE SPORT STRUCTURE OF LATVIA <i>A. Čuprika, A. Fernāte</i>	51
42.FUNCTIONAL ABILITIES OF CHILDREN WITH PSYCHONEUROLOGICAL DISTURBANCES <i>N. Sitņika, I. Kīsis</i>	52
43.EVALUATION OF EMOTIONAL STATE IN RECREATION ACTIVITIES <i>G. Ulme, J. Grants, I. Kravalis</i>	52
44.THE EFFECT OF INSPIRATORY MUSCLE WARM-UP ON SUBMAXIMAL ROWING PERFORMANCE <i>M. Arend, J. Mäestu, J. Kivastik, R. Rämson</i>	54
45.EFFECT OF SHORT-TERM EXERCISE ON REGENERATIVE CAPACITY OF RAT SKELETAL MUSCLE <i>M. Aru, K. Alev, P. Kaasi, R. Puhke, A. Pehme, J. Sagim, T. Seene, E. L. Rahusoo</i>	55

46.EFFECT OF DRAFTING ON HEART RATE, CYCLE LENGTH AND FREQUENCY IN CROSS-COUNTRY SKIING <i>I. Nikonovs, E. Bernāns, K. Ciekurs</i>	56
47.RESIDUAL FORCE DEPRESSION FOLLOWING MUSCLE SHORTENING IN FRESH AND FATIGUED HUMAN QUADRICEPS MUSCLE <i>G. Dargeviciute, N. Masiulis, S. Kamandulis, H. Westerblad, A. Skurvydas, D. Kiele, V. Aleknaviciute</i>	57
48.DISTURBANCES OF MUSLES NEURAL REGULATION IN CONNECTION WITH VEGETATIVE NERVOUS SYSTEM'S FUNCTIONAL STATE <i>Z. Galeja, A. Paeglītis</i>	58
49.RATE OF FORCE DEVELOPMENT IN ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTED PATIENTS <i>D. Kielė, N. Masiulis, R. Gudas, G. Dargevičiūtė, V. Streckis, V. Dudonienė</i>	59
50.BODY COMPOSTITION, BONE MINERAL CONTENT AND SKELETAL MUSCLE QUALITY CHARACTERISTICS IN CYCLISTS AND POWER LIFTERS <i>L. Lepasalu, E. Lätt, J. Jürimäe, J. Ereline, H. Gapeyeva, T. Kums, M. Mumm, M. Pääsuke</i>	60
51.FOOTBALL PLAYER BODY HYDRATION LEVEL CHANGES DURING TRAINING IN WINTER <i>L. Ozoliņa, I. Pontaga</i>	60
52.CONTROLLABLE REPEATED PASSIVE HEATING EFFECT TO ACCLIMATION SYMPTOMS AND NEUROMUSCULAR FUNCTION	
53. <i>H. Paulauskas, M. Brazaitis</i>	61
54.RELATIONSHIP BETWEEN LEG EXTENSOR MUSCLE STRENGTH, POSTURAL STABILITY AND RISK OF FALLING IN WOMEN WITH KNEE JOINT OSTEOARTHRITIS AFTER A 2-MONTH HOME EXERCISES PROGRAM <i>M. Rätsepsoo, H. Gapeyeva, J. Sökk, J. Ereline, T. Haviko, A. Märtson, M. Pääsuke</i> !	62
55.THE EFFECT OF POWER ENDURANCE AND HIGH-INTENSITY POWER TRAINING ON AEROBIC CAPACITY IN SPRINTERS <i>S. Raubaitė, N. Baranauskienė, A. Stasiulis</i>	63
56.CONCURRENT TRAINING VS. RESISTANCE TRAINING: EFFECTS ON SKELETAL MUSCLE MORPHO-FUNCTIONAL PARAMETERS <i>J. Sagim, K. Alev, P. Kaasik, R. Puhke, A. Pehme</i>	64
57.DOES PASSIVE HEATING AND COOLING INDUCE ANY MEMORY ALTERATIONS? <i>R. Solianik, A. Skurvydas, M. Brazaitis, V. Berneckė</i>	65
58.AEROBIC AND ANAEROBIC CHARACTERISTICS IN FEMALE LACROSSE PLAYERS <i>A. Kursīte, I. Pontaga</i>	65
59.IMPACT OF STRENGTH TRAINING PROGRAM ON PHYSICAL FITNESS AND PSYCHICAL CONDITION OF ELDERLY WOMEN <i>V. Abramavičiūtė, K. Zaičenkoviene</i>	67

60.EFFECT OF PASSIVE HEATING AND COOLING ON ATTENTION <i>V. Berneckė, M. Brazaitis, A. Skurvydas, R. Solianik</i>	68
61.THE CHANGE IN RESULTS OF ELDERLY PEOPLE'S PHYSICAL ACTIVITY BETWEEN YEARS 2005 AND 2012 <i>L. Kreivėnaitė, V. Streckis., K. Visagurskienė., A. Buliuolis</i>	68
62.NON-FORMAL PHYSICAL EDUCATION IN SCHOOL AS FACTOR FOR INNATE PHYSICAL POWERS TRAINING <i>A. Šarkauskienė</i>	69
63.PHYSICAL ACTIVITY IS RELATED TO BONE MINERAL DENSITY IN UNDERWEIGHT ADOLESCENT BOYS <i>D. Vaitkeviciute, E. Lätt, J. Mäestu, M. Saar, P. Purge, T. Jürimäe, J. Jürimäe</i>	70
64.THE EFFICACY OF A STRETCHING PROGRAM ON HAMSTRING IN STUDENTS OF BACCALAUREATE UTILIZING A BOUNCING STRETCH TECHNIC <i>C. A. Becerra Fernandez, D. Mayorga-Vega, E. Fernández Rodríguez, R. Merino Marban</i>	71
65.EVALUATION OF PHYSICAL DEVELOPMENT AND PHYSICAL ACTIVITY INDICATORS AMONG VILNIUS SCHOOL CHILDREN AGED 10 – 17 <i>V. Kavaliauskas</i>	72
66.COMPARISSON OF THE LIFESTYLE AND SUBJECTIVE HEALTH OF MASTER SWIMMERS AND PHYSICALLY INACTIVE LITHUANIAN ADULT POPULATION <i>V. Kriaučionienė, A. Laukė, B. Statkevičienė</i>	73
67.PHYSICAL ACTIVITY AND DIETARY HABITS OF UNIVERSITY STUDENTS <i>H. Vecenāne</i>	73
68.ASPECTS OF EDUCATIONAL ACTIVITY OF THE LITHUANIAN SPORT MUSEUM IN THE EDUCATION OF SCHOOL CHILDREN <i>D. Majauskiene, A. Kuzmiene</i>	74
PRESENTATIONS	
69.STUDENT ATHLETES' PERCEPTIONS OF CAREER TRANSITION IN SPORT AND HIGHER EDUCATION <i>A. Fernate</i>	76
70.HOW TEACHER MOTIVATION IS RELATED TO THE STUDENTS MOTIVATION AND PHYSICAL SELF ESTEEM: A CROSS-CULTURAL EVALUATION <i>V. Hein, A. Emeljanovas, J. H. Ekler, I. Valantine</i>	77
71.THE DIRECTION OF FUNCTIONAL ASYMMETRY AND LEARNING PERFORMANCE IN CHILDREN AND YOUTH <i>C. Kuśnierz</i>	78
72.COOPERATION DIRECTED LEARNING IN INCLUSIVE PHYSICAL EDUCATION <i>A. Kļavina1, L. Kristen2, L. Hammar, K. Jerlinder, T. Soulie</i>	79

73.LEARNING OUTCOMES ASSESSMENT IN SPORT TEACHER QUALIFICATION OBTAINING IN LATVIAN ACADEMY OF SPORT EDUCATION <i>R. Jansone, I. Immere, A. Fernāte</i>	80
74.LATVIAN HANDBALL PLAYERS' EFFECTIVENESS IN COMPETITIONS DEPENDANCE ON PSYCHOLOGICAL INDICATORS <i>Z. Vazne, E. Politers</i>	80
75.SPORT STUDENT FOREIGN LANGUAGE LEARNING AND USE HABITS <i>I. Rudzinska</i>	81
76.FORMATIVE ASSESSMENT – ASSESSMENT FOR LEARNING <i>L. Zeiberte</i>	82
77.EVOLUTION OF STUDENT OPINION ABOUT THEIR STUDIES AT LATVIAN ACADEMY OF SPORT EDUCATION <i>A. Rudzitis, U. Gravitis, A. Spunde</i>	83
78.PSYCHOLOGICAL SKILLS IN SPORT <i>I. Simonenkova</i>	84
79.EVALUATION OF WORLD YOUTH OLYMPIC GAMES FROM THE PERSPECTIVE OF YOUNG LATVIAN ATHLETES <i>A. Gulbe</i>	84
80.EMOTIONAL EXPERIENCES OF ADOLESCENTS IN SPORT <i>A. Budreikaitē</i>	85
81.FACTORS INFLUENCING 5TH – 8TH GRADE STUDENTS' ABILITY TO PARTICIPATE AND ENJOY PHYSICAL EDUCATION <i>A. Emeljanovas, E. Petrylaitē, L. Trinkūnienē</i>	86
82.COACH OPINION ON THE PROVISION OF COACH CONTINUING EDUCATION IN LATVIA <i>M. Jakovleva</i>	87
83.ATHLETES AND COACHES' EDUCATIONAL INTERACTION STRATEGIES IN ELITE SPORT <i>S. Sabaliauskas, S. Poteliūnienē</i>	88
84.CORRELATION AMONG BULLYING, SELF-ESTEEM AND ANXIETY OF 12 – 15 YEAR OLD ATHLETES <i>I. Tilindiene</i>	88
85.FACTORS OF THE PROFESSIONAL MOTIVATION OF THE SPORT PEDAGOGUES IN BULGARIA <i>D. G. Tsonkova</i>	90
86.THE STATE'S ROLE IN THE DEVELOPMENT OF PHISICAL EDUCATION IN RUSSIA IN THE PRE-SOVIET PERIOD <i>D. Belyukov</i>	90
87.PERSONALITY OF LECTURER IN GYM CLASSES <i>A. Homiča, U. Jermakova</i>	91
88.PUPILS' PHYSICAL ACTIVITIES AT SCHOOL(GRADE 2) (PILOT STUDY) <i>I. Bula-Biteniece, E. Majore</i>	92

89.	A BRIEF HISTORY OF VIBRATION AND VIBRATION DEVICES <i>V. Krauksts, K. Ciekurs</i>	92
90.	COMPARISON OF LOWER LIMB ISOKINETIC MUSCLE PERFORMANCE BETWEEN ROAD CYCLISTS AND MIDDLE DISTANCE RUNNERS <i>I. Rannama, K. Baskin, M. Roosalu, V. Kunitson</i>	94
91.	POSTURE SPECIFICS IN YOUNG ATHLETES IN DIFFERENT SPORTS <i>J. Solovjova, I. Uptis, J. Grants, J. J. Kalmikovs</i>	94
92.	LOCAL VIBRATION IN KAYAKING <i>V. Krauksts, K. Ciekurs, R. Vinogradovs</i>	95
93.	TRAINING CHARACTERISTICS OF NORWEGIAN DISTANCE RUNNERS AT AN INTERNATIONAL LEVEL <i>L. I. Tjelta</i>	96
94.	DYNAMICS OF CONCATENATION BETWEEN MUSCULAR BLOOD FLOW AND FUNCTIONAL INDICES OF CARDIOVASCULAR SYSTEM IN ENDURANCE OR SPRINT COHORTS DURING GRADED EXERCISE STRESS <i>J. Poderys, V. Papievienė, E. Trinkūnas, A. Buliuolis, A. Grūnovas</i>	97
95.	THE EFFICIENCY OF FREE THROWS OF YOUNG 13–14 YEAR OLD BASKETBALL PLAYERS ADJUSTING THE DIFFERENT PROGRAMS OF PERFECTION <i>A. K. Zuoza, I. J. Zuozienė, E. Voronovas</i>	98
96.	LOCAL VIBRATION INFLUENCE ON ANAEROBIC POWER AND ANAEROBIC POWER CAPACITY IN ROWERS <i>K. Ciekurs, V. Krauksts</i>	98
97.	RELATIONSHIP BETWEEN ISOKINETIC MUSCLE STRENGTH AND FINSWIMMING TIME <i>V. Kunitsõn, I. Rannamaa</i>	99
98.	CHANGES IN MORPHOLOGICAL CHARACTERISTICS AND INDICATORS OF EXPLOSIVE POWER IN YOUNG BASKETBALL PLAYERS <i>A. K. Zuoza, I. J. Zuozienė, L. Beniušis</i>	100
99.	CHARACTERISTIC OF FUTURE OLYMPIC CHAMPION AND OTHER YOUNG LITHUANIAN WOMEN SWIMMERS OF AGE 12 <i>R. Dadelienė, K. Milašius, J. Skernevičius</i>	100
100.	AEROBIC CAPACITY TRAINING OF HIGH PERFORMANCE ROWERS <i>A. Raslanas, R. Dadeliene, E. Petkus</i>	101
101.	THE REVIEW OF HIGH PERFORMANCE WOMEN TRACK CYCLISTS OF 3 KM TEAM PURSUIT RACE TRAINING PROCESS FOR EUROPEAN CHAMPIONSHIP 2012 <i>L. Tubelis^{1,2}, A. Jakimavičius²</i>	102
102.	FORCED MODE TRAINING IN BASKETBALL <i>U. Grāvītis, J. Rimbenieks, A. Andersons, M. Pliens</i>	103
103.	EFFECT OF ATTENTION CONCENTRATION ON THE ACCURACY OF FREE THROWS <i>R. Kreivyte</i>	104

104.	RELATIONSHIP BETWEEN LOWER LIMB ISOKINETIC STRENGTH AND 60m SPRINT RUNNING TIME	
	<i>M. Misjuk, I. Rannama, E. Niglas</i>	104
105.	INTERPRETATION OF PEAK OXYGEN CONSUMPTION IN 10-12-YEAR-OLD SOCCER PLAYERS: EFFECT OF BIOLOGICAL MATURATION AND BODY SIZE	
	<i>P. Purge, U. Viickberg, T. Jürimäe, M. Saar, E. Lätt, J. Mäestu, J. Jürimäe</i>	105
106.	INFLUENCE OF ACROBATIC SKILLS ON BASIC PHYSICAL AND COORDINATION ABILITIES	
	<i>O. Romero Ramos, M. Gonzalez Dominguez, J.I. Álvarez de Toledo Rohe, A. Ortega Linares</i>	106
107.	RELATIONSHIPS BETWEEN THROWING PERFORMANCE CHARACTERISTICS, ANTHROPOMETRICAL PARAMETERS AND MOTOR ABILITIES	
108.	<i>M. Visnapuu, K. Karuauk</i>	107
109.	CHANGE IN SPORTS MOTION ABILITIES OF STUDENTS	
	<i>N. Žilinskienė, D. Radžiukynas, D. Gražulis</i>	108
110.	HOW MANY YEARS MUST PASS BEFORE WOMEN CAN DEMONSTRATE SIMILAR SWIM COMPETITION RESULTS AS MEN	
	<i>B. Statkeviciene</i>	108
111.	INTERACTION BETWEEN AGE, BODY SOMATIC INDICATORS AND ATHLETIC RESULTS FOR MEN AND WOMEN IN ELITE PAIR FIGURE SKATING	
	<i>B. Statkevičienė, A. Čepulėnas, V. Bružas</i>	109
112.	ARE THERE THE DIFFERENCES BETWEEN MEN'S AND WOMEN'S BREASTSTROKE TECHNIQUE INDICATORS?	
	<i>B. Statkevičienė, Ž. Bagdanavičiūtė</i>	110
113.	VISUALIZATION OF LOCAL VIBROSTIMULATION	
	<i>U. Ciematnieks, L. Čupriks</i>	111
114.	THE POSSIBILITIES FOR THE IMPROVEMENT OF ASSESSMENT OF EMPLOYEES' ACTIVITIES AT LEISURE AND SPORTS CLUBS	
	<i>E. Jasinskās, B. Švagždienė</i>	112
115.	QUALIFICATION "RECREATION SPECIALIST" FOR LIFELONG LEARNING STRATEGY	
	<i>I. Kravalis, J. Grants, D. Krauksta</i>	113
116.	THE INFLUENCE OF SPORT STRATEGICAL PLANNING ON SPORT DEVELOPMENT IN LATVIA	
	<i>S. Luika, B. Luika</i>	113
117.	OUTDOOR ACTIVITY INSTRUCTORS EDUCATION AND CERTIFICATION IN LATVIA AND OTHER COUNTRIES	
	<i>I. Liepiņa, I. Smukā</i>	114
118.	THE CHILD AS FAMILY ANIMATOR OF PHYSICAL ACTIVITY	
	<i>K. Piech¹, I. Bula-Bīteniece², R. Jansone², J. Grants</i>	115

119.	LEISURE CLUSTER: FROM THEORY TO PRACTICE <i>G. Zilaityte¹, G. Junevicius²</i>	116
120.	ASSESSMENT OF SERVICE SKILLS IN THE COMPANIES PROVIDING WITH LEISURE FACILITIES: RESEARCH IN CUSTOMER APPROACH <i>B. Švagždienė, K. Grigaitė, E. Jasinskas</i>	117
121.	URBAN IMAGE-MAKING IN BUSINESS PERSPECTIVE <i>R. Andriukaitienė, B. Svagždienė, A. Pabedinskiene</i>	118
122.	COACHES' LOYALTY IMPORTANCE ON THE ORGANIZATIONS PROVIDING WITH RECREATIONAL SPORT SERVICE <i>V. B. Fominienė, D. Bulotienė, R. Mikalauskas</i>	119
123.	SPORT ORGANIZATIONS BRAND-BUILDING MODELS: THEORETICAL VIEW <i>S. Kromalcas, I. Valantine</i>	120
124.	DEVELOPMENT OF INOVATIVE HEALTH TOURISM SERVICE IN LEARNING ORGANIZATION <i>G. Zilaityte, B. Svagždienė, I. Valantine</i>	120
125.	BASIC UNDERSTANDING ASPECTS OF SPORT RECREATION, AS A COMPLICATED SOCIAL PHENOMENON <i>R. Mikalauskas, B. Švagždienė</i>	121
126.	THE INFLUENCE OF SERVICE CLOTHING SETS ON THE WORKING CAPACITY <i>V. Larins, A. Rudzītis, Z. Pavare</i>	123
127.	MITOCHONDRIAL RESPIRATION CAPACITY IN RELATION TO SKELETAL MUSCLE MASS, INFLAMMATORY MARKERS AND FUNCTIONAL PERFORMANCE IN RECREATIONALLY ACTIVE OLDER WOMEN <i>M. Pääsuke, J. Ereline, H. Gapeyeva, T. Kums, K. Alev, R. Puhke, P. Kaasik, R. Pääsuke, K. Paju, M. Eimre, L. Kadaja, E. Seppet</i>	124
128.	CHANGES IN EMG OF M. M. VASTUS LATERALIS AND MEDIALIS DURING INCREMENTAL CYCLING 24 HOURS AFTER PRIOR DROP JUMPS EXERCISE <i>N. Baranauskienė, S. Raubaitė, A. Stasiulis</i> ,	125
129.	THE INFLUENCE OF DIFFERENT PHYSICAL LOADS ON YOUNG ATHLETES LUNG FUNCTION <i>E. Kemerytė-Riaubienė, N. Jaščaninienė, A. Kepežėnas, R. Tamulevičius</i>	125
130.	IS THERE ANY ASSOCIATION BETWEEN HUMAN ACE I/D POLYMORPHISM AND INDIVIDUAL DIFFERENCES IN EXERCISE HEAT STRESS TOLERANCE? <i>V. Ööpik, S. Timpmann, K. Kreegipuu, M. Tamm, E. Unt</i>	126
131.	MUSCLE BLOOD SUPPLY DURING PROLONGED STATIC VOLUNTARY CONTRACTIONS <i>A. Paeglītis, I. Kukulis, E. Eglītis, Z. Galeja</i>	127

132. RELATIONSHIPS BETWEEN SHOULDER MUSCLE STRENGTH AND ENDURANCE IN PATIENTS WITH FROZEN SHOULDER SYNDROME BEFORE AND AFTER MANIPULATION UNDER GENERAL ANESTHESIA <i>J. Sokk, H. Gapeyeva, J. Ereline, M. Merila, M. Pääsuke</i>	128
133. PHYSIOLOGICAL RESPONSES AND ENERGETICS DURING DIFFERENT MODES OF PILATES SESSIONS WITH REFORMER: A PILOT STUDY <i>K. Zaicenkoviene, A. Stasiulis</i>	129
134. THE IMPACT OF DIETARY SUPPLEMENT MULTI MACA ON ATHLETES' ORGANISM <i>K. Milašius, R. Dadelienė</i>	130
135. STRENGTH DEVELOPMENT CAPACITY THROUGH THE LIFE – SPAN: PHYSIOLOGICAL LIMITING FACTORS <i>T. Seene, J. Lellep, P. Kaasik</i>	130
136. VOLUNTARY AND ELECTRICALLY EVOKED FORCE-GENERATION CAPACITY OF QUADRICEPS FEMORIS MUSCLE IN YOUNG AND ELDERLY WOMEN WITH SIMILAR PHYSICAL ACTIVITY <i>H. Gapeyeva, J. Ereline, T. Kums, H. Aibast, E. Seppet, K. Paju, J. S. McPhee, M. Pääsuke</i>	132
137. BIOMECHANICAL ANALYSIS OF FOREHAND HIGH AND LOW SERVE IN BADMINTON PLAYERS WITH DIFFERENT TRAINING EXPERIENCE <i>J. Ereline, H. Reino, H. Gapeyeva, T. Kums, M. Pääsuke</i>	133
138. INFLUENCE OF 3-MONTH THERAPY USING THE NEURO-OTHOPEdic PNEUMOSUIT ATLANT ON GAIT CHARACTERISTICS IN PRESCHOOL CHILDREN WITH SPASTIC CEREBRAL PALSY <i>H. Gapeyeva, P. Mitt, J. Ereline, M. Pääsuke</i>	133
139. INFLUENCE OF PASSIVE FOOT FLEXION MOVEMENTS APPLIED AFTER EXERTION ISOMETRIC WORKOUTS ON MUSCULAR BLOOD FLOW <i>A. Grūnovas, J. Poderys, E. Trinkūnas, V. Silinskas</i>	134
140. THE RELATIONSHIP BETWEEN THE QUADRICEPS FEMORIS THICKNESS AND FUNCTION IN FRAIL ELDERLY IN CLINICAL SETTING <i>V. Juodzbaliene, D. Imbrasiene, R. Sakaliene, V. Dudoniene, M. Baranauskiene</i>	135
141. DEPENDENCE OF PSYCHOMOTOR REACTION TIME ON GENDER AND TASK COMPLEXITY FOR ELDERLY DEAF PEOPLE <i>D. Mickevičienė, D. Karanauskienė, A. Skurvydas, K. Čapkauskas</i>	136
142. THE EFFECT OF WARM-UP AND DIFFERENT STRETCHING EXERCISES ON BICEPS BRACHII MUSCLE FUNCTION <i>E. M. Riso, M. Veevo, J. Ereline, H. Gapeyeva</i>	136
143. CONNECTION BETWEEN THE 1 ST YEAR STUDENTS' NUTRITION PECULIARITIES AND BODY FAT WEIGHT <i>D. Vizbaraitė, S. Čapkauskienė, I. Sedlīorienė</i>	137

144.	THE CHOISEN ELEMENTS OF LIFESTYLE OF THE POLISH STUDENTS OF THE UNIVERSITY OF PHYSICAL EDUCATION AND SPORT IN BIALA PODLASKA AND STUDNEST OF LATVIAN ACADEMY OF SPORT EDUCATION IN RIGA <i>A. Litwiniuk, R. Ciešliński, E. Huk-Wieliczuk, A. Daniluk, J. Grants, I. Kundzina</i>	139
145.	TAILORING PHYSICAL ACTIVITY PRESCRIPTION: EFFECT OF REGULATORY FOCUS ON ACUTE AFFECTIVE RESPONSES TO EXERCISE <i>D. Bondarev</i> ,	140
146.	A GENE FOR SPORTS: THE EFFECT OF TEN GENETIC VARIANTS ON THE PHYSICAL PERFORMANCE OF LITHUANIAN ATHLETES <i>V. Ginevičienė</i>	141
147.	PREVALENCE OF GENERALIZED JOINT HYPERMOBILITY IN VILNIUS SCHOOL-AGED CHILDREN <i>A. Gocentas, D. Mieliauskaitė</i>	142
148.	EARLY EXPOSURE TO RECREATIONAL GYMNASTICS BENEFITS GEOMETRIC AND BONE ARCHITECTURE PROPERTIES: A 4-YEAR LONGITUDINAL HIP STRUCTURAL ANALYSIS STUDY <i>R. Gruodyte-Racienė¹, M. C. Erlandson^{2,3}, S. A. Jackowski⁴</i> ,..... <i>A. D.G. Baxter-Jones⁴</i>	143
149.	ACE I/D POLYMORPHISM IS ASSOCIATED WITH PHYSICAL ACTIVITY IN PUBERTAL BOYS <i>J. Mäestu, E. Lätt, T. Rääsk, K. Laas, T. Jürimäe, K. Sak, J. Jürimäe</i>	144
150.	THE EFFECT OF PHYSICAL ACTIVITY AND BODY COMPOSITION ON HEALTH-RELATED PHYSICAL FITNESS IN WOMEN AGED 20 – 49 <i>A. Mihailova, I. Kaminska, A. Bernāne, O. Ivanova</i> ,.....	144
151.	EFFECT OF KINESIO TAPING ON THE TOE TOUCH TEST RESULTS AFTER SKIING <i>R. Merino, O. Romero, E. Fernandez, I. Smuka</i>	145
152.	COMPLEX ASSESSMENT AND CORRECTION OF CEREBRAL HEMODYNAMICS DISORDERS AMONG WRESTLERS WITH CERVICAL OSTEOCHONDROSIS BY MEANS OF BIOINFORMATIONAL TECHNOLOGIES <i>L.V. Sharova, N. M. Belokrylov, Y. I. Kravtsov</i>	146
153.	BONE MINERAL DENSITY IN 11–13-YEAR-OLD BOYS: RELATIVE IMPORTANCE OF THE WEIGHT STATUS AND BODY COMPOSITION FACTORS <i>A. Ivuškāns, E. Lätt, J. Mäestu, M. Saar, P. Purge, K. Maasalu, T. Jürimäe, J. Jürimäe</i>	146
154.	REHABILITATION IN SHOULDER JOINT INSTABILITY AMONG WRESTLERS <i>N. M. Belokrylov, L. V. Sharova</i>	147
155.	PHYSICAL ACTIVITY AS A DETERMINANT OF PHYSICAL AND PSYCHO EMOTIONAL WELLBEING IN LATE ADOLESCENCE <i>V. Juškelienė, S. Ustilaitė, A. Raslanas</i>	148

156. STIMULATION OF PHYSICAL ACTIVITY IN FAMILIES WITH PRESCHOOL CHILDREN <i>Z. Birontienė</i>	148
157. THE EFFECT OF SPECIAL VOLLEYBALL TRAINING ON BODY STRUCTURE AND COMPOSITION OF FEMALE VOLLEYBALL PLAYERS <i>M. Charmas, A. Bodasińska, M. Zajac</i>	149
158. LASE STUDENTS OPINION ABOUT MOVEMENT GAMES AT SCHOOL AND IN TRAINING PROCESS <i>I. Dravniece, S. Anisimova</i>	150
159. LITHUANIAN 11–12 YEARS SCHOOLCHILDREN’S CHARACTERISTICS OF PHYSICAL ACTIVITY DEPENDING ON THE CONTENT OF THE PHYSICAL EDUCATION LESSON <i>A. Emeljanovas, B. Mieziene, V. Putriute, M. Liepa</i>	151
160. SHOE CHARACTERISTICS AND BALANCE IN YOUNG WOMEN <i>T. Kums, S. Valgemäe, J. Ereline, H. Gapeyeva, H. Aibast, M. Päsuke</i>	152
161. PHYSICAL ACTIVITY RELATIONS WITH BODY FATNESS IN BOYS WITH DIFFERENT WEIGHT STATUS <i>E. Läät, J. Mäestu, T. Rääsk, D.A. Rubin, P. Purge, M. Saar, K. Maasalu, T. Jürimäe, J. Jürimäe</i>	153
162. EFFECT OF 9 WEEKS SCHOOL-BASED PROGRAM WITH 1 MINUTE OF STRETCHING PER EACH PHYSICAL EDUCATION LESSON ON HAMSTRINGS FLEXIBILITY <i>R. Merino Marban, C. A. Becerra Fernandez, D. Mayorga-Vega, E. Fernández Rodriguez</i>	154
163. HEALTH BEHAVIORS OF FEMALE STUDENTS OF PHYSICAL EDUCATION FROM POLAND AND LITHUANIA <i>Z. M. Ossowski, V. Juškelienė, V. J. Česnaitienė</i>	155
164. PURPOSEFUL PHYSICAL EDUCATION PROGRAM EFFECT ON PHYSICAL FITNESS AND MOTOR ABILITIES CHANGES OF PRESCHOOL CHILDREN <i>R. Rutkauskaitė, S. Dambrauskaitė, L. Klikodujeva</i>	156
165. OBJECTIVELY MEASURED WEEKLY PHYSICAL ACTIVITY AMONG ADOLESCENT BOYS AND THEIR RELATION TO BODY COMPOSITION AND PHYSICAL FITNESS <i>R. Rutkauskaitė, E. Maciuleviciene, R. Sadzeviciene</i>	157
166. RELATIONSHIPS BETWEEN ANTHROPOMETRY, BIOLOGICAL AGE, BODY COMPOSITION AND BONE PARAMETERS IN PREPUBERTAL RHYTHMIC GYMNASTS <i>M. Saar, A. L. Parm, K. Pärna, J. Jürimäe, V. Tillmann, K. Maasalu, I. Neissaar, T. Jürimäe</i>	158
167. DIDACTIC MODEL FOR MIDDLE-AGED AND ELDERLY PEOPLE TO PURPOSEFULLY MAINTAIN AND IMPROVE BALANCE <i>V. Ševcenko, V. Lāriņš</i>	159

168. OSTEOPATHIC MANIPULATIONS OF THE ANKLE IN THE CONTEXT OF YOUNG ORIENTEERS BALANCE IMPROVEMENT <i>B. Smila, A. Fernāte, V. Zaļaiskalna</i>	160
169. MAXIMAL RESPIRATORY PRESSURES AND THEIR ASSOCIATION WITH SPIROMETRIC PARAMETERS AND CHANGES DUE TO IMMERSION IN WATER <i>M. Rumaka, I. Upitis</i>	160
170. THE MYOGLOBIN GENE A79G POLYMORPHISM IN LITHUANIAN ATHLETES <i>V. Ginevičienė, A. Jakaitienė, A. Pranculis, K. Milašius, L. Tubelis, V. Kučinskas, A. Utkus</i>	161
171. ELITE TRAINING AND UPPER SECONDARY EDUCATION – MODELS FOR SPORTIVE SUCCESS <i>R. Carlson</i>	163
172. COMPARATIVE APPROACH TO SPORTS AND EDUCATION SYSTEMS IN LATVIA <i>J. Grants</i>	164
173. BSUPC IN FRAMEWORK OF THE BELARUSIAN SYSTEM OF SPORT EDUCATION <i>Dz. Smaliakou</i>	165

INVITED SPEAKERS

INVITED SPEAKERS

THE DEVELOPMENT OF EU DIMENSION IN SPORT

B. Ooijen

*Policy Officer Sport Unit European Commission
Directorate-General Education and Culture*

Sport became a new EU competence in December 2009, giving the Union a mandate to develop the European dimension in sport. In the Communication on Sport (2011) the Commission outlined an EU policy agenda for sport with concrete actions that have EU added value and complement Member State actions. In response, the EU Council adopted the first EU Work Plan for Sport (May 2011) which set clear policy goals and defined concrete actions to meet those goals. In order to support this policy, the Commission has implemented limited budgets for sport, so-called Preparatory Actions, since 2009. In this framework, 30.5 million Euros have been spent on 71 sport projects over the past 4 years. They aimed at tackling cross-border threats such as doping, violence and intolerance, at promoting good governance, gender equality and dual careers of athletes, and at supporting social inclusion and health through sport. Based on the success of these projects, EC has proposed a Sport Chapter as part of the new Erasmus for All Programme, starting in 2014. This programme intends to ensure a stable financial framework for new networks and partnerships in sport. For this purpose, the programme includes a specific Sport Chapter. It will provide targeted support to the lower levels of the sporting pyramid, namely for the development of grassroots and amateur sport, with positive effects also for the higher levels (elite sport).

SPORT PSYCHOLOGY – NEEDS AND PERSPECTIVES FOR RESEARCH, EDUCATION, AND APPLICATION

R. Seiler

University of Bern, Bern, Switzerland

Sport psychology has shown an increasing development in the past 25 years. A first focus is laid on the growth of research output as indicated by the number of publications. A more detailed analysis shows that some mainstream topics are very dominant in the international research literature whereas other themes are completely lacking. Possible biases are discussed as well as consequences for the body of knowledge in sport psychology. The need for a sound training in sport psychology is discussed in relation with the progress in sport psychology research. Different concepts of education in sport psychology with their respective background are compared and their impact on the development of sport psychology is discussed. The field of application, mainly in top level sport, is

presented with a focus on professional standards and deontological codes. Conclusions are drawn with the aim to open new perspectives for research, education, and application of sport psychology.

EFFECT OF DANCE INTERVENTIONS ON PHYSICAL AND MENTAL FITNESS IN ELDERLY, AGED FROM 65 TO 80 YEARS

A. Hökelmann, K. Rehfeld, P. Blaser, W. Lehmann

Otto von Guericke University Magdeburg

Department of Sport Science, Department of Psychology, Magdeburg, German

Fitness, both mental and physical, is a crucial contributing factor to the psychosocial and physical well-being of the older population. During aging, cognitive and physical performance decline, but it can be improved by regular training. Physical activities which promote coordinated movement not only strengthen the neural network between sensory and motor systems and establish new neural connections. Dancing combines many diverse features making it a promising neuroplasticity – inducing tool. Dance movements involve synchronized and highly organized body movements in a spatial and auditory sequence; the motor sequence is integrated with interval timing such as the rhythms and beats found in music (Brown, et. al. 2005). Dance movements can be regarded as the motor output of the central music processing system operating in tandem with central pattern processing. We investigated the effects of 18- and 6- moth dance class ones or two times per week. Methods: We performed a broad assessment covering cognitive and motor function, such as memory, intelligence, reaction time, attention motor and postural performance as subjective well-being. The intervention program of dance combined with music was implemented as a means of examining the extent to which music and dance contribute to the delay of, or improvement in, age-related lags between cognitive processing and motor production. One of the principle aims was to determine if continuous motor learning of dance sequences integrated with music would have positive effects on motor and mental fitness. Subjects were randomly assigned into experimental groups (n=90) and two control groups (n=40) for the two-year program (2009-2011), for the 6-month program we randomized 60 seniors in two groups. All groups participated in 1) experiment: 90 minutes' weekly intervention and in the 2) experiment: 180 minutes' weekly intervention using music and movements from different dance styles, the control groups participated in fitness exercises. Results: The following changes were realized: In the dance group, beneficial effects were found for dance-related parameters, but also for cognitive and motor performances and subjective well-being. Reaction time, attention and indicators of fluid intelligence demonstrated a statistically significant improvement for the

experimental groups. The coordination/rhythm ability for the females also demonstrated a statistically significant improvement after the first year of training. The experimental group has demonstrated significant cognitive and psychomotor improvements, particularly in their ability to recognize and adapt to spatial imaginative capacities as well as in the ability to recognize and execute complex movement patterns. Our findings corroborate previous observation that dancing evokes widespread positive effects. Conclusions: Weekly training including a movement selection of mixed dance styles is better suitable to improving or stabilising of motor and cognitive function in elderly compared to forms of health sport. Dancing is an activity that emerged from a need for social interaction and non-verbal communication, and it is universal human expression across generations and cultures and social classes.

SPORT BIOMECHANICS RESEARCH IN ITALY AND AT BOLOGNA UNIVERSITY

A. Cicchella

*Department for Quality of Life Studies
University of Bologna, Bologna, Italy*

Sport techniques biomechanics is an area of research which has a long tradition at Bologna University and in Italy. A very famous representative was Leonardo Da Vinci. Later, Augusto Borrelli studied walking, running, jumping, the flight of birds, the swimming of fish, and even the piston action of the heart within a mechanical framework. He could determine the position of the human center of gravity. Beginners of the studies in Bologna were in the tradition of anatomy. Prof. Lamberto Coppini studied Injury pathomechanics on the shroud of Turin for many years. Biomechanics modeling of the body of Jesus Christ allowed to precisely studying the angle of insertion of the lance and the force necessary to insert it. 3D software of human body models was thus written and applied for the reconstruction of a 3D model that can be seen in Bologna. Rizzoli Institute of Bologna is the larger orthopaedic facility in Europe. The biomechanics labs of the Institutes were active in many fields, ranging from injury biomechanics, to walking analysis in diseases to ergonomics and sport injury rehabilitation and sport shoes design. In 2000 the Faculty of Exercise and Sport Sciences was founded at Bologna University (currently divided in two Departments: Neuro-motoric department and Department for Quality of Life studies). The biomechanics lab is actually involved mainly in sport biomechanics research. Some highlight of the result obtained will be provided.

**METHODS FOR MONITORING TRAINING STATUS AND THEIR
EFFECTS ON PERFORMANCE IN ROWING**

J. Jürimäe

Chair of Coaching Sciences, University of Tartu, Estonia

Rowing competition takes place on a 2000-m course and lasts for 5 – 7min depending on the boat class and performance capacity of the rower. Aerobic contribution to energy supply amounts to approximately 70-80% during 2000-m rowing distance and maximal oxygen consumption appears to be one of the best criteria for predicting performance in rowing which relies on power production by large muscle groups. Prolonged extensive endurance training session's on-water make up the largest part of the training programme in rowers and this may easily lead to a possible overreaching state. There is a cascade of various responses to prolonged training that could be used in rowing training monitoring. However, it is evident that only some of the parameters are reliable and specific enough. Accordingly, training monitoring studies in rowers should become more specific in their nature. Different blood biochemical and psychometric parameters in addition to performance tests have been used in rowing training monitoring. Recent studies confirm that recovery and stress should be monitored simultaneously in high performance areas to prevent rowers from possible overreaching and/or overtraining state. Multi-level approach of training monitoring should be followed and performance is also the definite parameter for analysis of the adaptive state of the rower to specific training programme. Inadequate recovery in rowers could also be diagnosed by significant changes in post exercise specific adipocytokine values. In conclusion, probably the most effective way to monitor training status in rowers is to evaluate both stress and recovery components at the same time using psychometric data together with the blood biochemical and performance parameters.

**ANAEROBIC POWER AND MUSCLE WORK CAPACITY OF
LITHUANIAN BASKETBALL PLAYERS**

R. Paulauskas

*Lithuanian University of Educational Sciences,
Faculty of Sports and Health Education, Department of sport teaching*

Basketball players need to repeat performance of highly intensive work for a particular time combining them with rest intervals. However, the anaerobic power and repetitive work capacity of players has not been extensively analysed all over the world. The aim of our study is to investigate anaerobic power and specific

capacity of elite and young basketball players. Methods: During competition period the indicators of anaerobic power of basketball players were measured: vertical jump power, anaerobic alactic muscular power, anaerobic capacity of intermittent work. Laboratory 5x6 second repeat-effort test with rest intervals of 24 sec was employed. Subjects: The sample included 3 groups of participants 14 y.o. young basketball players, who regularly trained 4 times a week and played in school learners' competitions, 17 y.o. junior players who regularly trained 6 times a week and played in Lithuanian junior basketball league and 25 y.o elite basketball players, who regularly trained 8 times per week and played in competitions of Lithuanian Basketball League (LBL) and Baltic Basketball League (BBL). Results: A statistically significant difference was observed for absolute muscle power of elite and young basketball players in the first sprint ($p < 0.004$). The research on relative indicators for one kilogramme of the body mass showed that the power of elite (13.06 W/kg) and young players (11.74 W/kg) did not differ statistically ($p < 0.09$). The fatigue index investigated in both groups did not differ ($p < 0.77$). Conclusions: Vertical jump anaerobic power test showed that Lithuanian elite basketball players have higher jump, but longer contact time during the jump than young athletes. The research revealed that relative anaerobic alactic muscle power of elite basketball players did not differ from those of young (14 y.o) and junior (17 y.o.) athletes. The same anaerobic repetitive muscle work capacity was observed in both groups. It was established that the concentration of lactate in the blood increased after physical load and did not differ in all groups. Keywords: anaerobic, power, fatigue, lactate, recovery, muscles.

MECHANOTHERAPY IN REHABILITATION PROCESS

A. Kaupužs

*Rezekne Higher Education Institution,
Personality Socialization Research Institute, Rezekne, Latvia*

Mechanotherapy was first defined in 1890 as the employment of mechanical means for the cure of disease. During the LAT-LIT cross border project MODPART the mechanotherapy approach was used to persons with mobility limitations. There were applied three rehabilitation technologies: the multi-purpose computerized isokinetic device Biodex System for testing and exercising; balance assessment and training device – BioSway and local vibromassager device. In project research were involved 25 persons with lower extremities mobility limitations (bone fracture, ligament injury, and osteoarthritis). For each participant was developed individual rehabilitation programme consisting of 12 to 24 procedures. Programme consisted of a combination of at least two device interventions according diagnose indications. As each participant has unique prescription for rehabilitation, each programme feedback data were analyzed as case study. The design of project study

INVITED SPEAKERS

was linear research. The study of training effect of local vibrostimulation is a quite new research area. There are some results that local vibrostimulation effects on physiological, functional and biomechanical bases. Also our research data approve the positive tendencies of local vibromassage influence. The improvement of peak torque of the quadriceps femoris was in range from 5 to 18 percentages. Balance deficiencies in post-surgical hip, knee and ankle patients, as well as osteoarthritis patients are one of the main problems of mobility rehabilitation. Using the BioSway it can be safely assessed stability data and trained balance and gait skills through progressive modes. Patients are motivated with real-time biofeedback while their progress can be documented. It was found that after 10 training procedures the results of standardized testing protocol (the Clinical Test of Sensory Integration and Balance protocol -CTSIB) have improved in the range from 7 to 21 percentages. The Biodex System is designed to progress patients through the rehabilitation process in the safest, quickest, and most efficient way. Biodex System provides fixed biomechanical positioning that ensures that harmful patterns of compensation do not develop when the patient is returned to function. The Passive Mode allows to develop of the patient's passive and active range of motion (ROM), followed by the development of strength in the isolated joints and surrounding musculature. The basis of the strengthening component is Isokinetic Muscle Loading, the only safe method of maximally loading a dynamically contacting muscle throughout a joint's entire range of motion. The improvement of peak torque of the quadriceps femoris was in range from 28 to 89 percentages before and after rehabilitation programme. The implementation of new developed programmes will contribute to a new approach for rehabilitation of injures of lower extremities.

6TH BALTIC SCIENTIFIC CONFERENCE

**6TH BALTIC SCIENTIFIC CONFERENCE
OF YOUNG SCIENTISTS**

SPORT SCIENCE FOR SUSTAINABLE SOCIETY

(ORAL AND POSTER PREZSENTATION)

**PSYCHOMETRIC INDICATORS OF GENERAL HEALTH
QUESTIONNAIRE IN LATVIA**

**I. Zelča, Ž.Vazne, A. Čuprika, I. Amantova, Z. Galeja,
L. Ozoliņa, O. Vaisjūns, L. Ozola**
Latvian Academy of Sport Education, Riga, Latvia

General Health Questionnaire (GHQ) is widely used all over the world to state psychological load and overload, as well as general mental state. Various GHQ versions were used in practice including questionnaires of 12, 28, 30 and 60 questions. GHQ-12 is the most popular and shortest version of the inquiry which is often used as a means to state psychological stress. The aim of the research was to state the psychometric indicators of the General Health Questionnaire -12 for the Latvian Academy of Sport Education student sample (N=225). Students aged 18 – 40 years of the Latvian Academy of Sport Education participated in the research including 41% of the 1st year students, 14% of the 2nd and 45% of the 3rd year students. 44% of the respondents were the representatives of the individual sports, 15% – of the team sports, but 41% did not do any sport. 59% of them were women and 41% – men. Were used the following research methods: inquiry-questionnaire (GHQ-12) and mathematical statistics. In data analysis Cronbach alpha was stated, the dispersion analysis, factor analysis and correlation analysis were made. As a result it was concluded that GHQ-12 can be used in psychological research in Latvia, as the questionnaire has adequate validity (the Cronbach alpha coefficient is 0.72) and the factorial validity indicators. GHQ-12 three factor structure (“Emotional condition”, “Psychological distress”, “Social function”) is recognized as the most suitable. Mutual correlations ($p < 0.01$) were stated for: “Place of residence” ($r = .260$) and “Combining studies and work” ($r = .180$) are weak and positive, but “Relation status” ($r = -.177$) correlates weakly and negatively with the factor “Emotional condition”. A kind of sport correlates weakly and negatively with the factor “Psychological distress” ($r = -.140$). The results of the research differ from the ones obtained by other researchers. It can be explained by the fact that the respondents of this research were students who are characterized by self-motivation, aim setting and positive view on life in general. Key words: GHQ-12, validity, factor structure, correlation analysis

INDIVIDUAL COMPLEX PREPARING OF HOCKEY PLAYERS

A. S. Pavlov

Russian state university of physical education, sport, youth and tourism

Introduction: The theses about the complex of preparing elite athletes can be realized exceptionally on the basis of knowledge and practical use of really working physiological laws and theory and methods of sport training based on these laws. Thus, in accordance with the functioning adaptation laws: any concrete human activity is absolutely specific according to the parameters of this activity and to structural and functional characteristics of the work of the organism, fulfilling this activity. Absolute specificity of each concrete activity of an organism always causes an absolute specificity of structural and functional expenditures and consequently – absolute specificity of rehabilitation processes and adaptation changes which lie at the basis of physiological mechanisms of the rise of athlete's efficiency. Objective and research methods: The main aim of the work of a coach is rising of the complex of condition level of particular athlete. And therefore, an effective complex of actions enhancing the condition level of specific activity and athletic effectiveness cannot be constructed in separation from sports and pedagogical process and its peculiarities. One of the most important aspects of this complex is specific practicing under certain conditions. Special attention should be paid to the choice of means and methods of rehabilitation and improvement of the athlete's efficiency (Fig. We should stress the necessity of strict individualization of complex training process for each athlete. In our research we used the possibilities of enhancing the sporting work capacity with applying the low-energy lasers on athletes on the base of modern conceptions. It is about mechanisms of energy supply of athlete's organism and its rehabilitation after physical loads and effects on interacting the low-intensity laser light with biological object. The effectiveness of complex measures with hockey players assessed by the test – running on the 26 meters ice-skating distance. Research results: In the experiment with participation of elite hockey players there was proved high effectiveness of complex, physiologically justified actions on the raise of the condition level of specific activity of athletes, specializing in hockey. Conclusions and summary: Specificity of training determines the specificity of the functional changes of an athlete. Laser stimulation potentiates these functional changes. Thus, practical use of the laws of physiology in developing of sport and pedagogical process and the use of modern tools and methods in raising the level of athletes' special capacity provide an opportunity to improve capacity of hockey players.

QUESTIONS IN MODELING TRAINING PROCESSES FOR HOCKEY

A. Petrov

Russian state university of physical education, sport, youth and tourism

This presentation is about the problems in modeling training processes for athletes. Having the best possible training model for athletes, is one of the big questions in sports today. Modeling activities and training processes for every athlete on the team exactly the same is wrong. Each athlete needs an individual approach; some athletes may be elite in skating but lack in power and stamina to use that skating technique to its fullest potential. Some may be the opposite; they have perfect physical attributes, but lack in technique. The same can be said about mental capabilities of players. How fast a person can react to movement on the ice, how many mistakes a person makes under pressure can all be trained. All of these things need to be trained differently; players may excel in certain attributes, but need work in others. If you don't model training processes for individual players, you won't be able to unlock the full potential of the athlete. This presentation underlines the problems in modeling training processes today.

E- PLANNER FOR THE SUBJECT OF SPORTS IN GENERAL SECONDARY EDUCATION

A. Piļkevičs, R. Jansone, I. Bula-Biteniece

Latvian Academy of Sport Education, Riga, Latvia

In the research is developed an innovative tool for planning and assessment in the subject of Sports in general secondary education. Researching Latvian assessment in the subject of Sports can be drawn the conclusion that for the introduction of innovative assessment paradigm is necessary online based curriculum planning tool (e-planner), which could help teacher in qualitative and professional assessment of student knowledge, skills, attitudes and the dynamics of development. This finding has served as the basis for the hypothesis of the research: the introduction of e-planner will have a positive impact on study process planning and assessment in the subject of Sports on secondary education level. The object of the research: e-planner in the study subject of Sports. The aim of the research: the creation of an e-planner to improve the quality of assessment in the study subject of Sports. The tasks of the research: Determine the theoretical basis for the creation of an e-planner. Determine the content of e-planner according to the curriculum in the subject of Sports and evaluate sports teacher opinion about e-planner for the subject of Sports. The study is based on an innovative approach to

modern IT technologies and the use of online learning process optimization. The result of the research: is worked out the first online curriculum planning tool in study block in the Latvian language, which is based on theoretical knowledge and advanced understanding of student-centered process assessment in the subject of Sports.

PHYSICAL EDUCATION TEACHERS' ATTITUDE TOWARD TEACHING STUDENTS WITH SEVERE AND MULTIPLE DISABILITIES

N. Strazdiņa² A. Kļaviņa¹

¹Latvian Academy of Sport Education, Riga, Latvia

²Liepaja University, Liepaja, Latvia

Physical education teachers face many challenges when teaching students with severe and multiple disabilities (SMD) in their class because of extensive accommodations to the curriculum, to instructions, and to equipment they need. There is limited research on factors impacting PE teachers' attitude toward teaching students with SMD. The purpose of this study was to develop and provide preliminary validity evidence of the instrument assessing the PE teachers attitude toward teaching students with severe and multiple disabilities in the special education school environment. Development of the instrument was guided by the theory of planned behavior (TPB) (Ajzen 1991, 2000) including three levels of attitude components: (1) behavioral beliefs (BB), (2) normative beliefs (NB), and (3) control beliefs (CB). This study was Pilot Study of the final questionnaire construction, according to Ajzen (2000), to define beliefs of PE teachers and experts regarding three components of TPB. Subjects and methods: Participants were 26 PE teachers from special schools including students with SMD and 12 national and international experts in adapted physical education. The questionnaire contained nine questions about teaching students with SMD demonstrating behavioral beliefs, normative beliefs, and control beliefs. Results: The teacher data collection procedure obtained 114 BB responses, 116 SN responses, and 134 CB responses, while for experts there were 81 SN, 58 SN and 134 CB responses. The top 75% attitude categories in each of the three components were selected for factor analyses. Conclusions: In general, this study showed the top problem categories PE teachers face when teaching students with SMD. Within each of the three TPB categories detailed result analyses of proposed final questionnaire on PE teacher's attitudes towards teaching students with SMD in special education setting have been defined and discussed.

**SOME ASPECTS OF INDIVIDUAL SPORTS ATHLETES'
PSYCHOLOGICAL PREPARATION FOR LONDON OLYMPIC GAMES**

R. Žilinskienė¹, I. Girčytė²

¹Vilnius University, Lithuania, Vilnius, Lithuania

²Lithuanian Olympic Sports Centre, Vilnius, Lithuania

The aim of this study was to evaluate psychological preparation of Olympic athletes of individual sports for London Olympic Games, to identify situation and problems in this area and to present possible recommendations. Subject and methods: questionnaire (combination of open and closed questions) was distributed to the athletes – participants of the London Olympics, representatives of individual sports. The qualitative and quantitative analysis had been carried out. Results. Most athletes (and especially of younger age) identified need for theoretical and practical psychological training as well as need for sport psychologists' participation in different stages of sports training and competition process, they identified main problematic topics where assistance is needed most. Comparing to earlier Olympic periods, significantly more athletes worked with sports psychologists. Conclusions. Aiming to solve the identified problems, recommendations could be as follows: to improve working sport psychologists' number and qualifications and their sport-specific knowledge, to include more consistently sport psychologists into the athletes' assisting team, to improve psychological education of athletes and coaches, to find more efficient and attractive ways of educating/presenting needed information; to start psychological training of athletes at younger age.

**THE CONTENTS OF PHYSICAL ACTIVITIES, THE HEART RATE
FREQUENCY AND THE AMOUNT OF STEPS MEASUREMENTS OF 4
TO 5 YEAR-OLD CHILDREN, IN THE KINDERGARTEN'S DAILY
REGIME**

(THE RESULTS OF PILOT STUDIES)

S. Lisovska, R. Jansone

Latvian academy of sport education

The younger is the child; the closer is the direct coherence between the physical activity and child's mental development, because the movement analyser has a significant meaning in this process. When the child moves a lot and intensively, the movement analyser in the cephalic brain is situated near the vision, auditory, perception, sensory areas, and being in tone, it coordinates the activities of

different brain areas. Thus, the movement analyser is the instrument of sensomotoric integration. Subject matter: the contents of physical activities, the amount of steps and the heart rate frequency measurements of 4 to 5 year-old children in a pre-school educational establishment. Aim: to define the optimal contents of physical activities, the amount of steps and the heart rate frequency of 4-5 year-old children in the pre-school educational establishment. Results: Was defined the contents of different activities in the daily regime, observed many and different activities. Children 13% of day spent a lot of time talking with others and 13% spent helping or observing others. Was determined child's amount of steps and heart rate frequency? Analysing the data of pedometer, it was observed that the highest amount of walking was at 12 a.m when the average step count was 1090 steps. The highest pulse rate was reached at 12 a.m. when the mean pulse rate in group was 124 beats per minute. Was diagnosed the level of child's gross motor skills (Ulrich test, 2002). According to Ulrich's test, was obtained the following result: 1 out of 8 children gross motor skills correspond to his age. Conclusions 1. By defining the contents of activities, it has been concluded that the contents of daily physical activities is varied and children are physically active, 30% of the day time children spend communicating, walking or helping each other. 11% of the time they spend sleeping. 2. Children are quite active, and that maintains constant heart rampage. But children mean amount of walk is not enough. It is very important to know what children do outside the kindergarten. 3. Analysing Ulrich's test, it has been concluded that the indicators of children's locomotors skills and manipulative skills does not correspond to their age.

EDUCATIONAL PREREQUISITES FOR PHYSICAL ACTIVITY AND SPORT ORIENTATION OF ADOLESCENTS FROM VARIOUS AGE GROUPS

R. Mélinis, A. Vilkas

Lithuanian University of Educational Sciences, Vilnius, Lithuania

Educational prerequisites for adolescents' sport orientations, links of physical activity, physical and functional capacities at different developmental stages have not been broadly investigated in Lithuania. The goal of the research is to reveal the links of physical activity and educational prerequisites for sport orientation as well as physical and functional capacities of adolescents (boys) from various age groups. The research sample included 300 adolescents, who were divided into 6 groups from 5th to 10th forms. The main research instruments included: questionnaire survey and testing of physical fitness and functional organism capacity. The respondents answered 10 questions in the questionnaire form. The respondents, who go in for sports (158 boys) answered additional 9 questions about their sport orientation. Boys' functional and physical capacities were tested

employing 9 Eurofit tests (flaming balance, plate taping, sit-and-reach, standing broad jump, handgrip test, sit-ups for trunk strength, bent arm hang, 10 x 5 meter shuttle run and physical work capacity test (PWC 170)). The analysis of the results revealed that the biggest number (10.2 %) of adolescents in the research sample, who do not go in for sports after school are 6th formers, 57 % of 8th formers do not attend any extra-curricular activities, whereas 9th formers (boys) are mostly interested in sports and dancing activities; 7th formers spend least time outdoors, while 9th formers spend most of time in front of TV and at the computer. The boys from 10th forms (75.6 %) and 9th forms (61.4 %) evaluate their physical activity best. The main factors, which encourage adolescents to attend sport training, embrace their wish to master the technique of the chosen kind of sports and friends' example. The choice of sports has been predetermined by adolescents' wish to enrich their knowledge and to acquire skills, their wish to strengthen self-confidence and parents' recommendations. Adolescents go in for sports because they want to be healthy and strong, to achieve good results and spend their leisure time meaningfully. The analysis of the research data revealed that physical and functional fitness change getting older, but the most considerable dynamics of indicators is observed in the period between 6th-7th forms and between 8th – 9th forms. This could have been influenced by the most intensive processes of puberty and discrepancies in biological and calendar age caused by these processes. It should also be mentioned that considerable positive changes in adolescents' physical and functional capacities weakly correlate with adolescents' sport orientation.

SELF-APPRAISAL AND ITS IMPACT ON THE EMOTIONAL STATE OF THE ATHLETES

S. Saulite¹, N. Vysochina²

¹*Latvian Academy of Sport Education, Riga, Latvia*

²*National University of Physical Education and Sport of Ukraine, Kiev, Ukraine*

The impact of psychological factors on the firepower of performances in athletes becomes particularly crucial in modern sports of high achievements. One of the most important factors influencing training, game and firepower is self-appraisal of a personality. Any participation in competitions causes emotional stress, so an athlete should approach the competition with confidence to complete. Scientific literature elucidates poorly the impact of self-esteem on the emotional state of an athlete as a factor promoting optimization of professional activity, which has made this problem very interesting for the study. The aim of this study is to trace the relationship between the self-esteem level and emotional state of an athlete personality as a factor promoting optimization of professional activity. The Research shows that the level of self-appraisal exerts direct effect on the emotional

following methods were used: theoretical analysis, compilation and systematization of data from scientific literature. Results and conclusion state of an athlete, which predetermines his professional results. Analysis of literature from science has shown that self-appraisal level of athletes of higher rank is characterized by high performance and depends on actual results of their activity. A self-appraisal formed on the basis of feeling of self-reliance engenders emotional comfort, harmonizes personality of an athlete, countervails his psychic state and leads to stable and successful results. Development of emotional-volitional properties and ability of psychic state self-regulation on the basis of high self-appraisal are one of main promising problems in the field of psychological training of athletes.

SPORT ACTIVITY IN THE FAMILY FROM THE PERSPECTIVE OF THE PEOPLE OF THE "THIRD AGE"

P. S. Tsonkova, D. G. Tsonkova

Veliko Tarnovo University "St. St. Cyril and Methodius", Veliko Turnovo, Bulgaria

The interest in the selected topic is related to the concept that each member of society, no matter of his age group, is a participant in the formation of a value system in children and young adults, regarding sport activities. The main purpose of the current article is to present the opinion of people in their "third age" (the elderly) regarding sport activities of young people and the significance of family in the development of interest towards said activity. Methodology and Organization: In 2012, a survey was conducted among people over the age of 65. The collected data was used to draw some general conclusions, which were further expanded with specific observations from the lives of Bulgarian families. Results: The answers from the survey were systematized. A general opinion from people in their "third age" was formed in regards to the following points: Sports education in schools. Sport interests of young people. The part, which family plays in developing and guiding an active interest in sports. Sport activity during the family's leisure time. Conclusion: The carried-out analysis shows that elderly people's experience and knowledge is valuable and can be used in the family to develop a positive attitude toward sport activity.

EMOTIONAL INTELLIGENCE AMONG LITHUANIAN AND LATVIAN STUDENTS OF SENIOR HIGH SCHOOL AGE IN PHYSICAL EDUCATION CLASSES

A. Akelaitis, R. Malinauskas

Lithuanian Sports University, Kaunas, Lithuania

The aim of this study was to analyse and compare the emotional intelligence among Lithuanian and Latvian students of senior high school age in physical education classes. Subjects and methods: Students of senior high school age (15 – 18 years old) were separated in a randomized way from Lithuania and Latvia secondary schools. The participants of the study were 124 students (68 Lithuanian and 56 Latvian). The measure of emotional intelligence was evaluated using Schutte et al. Self-Report Inventory (SSRI). The test includes 33 items that assesses global trait EI and four facets: optimism/mood regulation, appraisal of emotions, ability to understand and analyse emotions and utilisation of emotion. Participants respond using a 5-point Likert scale, ranging from “strongly disagree” to “strongly agree”. The reliability of this scale in our study was adequate: Cronbach’s alpha was 0.78 for emotional intelligence. The statistical hypotheses were tested by applying the Student t-test. Results: It was found that 54% of the Lithuanian representatives and 56% of Latvia's representatives have an average level of emotional intelligence. There were only tendencies that girls have higher ability to understand and analyze emotions ($p > 0.05$). No statistically significant differences ($p > 0.05$) were observed according optimism/mood regulation, appraisal of emotions, ability to understand and analyze emotions and utilisation of emotion levels between Latvian and Lithuanian students of senior high school age in physical education classes. Conclusions: The results shows that by the level of emotional intelligence there were no statistically significant differences ($p > 0.05$) between Latvian and Lithuanian students and between boys and girls of senior high school age in physical education classes.

GENDER DIFFERENCES IN PHYSICAL BODY IMAGE PERCEPTION AMONG 8th GRADE PUPILS

S. Derkintienė

Klaipėda University, Klaipėda, Lithuania

Research background and hypothesis: Previous studies have shown that adolescents experience major physical, social, emotional and moral changes. Due to such undergoing changes physical appearance of teenagers is of a great influence during that period. It is being claimed that dissatisfaction with the physical body image among girls is often reflected in a desire to be thinner, among

boys – a desire to be bigger, taller, become more muscular and have a nice body shape. It is known that adolescents have a very precise physical body image, which is related to their own perception. However, there is a gap in research, analyzing dissatisfaction with a physical body image aspect, i.e. body's physical type. Hypothesis: there is a difference in dissatisfaction with the body type among 8th grade boys and girls. Research aim: to estimate a physical body image perception among 8th grade girls and boys. Research methods: The research has been conducted during the months of March-April-May of 2012. A random probabilistic sampling method was used with 8th grade pupils from 24 general education schools, located in various cities and towns around Lithuania. The research sample was comprised of 1347 (boys n=674, girls n=673) 8th grade pupils. Results and conclusions: Results of the present research allow concluding that respondents are more dissatisfied with all of the areas of a physical body image, i.e. lower part of a body, middle area of a body as well as upper part of a body, depending on environmental factors, i.e. phenotype. It has been established that the research participants tend to be more satisfied with their individual morphological and functional features of a body, i.e. facial skin, body hair, feet, cheeks, ears, hair, chin, lips, eyes, neck, while are most dissatisfied with a body build, shape and size of certain separate body parts, i.e. areas of body image. The above named features depend on adolescent's genotype. There is a difference in physical body image perception between boys and girls ($p=0.000$). Boys are more content with their physical body image compared to girls. Research results revealed that differences in physical body image perception among 8th grade pupils are gender related i.e. girls, compared to boys ($p<0.001$), are more dissatisfied with their physical body image. Keywords: physical body image, adolescence, body weight, body type, body shape.

PECULIARITIES OF SOCIAL RESPONSIBILITY AMONG LITHUANIAN AND LATVIAN SPORTS SCHOOLS STUDENTS

D. Juodsnukis, R. Malinauskas

Lithuanian Sports University, Kaunas, Lithuania

The aim of the present study was to identify peculiarities of social responsibility among Latvian and Lithuanian sports schools students. Research question: what are the peculiarities of social responsibility among Latvian and Lithuanian sports schools students? Subject and methods: There was used V. Marischuk's adapted CSR Assessment Questionnaire for identifying peculiarities of social responsibility. The participants were 45 Lithuanian and 42 Latvian football players of sports schools. Total number of participants was 87; their age was from 15 to 16

years. The nonparametric chi-square test was used for the statistical analysis of the data. Results: Having compared the investigation results of social responsibility among Latvian and Lithuanian sports schools students, it was found that 57% of the Lithuanian representatives and 51% of Latvia's representatives exhibited average level of social responsibility, and 24% in Lithuania and 29% in Latvia were characterized by higher social responsibility level, as well as 19% of Lithuania's representatives and 20% of Latvia's representatives were characterized by low social responsibility level. Compared to separate groups of Lithuanian and Latvian social responsibility, statistically significant differences were not found ($p > 0.05$). Conclusions: The results shows that by the level of social responsibility there were no statistically significant differences ($p > 0.05$) among Lithuanian and Latvian sports schools students. Was found only a tendency that for the Latvian and Lithuanian sports schools students most typical is medium level of social responsibility.

DEVELOPMENT OF PHYSICAL AND SELF-CONTROL ABILITIES OF JUNIOR SCHOOL CHILDREN (10 – 11 YEARS OLD)

V. Kontautienė, A. Vilkas

Klaipėda University, Lithuanian Educational University

The goal of the research is to reveal change in physical abilities of junior school learners (10-11 years old) and their links with development of self-control abilities applying the programme for development of self-control abilities in lessons of physical education during the experimental period. The pedagogical experiment was carried out in 4th forms of general education schools of Klaipėda, Kaunas and Raseiniai from 2011 to 2012 and lasted for one school year. The research included 178 school learners in the experiment group ($n = 85$) and in the control group ($n = 93$). The research methodology: The questionnaire method was applied to evaluate the change in self-control abilities, whereas the testing method was used to identify the change in physical abilities (flexibility, explosive power, agility, speed, balance, abdominal muscle strength and endurance). The research revealed a positive impact of the programme for self-control development on change in physical abilities: statistically significant differences were identified between the results of flexibility, long jump, abdominal muscle strength and endurance ($p < 0.01$), agility and speed ($p < 0.05$) of boys from the experiment and the control groups and between the results of flexibility, long jump, speed, balance, abdominal muscle strength and endurance of girls ($p < 0.01$). The scale for assessment of self-control abilities (Cronbach's alpha 0.911, ($n = 37$)) was divided into sub-scales of physical and psychosocial self-control. Correlation links between abilities of physical and psychosocial self-control applying Pearson's correlation revealed that

school students with better abilities of psychosocial self-control also demonstrated a number of better physical abilities: linear correlation links were established between psychosocial control and flexibility, explosive power, speed, endurance and balance abilities. These links showed that improvement of self-control skills has an influence on self-development of physical abilities. The analysis of psychosocial self-control scale variables leads to the assumption that school learners who are able to control and suppress soreness ($p < 0.01$) and to adapt easily to different requirements ($p < 0.05$) have better balance abilities; those, who are able to notice and assess tiredness and their pulse rate, have better stamina abilities. It is essential while developing pupils' physical abilities during Physical Education lessons. Keywords: self-control, physical abilities.

ADOLESCENT ATHLETES PROSOCIAL BEHAVIOR AND VALUES RELATIONS IN SPORT

T. Stupuris, S. Šukys, I. Tilindienė

Lithuanian Sports University, Kaunas, Lithuania

Introduction. Sport by nature is a social context, in which participants interact with, relate to, and influence, each other. Rule breaking and aggressive behaviors can result in negative experiences for sport participants, whereas behaviors such as helping injured opponents and encouraging team-mates can contribute to a more positive sport experience, (Kavussanu, 2008, 2009). In this regard research on athletes' prosocial behavior becomes more important as it is shown in presently conducted studies on morally relevant behavior that occurs in sport (Kavussanu, 2006; Boardley, Kavussanu, 2008; Kavussanu, Boardley, 2009). Although scholar attention on prosocial behavior in sport context is significant the evaluations of the role of values have been underestimated in sport psychology (Lee et al., 2008). In sport, they might include not only criteria of success, such as winning or playing well, but also fair play, sportsmanship, friendship, and tolerance, which are concerned with the quality of interaction during the activity (Lee, Whitehead, Balchin, 2000). We would like to emphasize that there is a lack of such studies although research on adolescents' prosocial behavior is ample (Carlo, et al., 2003; Carlo, Carlo et al., 2007; Carlo et al., 2010). Based on arguments stated above we hypothesize that prosocial conduct that takes place in sports will be positively associated with moral and competence values and would negatively correlate with status values. This study aim is to examine relationships among prosocial acts in sport context and values that are salient in sport. Subjects and methods. Study involves 201 team sports athletes, sample drawn from Kaunas and Alytus cities sport schools by applying convenience sampling method. Participants were drawn in two age groups 15-17 and 18-19 year olds. Age of participants ($M = 16.3$ $SD = 0.85$) and ($M = 18.2$ $SD = 0.44$) male ($n = 153$) and female ($n = 48$). Distribution

according sports: Basketball (n=105), Soccer (n=44), Handball (n=21), Ice hockey (n=16), Rugby (n=15). Participants were asked to fill out the questionnaires measuring prosocial and antisocial behavior in sports 20-items (Kavussanu ir Boardley, 2009), and The Youth Sport Values Questionnaire-2 (YSVQ-2; Lee et al., 2008). The 13 – item. Results: Factor analyses revealed two factors representing prosocial behavior (with teammates ($\alpha=0.89$) and opponents ($\alpha=0.83$). Estimating data in youth sport value scale it was found three factors representing Moral ($\alpha=0.83$), Competence ($\alpha=0.89$), and Status ($\alpha=0.71$) values. Moral values positively correlated with prosocial sport conduct among teammate ($r=0.35$; $p<0.01$) and with opponents ($r=0.17$; $p<0.05$). Positive competence values correlations were established with prosocial behavior within a team ($r=0.48$; $p<0.01$) and with opponents ($r = 0.16$; $p<0.05$). There were no status values correlations with sports prosocial behaviors stated above. Conclusions: Established correlations partly confirmed our hypothesis that values that are salient in sport will be associated with moral behavior that takes place in sport context. Although moral and competence values were positively associated with prosocial sport acts, there were no such relations with status values.

MEANS TO INCREASE THE WORD STOCK OF GRADE 1 CHILDREN HAVING SPEECH DISORDERS IN SPORTS CLASSES

I. Tihomirova

Latvian Academy of Sport Education, Riga, Latvia

It is described in the literature how combining physical activities with key words learnt beforehand the memory process is faster. The author has not found any research described in the literature in Latvian about thematic key picture application in a sports class to increase pupils' word stock. There is experience about using of this means in other subject classes and positive effect on the development of pupils' speech has been pointed out. So, the problem under research is how to strengthen pupils' memory and increase pupils' having speech disorders word stock participating in sports classes. Aim of the research: Investigation how to increase grade 1 pupils' having speech disorders word stock by applying thematic key pictures in sports classes. Tasks of the research To analyze theoretically scientific literature..1 To state the amount of the initial thematic word stock. 2. To work out and approbate in practice thematic key pictures 3.To state the effect of thematic key picture application on the amount of thematic word stock. One of the methods that gives a possibility to use children physical and mental peculiarities is „integrated studies”. Sports classes can successfully fit such studies, fully carrying out specific tasks of physical education. Sports can include so called classes with a plot or separate exercises, games or learning material of some subject. We used plays and movement games adapted to the theme of the class. One of the research aspects is the evaluation about pupils' possibilities to remember and recognize animals/birds seeing colorful photos and black-and-white pictures. Summing up the results, the following was analyzed: quantitatively – correlation of a correct answer and total number of answers, qualitatively - use of incorrect word.As a result it is stated that a pupil names only separate words, he/she has limited word stock and often he/she replaces one word by another. Conclusions: In the course of the research grade 1 pupils' knowledge about 24 mammals living in Latvia shows which words are “the most difficult”. The results after the experiment significantly improved ($\alpha>0.05$), after the first plot-class in 1g and 1d class – up to 74%, 1abv – 55%. It was found out in the research that the applied methodological approach positively affects the increase of pupils' word stock and stabilizing of their memory. Pupils' active and passive word stock broadens. The applied methodology in sports classes help to motivate pupils to work both in sports and other subject classes.

ANALYSIS OF LITHUANIAN YOUNG SOCCER PLAYERS' GAME PERFORMANCE**D. Gražulis, D. Radžiukynas***Lithuanian University of Educational Sciences, Vilnius, Lithuania*

The aim of our study was to analyze playing style of young Lithuanian soccer players. Subjects and methods: In our study we evaluated individual technical and tactical actions and their effectiveness in two matches. 14 young soccer players (aged 15–17) took part in this research. We registered the main actions in a defence and in an offensive play. Statistical data analysis was performed using Microsoft Access software by entering technical and tactical player action data to the database table and then extracting various statistical reports using SQL language constructs. Results: Our research showed that young soccer players in two matches have made 665 and 607 technical and tactical actions and unsuccessful actions from them were 222 and 204 (33.4 % and 33.6 %). We registered 194 and 187 (29.2 % and 30.8 %) defensive actions (tackles, balls won, fouls committed) and 471 and 420 (70.8 % and 69.2 %) offensive actions (passes forward, passes backward, long passes, crosses, shots on-goal, individual play (dribble, 1 on 1 play etc.), balls lost, fouls suffered). The team players in two matches have made 25.3 % and 28.7 % passes forward, 12.9 % and 12.0 % were long passes and crosses, 11.0 % and 9.1 % were long passes. In two matches centre midfielders made 34.1 % and 31.8 % of the total number of actions, wingers: 26.8 % and 25.2 %, and centre midfielders were much successful as wingers. Defenders made 14.2 – 18.6 % of the total number of actions and unsuccessful actions they performed: 31.4 – 35.4 %. The goalkeepers' part of all actions in two different matches was quite similar: 5.6 % and 5.3 %. Attackers had the highest error rate: 47.9 % and 43.3 %. Conclusions: As young soccer players use not so often short and medium backward passes and crosses they do not have much better ball possession. This analysis shows the efficiency of training system as well as playing style of Lithuanian young soccer players. On that ground this feedback shows how to improve the education of special competencies of young soccer players.

DEVELOPMENT OF A BODY CONTACT IMPROVEMENT MODEL FOR STANDARD SPORT DANCES**A. Kļonova¹, L. Žilinskis², A. Cicchella³, J. Kļonovs⁴**^{1,2} *Latvian Academy of Sport Education, Riga, Latvia*³ *University of Bologna, Bologna, Italy*⁴ *Aalborg University Copenhagen, Copenhagen, Denmark*

One of the most difficult parts of the training process is learning to synchronize and coordinate dancing movements within the couple, which leads to dancing lightness and harmony. During this process, it is important to create a proper partners' body contact for maintaining a proper posture and body lines. Technically, it is not possible to correct the Standard dance performance without addressing aforementioned requirements. Despite the fact that a correct partners' body contact and physical preparation of dancers are the substantial factors for a successful Standard dance sport performance, an appropriate teaching methodology is not yet fully developed. Available literature sources describe different dance sport techniques and aspects of the dance character and style (Howard, 1998), however they do not describe how to achieve the correct posture and partners' body contact. Furthermore, there is a lack of research on the physiological engagement of each Standard dance and how it affects the quality of the partners' body contact. Consequently, the aim of this study was to create a reference model of the ideal Standard dance partners' body contact, as well as to develop and evaluate the practical recommendations for achieving this model. Methodically, we derived the model based on the analysis of highest-class dancers' biomechanical and physiological measurements, in consideration to their anthropometry. In order to find the relevant features for building the model, we applied the method of expert estimation. For evaluating the effectiveness of the proposed practical recommendations, we applied a pedagogical experiment, which consisted of five main stages: (1) measuring the anthropometrical parameters, (2) testing the physical preparation, (3) measuring and analyzing the biomechanics using the "Motion Capture Smart 2011" system, (4) measuring and analyzing the relevant physiological parameters using the "Medgraphics Breeze" system, and (5) investigating the statistical relationships using SPSS software. Subsequently, we have presented and approbated our novel practical recommendations for improving the body contact and optimizing the physiological engagement in 20-29 years old „A” class Standard sport dancers. The results revealed that the focus group, which followed our proposed practical recommendations during the 10-month long training process, achieved significantly closer biomechanical and physiological parameters to the ideal reference model than the subjects who were following a standard training process. Furthermore, the international rankings showed a statistically significant improvement ($p < 0.05$) of the focus group after the training period. In conclusion the appliance of the proposed practical recommendations

increases the quality of Standard sports dance performance and reduces the preparation time for high-level dancers.

A LONG -TERM ATHLETE DEVELOPMENT: THE SENSITIVE PERIODS

A. Lazauskas, A. Skarbalius

Lithuanian Sports University, Kaunas, Lithuania

Preparation of elite athletes has been discussed in many areas of sport studies (Bailey et al., 2010). Duration of long-term athlete development program can take from 10 to 13 years or even more (Ericsson et al, 1993). During the preparation for the elite level many factors can influence result of the performance (Bailey et al., 2010). It is important to manage the training program and all the others factors like genetic potential and education level, because of the importance of athlete career and quality of life behind sport arena. Aim of the study - to discover the critical points in the process of a long-term athlete development and create some recommendations for training programs. Subjects and methods: Subject of the research are elite athletes. The methods employed for the study includes review of literature and meta-analysis. Results: A long-term athlete development model is adopted in many countries (Ford et al, 2011). Researchers agree that preparation of an elite athlete goes through different domains - biological, psychological and social (Bailey et al., 2010). To achieve best results at the international level, it is necessary, to focus on the synergy of a human evolution and training program. Conclusions: Process of a long-term athlete development can be discussed by three sensitive periods. First period is entrance to the program. Main question is when to start to develop fundamental movement skills of a child? Second sensitive period is sport specialization time. It is important what kind of sport to choose and what indicators can be implemented at this time of a long-term athlete development program. Third sensitive period of a long-term athlete development is when to finish career at the highest level of the performance or depending on the sport participation results.

ABILITIES CHARACTERIZING HIGH QUALITY OFFICIALS OF SPORT GAMES

R. Līcis, A. Rudzītis, L. Žilinskis

Latvian Academy of Sport Education, Riga, Latvia

The question concerning such a person who is forced to work in the conditions of increased stress and about work safety still is a psycho-physiological part of a

broader problem. Officials of sport games can also be added to this group as this occupation has become their profession. Today there is a situation that in order to enrol the most suitable individuals in this job it is necessary to select the candidates for sport game officials according to strictly worked-out criteria. Aim of the study was to investigate the abilities characterizing high quality officials of sport games. 18 international level officials of sport games in Latvia were selected as subjects of the research. Methods: To state the subjects' physical ability, functional state, psychological peculiarities the following methods were applied: a computerized testing device "Omega" was used to assess functional state of the body; situation alertness, psycho-emotional stability, self-regulation ability and motivation were stated with the help of tests used in sport psychology; simple reactions and the quickness of alternative reaction were measured using the computer system *Vienna Test System*. 16 parameters of each subject were obtained, and they were processed using Factor analysis – closed variant of the main components with the following turning of the reference axis according to the Varimax criterion. Making the Factor analysis 9 main factors were obtained characterizing officials of sport games. Results: 9 main factor contributions in the common dispersion were 93.7%. 7 factors of higher value were interpreted, and they were as follows: choice reaction time, its contribution in the dispersion 30.31%; functional state of the body and readiness (17.92%); correctness of the answers in choice reaction time test (the quality of the decisions made) 15.40%; the simple reaction time (9.02%); IQ coefficient (7.20%); psychological preparedness (5.01%) and the ability to concentrate (4.80%). Conclusions: The quickness of the alternative reaction and the quality of the decision made in this situation were the most important abilities characterizing high quality officials. The second most significant parameter was the functional and physical abilities of officials. Psychological ability and preparedness are important for officials. It is supposed that developing the above mentioned components will be possible a more successful preparation of sport game officials.

CHANGES IN PHYSICAL FITNESS OF 9 – 10 YEARS OLD SPORT DANCERS DURING A TEN-MONTH TRAINING CYCLE

A. B. Ušpurienė, A. Čepulėnas

Lithuanian Sports University, Kaunas, Lithuania

Research shows that the mastery level of dancers in sport dancing is closely related to their physical fitness though there has not been enough research in the changes of indices of physical fitness of juvenile (9–10 years old) sport dancers while training sport dancing. Research aim was to test the effect of training in sport dancing on the indices of physical fitness of 9–10 years old sport dancers. The

subjects in the research were 9–10 years old sport dancers (n=20): 10 girls and 10 boys. The dancers were tested twice: in January 2012 and in November 2012. Methods: We established the following indices of physical fitness: hand grip strength, the frequency of fine hand movements, the frequency of leg movement running on the spot for 10 s, speed of hand movements performing 25 cycles of movements, static balance, trunk flexibility, dynamic strength endurance of abdominal muscles, explosive strength and speed strength of legs, explosive strength endurance, simple and complex psychomotor reaction to light stimulus. Results: Dancing practice sessions add a positive effect on psychomotor abilities – simple psychomotor reaction for girls and boys ($p < 0.05$) and complex psychomotor reaction for boys ($p < 0.05$). The indices of physical fitness of juvenile sport dancers did not change much in the research period. Specialized dancing practice sessions did not have significant effect on the improvement of physical fitness, however, a tendency of improvement in physical fitness was observed. The indices of physical fitness of juvenile sport dancers did not change much in the research period. Loads of technical and special training did not affect the changes in dancers' motor skills. Conclusions: Physical fitness is a significant component of juvenile sport dancers' sports fitness, and the improvement of physical fitness indices requires inclusion of physical training into the programs of training sport dancers, or regular practice sessions in sport dancing should be supplemented with physical exercises for the development of motor skills.

HIGH-MASTRIES KAYAKER PREPARATION FOR WORLD CHAMPIONSHIPS CHARACTERISTICS

V. Vaicikonis E. Balčiūnas, K. Milašius

Lithuanian University of Educational Sciences, Vilnius, Lithuania

The goals which have been raised are to analyze the application of physical strain in a year-long preparation of kayakers, who are preparing for the world championship. To analyze the fluctuation of high-mastries kayaker's physical and functional capability in a year-long cycle. To stress the peculiarities of preparing the kayaker of high – mastries, to find the ways to prepare them more effectively, to be prepared to get started well in Olympic games, world's and European championships. We have analyzed the course of preparation for the world championship of 2007 of a kayaker and world prizeman, the change of his physical and functional strength throughout a year. The coaches planning, records and diaries of the sportsman have been analyzed. The physical and functional strength have been analyzed during the preparatory period's beginning, high physical strain's preparatory period, special preparation's period, preparatory period of the competition season and before the main competitions.

TOTAL TIME AND HEART RATE CHANGES OF YOUTH GOLFERS DURING PRE-SHOT ROUTINES ON-COURSE CONDITIONS

M. Zienius, A. Skarbalius, A. K. Zuoza, K. Pukėnas
Lithuanian Sports University, Kaunas, Lithuania

The aim of the research was to evaluate the total time and heart rate (HR) changes of youth golfers during pre-shot routines of different shot types on-course conditions. **Subjects & Methods:** Ten male golfers (age 16.7 ± 1.95 years, height 180.2 ± 7.63 m, body mass 69.1 ± 7.77 kg, handicap index 8.02 ± 3.54) participated in this study. We analysed total time and HR changes of pre-shot routines of these shot types: 1. Tee shots (TEE); 2. Fairway shots (FWY); 3. Approach shots (APR); 4. Putts. The total time was measured from the time the players stood behind or beside the ball to the movement they started their backswing. The HR responses were recorded at two-second intervals using the Suunto t6 heart rate monitors (Suunto Ltd., Vantaa, Finland). **Results:** Pre-shot routine of APR (14.31 ± 2.02 s) was significant shorter ($p < 0.05$) compared with – of TEE (16.56 ± 2.32 s) and putts (19.97 ± 3.55 s). Average HR during pre-shot routine of putts (102.05 ± 4.68 beats·min⁻¹) was significant lower ($p < 0.05$) compared with – of TEE (110.86 ± 5.8 beats·min⁻¹), FWY (111.53 ± 3.91 beats·min⁻¹) and APR (111.51 ± 3.48 beats·min⁻¹). HR significantly increased ($p < 0.05$) from start (107.58 ± 4.65 beats·min⁻¹; 109.66 ± 3.89 beats·min⁻¹) to end (114.15 ± 5.08 beats·min⁻¹; 113.41 ± 3.11 beats·min⁻¹) of pre-shot routine of TEE and FWY, respectively. **Conclusions:** Findings suggest, that pre-shot routine of APR should be longer, because these shots require more accuracy than TEE. Players should change their pre-shot routines of TEE and FWY, because HR values are significantly higher ($p < 0.05$) at the end compared with the start of pre-shot routines of these shots.

FOREHAND TECHNIQUE TIME PARAMETER GROUP AND INTERGROUP VARIATION IN TENNIS

A. Zuša¹, J. Lanka¹, A. Vagin²

¹*Latvian Academy of Sport Education. Riga, Latvia*

²*Russian State University of Physical Education, Sport and Tourism, Moscow, Russia*

Sport movement biomechanical analysis allows analyzing the stability of athlete's technique. For this reason it is possible to determine time, kinematic, dynamic and electrophysiological parameter variation. Knowledge of different forehand stroke characteristics and their variations allows better understanding the specifics of the movement organization. Aim of the study: group and intergroup variation of

time parameter in forehand stroke. Subjects: ten young (age 11 ± 0.6 , height 156.3 ± 4.8 cm, weight 43.5 ± 3.6 kg, experience in tennis 5 ± 0.5 years) and six intermediate tennis players (age 19.5 ± 2.3 , height 170.5 ± 7.8 cm, weight 66.8 ± 7.7 kg, experience in tennis 13.2 ± 1.7 years). Method: high-speed video registration system “Qualisys” (Sweden) with 6 cameras. For time parameter determination forehands ($n = 110$) were divided into phases. The data was processed by MsExcel programme (with this we calculated: mean (\bar{x}), standard deviation (σ) and coefficient of variation ($V\%$) for all individual and group results). Results: in stroke preparation phase time parameter variation for young tennis players was 22%, for adults 43%. The racquet and ball contact phase time variation for young players was 47%, for adults 23%. The variation of stroke final phases was 33% for young players and 50% for intermediate adult players. Whole forehand movement performance time variation is 16% for young and 18% for adult players. Conclusions: stroke movement main phase’s time variation is smaller in comparison with other phases for both groups, but for intermediate players it is much less. Variation entire movement realization time is small both for young players and adults. This fact repeats already existing research findings that have shown that whole movement time variation is smaller than each phase variation time.

SHOULDER MUSCLE ACTIVATION DURING SUCCESSFUL AND UNSUCCESSFUL SHOTS IN more AND LESS SKILLED NOVUS PLAYERS

V. Talts, J. Ereline, H. Gapeyeva, T. Kums, M. Pääsuke

*Institute of Exercise Biology and Physiotherapy
University of Tartu, Tartu, Estonia*

Aim of the study: The aim of the present study was to compare the activation of shoulder muscles in more and less skilled novus players during novus shots of different difficulty level. Subjects: Nineteen novus players (5 female and 14 male) participated in the study. The subjects were distributed into two groups according to their competition results: 10 highly skilled and 9 less skilled novus players. Methods: Participants performed three sets of different difficulty level novus shots – penalties, cut and rebound shots. Surface EMG (sEMG) amplitude of posterior and lateral deltoid and trapezius muscle of the subjects’ dominant side was measured during the shot and compared between successful versus unsuccessful shots in more skilled players and less skilled players. Results: During successful penalties, cut and rebound shots the sEMG amplitude of trapezius muscle in more skilled players was significantly lower (34 %; $p < 0.05$; 19 %; $p < 0.001$ and 60 %; $p < 0.01$, respectively) than in less skilled players. Successful penalties and rebound strokes compared to unsuccessful ones in both groups, and

successful cut shots compared to unsuccessful ones in more skilled players are characterized by lower activity in trapezius muscle. Besides that, higher activity of trapezius muscle is a characteristic feature of less skilled players' novus shots. Conclusions: Results of the study confirm the previous findings that athletes with higher skill level use different muscle recruitment than their lower level opponents. Different pattern of muscle recruitment has also an influence on movement effectiveness and precision.

DEVELOPMENT OF THE BACK MUSCLE STRENGTH EXPRESSIONS (WOMEN AGED 23 – 25)

A. Lajevska, A. Čuprika, L. Čupriks

Latvian Academy of Sport Education, Riga, Latvia

Having analyzed the studies found in the literature sources, it was seen that especially using of a big ball in trainings is one of the healthiest means for the spine, as it gives shock absorbing push when touching parts of the body. Aim of the study: possibilities to develop strength expressions of the back muscles with "FIT-BALL", applying substantiated didactic approach to women's training process. Subjects: 23 – 25 years old women, 10 athletes, with experience in fitness. Methods: Investigation and analysis of literature about "FIT-BALL", back muscles, isokinetic work. In experiment was used isokinetic dynamometer REV9000, the observed parameters – torque (Nm), work (J), power (W) and fatigue index. The tested motion was upper body flexion und extension in a dynamic movement in the concentric mode – in the angular range from 4 to 97 degrees, five angular speeds were selected: 30, 60, 90, 120, 150deg/sec, from four to 20 repetition in each angular velocity were used. The experiment lasted for six months. Results and Conclusions: Positive dynamics was observed after the application of the "FIT-BALL" routine in all parameters of strength expressions. The participants' of the experimental group result difference is significant, and the increase is statistically significant. The biggest difference of the strength momentum parameter 19% was stated at 60°/s, The biggest difference of the work parameter 22% was stated at 120°/s, and at the angle speed 120°/s the biggest difference of 29% was stated. Therefore the exercises with the "FIT-BALL", used in the training process, taking the control results, didactic bases, theoretical aspects of physical qualities and age group peculiarities as the bases will facilitate strength expressions of the back muscles and the development of coordination and posture.

DEVELOPEMENT OF RAPID FORCE AND POWER WITH SPECIAL EXERCISES OF KETTLEBELL SPORT

M. Lesčinskis, S. Saulīte
Latvian Academy of Sport Education

Many kinds of sport require a physical ability that consists of two components, one of which is rapid force or power. To develop rapid force in these kinds of sports coaches often use only exercises with personal weight or weightlifting exercises. This means that the coaches' knowledge of the kettlebell is relatively insufficient and the coaches do not use kettlebell in their training process. Many special exercises with kettlebells in their performances are very dynamic. The aim of the research is to work out exercises routine with kettlebells for the development of rapid force. In research will participate subjects from many kinds of sport, at age 18 till 25 years. Methods: During the study, for determination of rapid force and power parameters we will perform tests on "FiTRO Force Plate". On the "FiTRO Force Plate" we will perform the following control exercises: vertical jump with hands on hips and with hand movement, vertical jump from two steps, both legs and hands' movement, and vertical jump with one leg take off. In pedagogical experiment will participate 3 groups – one experimental group and two control groups? All three groups will carry out training process for 8 weeks, equal to all groups, for increasing the overall physical condition. Main differences of overall physical training process between groups will be different means for development of rapid force and power. One control group will use weightlifting exercises and other control group will use exercises with personal body weight, but experimental group will use special exercises with kettlebells. Conclusions: The inclusion of special exercises with kettlebells in training process can be just as effective in increasing rapid force and power as the inclusion of weightlifting exercises or exercises with personal body weight. To develop rapid force in different kinds of sport coaches can use many dynamics exercises with kettlebells.

MODERN REALITIES SELECTION AND PREDICTION IN SPORTS

E.V. Gorina, E.G. Pritkova
Volgograd state Academy of physical culture, Volgograd, Russia

The steady rise of achievements and occupation in swimming takes place on the background of low effectiveness of forecasts. The level of modern science allows creating pattern testimonials as for young sportsmen so for leading sportsmen in the chosen kind of sports. However they do not reflect the specific individual diversity of the organism, the peculiarities of inherited inclinations of a sportsman,

realized in the process of training of motor abilities as well as individual rate of development of physical qualities. Proceed from the aforesaid it is evident that for liquidation of flaws in the questions of individual forecasting in swimming it is necessary to take into account the genetic factors influencing the development of the organism, the peculiarities and the rate of its adaptation to the physical loading, the specificity of sporting training. Key words: swimming, young swimmers, sporting selection, orienteering, forecasting, genetic inclinations, genetic markers.

DEVELOPMENT OF KAYAK ROWERS' AEROBIC CAPACITY

E. Balčiūnas¹, R. Nekrošius², R. Dadelienė¹, J. Skernevičius¹
Lithuanian University of Educational Sciences¹ Vilnius, Lithuania
Lithuanian Sports University², Kaunas. Lithuania

Kayak rowing event of 1000 m requires aerobic energy production from 70 to 80 percent. Due to this fact, preparing kayak rowers in different yearly periods much time must be allocated to aerobic capacity development. The aim of the work was to investigate aerobic development process of elite kayak rowers, participating in 1000 m event, in their preparatory period. Subjects and methods: We performed the study on the content of means and methods of the non-water physical load, carried out by Lithuanian champions, World Championship silver medal winners at the beginning of their preparatory period. Change of aerobic capacity was studied using gas analyser "Oxycon Mobile", the physical load being performed using kayak rowing ergometer "Dansprint". 1000 m event rowing ergometer simulation test was also applied. November training mezocycle included 5 microcycles: 1) introductory – 5 sessions; 2) increasing physical load – 5 sessions; 3) partial recovery – 4 sessions; 4) great physical load – 7 sessions; 5) recovery and supercompensation – 4 sessions. Characteristic feature of December training mezocycle was a microcycle, devoted to VO_2 max increase applying special physical loads. Characteristic features of January mezocycle were the following: increased number of training sessions up to 8 within microcycles; were included exercises for creatinphosphate capacity development, and was initiated the application of physical loads for the stimulation of glycolytic reactions. The fifth microcycle was devoted to recovery and supercompensation and included stage testing. Within the structure of kayak rowers' training mezocycles, characteristic was involvement of introductory and recovery supercompensation microcycles. Results: The carried out investigation demonstrated remarkable progress of kayak rower R.N. during 3 months period: VO_2 max increased from 56.1 to 67.5 ml/min/kg, working capacity increased from 280 W to 320 W, 1000 m simulation test index used to improve from 3 min. 48 sec. to 3 min. 44 sec. Progress of kayak rower A.O. was slightly less. Conclusions: The study proved effectiveness of

kayak rowers' performed physical loads, their adjustment to recovery and supercompensation periods in development of kayak rowers' aerobic capacity.

**RELATIONSHIP BETWEEN BETA ENDORPHINS AND WELL-BEING
FOR FURTHER OUTDOOR ACTIVITIES IN 45 TO 55 – YEARS-OLD
PEOPLE (pilot study)**

I. Kundzina, J. Grants

Latvian Academy of Sports Education, Riga, Latvia

Regular physical activity is associated with a wide spectrum of psychological effects. A number of studies have demonstrated beta-endorphin (β -EP) concentration increase in plasma in response to physical activity. The aim of the study is to explore the β -EP effects on the human's body and its relation to the emotional state in affect of physical load. Subjects and methods: six 45 to 55-years-old moderate and high physically active people. Physical load tests on velo-ergometer, International Physical Activity Questionnaire, Beta-endorphin (β -EP) testing from the venous blood, lactate samplings, "FaceReader 3.0" (FR). Results: the subjects did maximal load test on velo-ergometer in laboratory conditions with load increase in every 3 min. In average the velo-ergometer test lasts for 28 min. The venous blood was taken before and 5 min after the load test and the results show β -EP increase in 3 subjects (JG + 33.74%, IB +17.84%, MP +38.79%) and decrease in other 3 subjects (IK -21.17%, JP -16.8%, IZ -7.87%). FR was used before the load test and 5 min after. FR data show negative emotions reduction after the load test (angry -11%, scared -6%, sad -3%) and enhance of happiness +10%, disgust +8% and neutral emotions +10%. In conclusion, these findings demonstrated increase of β -EP for a half of the subjects. We didn't observe positive correlation between β -EP increase and happiness ($p < 0.05$). Before the load test FR data showed scare, sadness and anger, but 5 min after physical activity those emotions disappeared or decreased. In four subjects we obtained increase of disgust. It can be associated with laboratory conditions. Regarding a link between β -EP and well-being there it is needed to carry out further investigation which will take part outdoors using different physical recreation activities.

THE IMPROVEMENT OF MANAGEMENT FACILITIES OF SPORTS ORGANIZATIONS IN LATVIA

G. Jansons, J. Ošenieks

BA School of Business and Finance, Riga, Latvia

The operation of sports organizations in Latvia is rather poorly studied area. In aforementioned article the authors will demonstrate the facilities of significant enhancement and upgrading of the process management of sport organizations in micro and macro scale in Latvia, exploiting the expertise of management theory. The quality of management of sports organizations is a relevant precondition of the development of sports economy in Latvia. It is possible to obtain significant improvement of the process management of sports organizations in Latvia, using cognitions from management theory considering both micro, and macro scales. Purpose of the article: The formation of the management methodology of sports organizations in connection with sports economy. Object: The branch of sports in Latvia. Topic of the study: Methodology of sports organization process management system in micro and macro scale. Methods: During the elaboration process of the article the quantitative and qualitative research methods of the economic science were used. Major conclusions: until know, the united methodology has not been elaborated yet, in order to evaluate the influence of sports organizations on sports economy. The lack of united methodology is considered to be connected with the shortage of credible statistic data as illustrated from the example of Latvia.

ENTREPRENEURSHIP AND NEEDS OF TOURISM SERVICE USERS

R. Navickiene

Lithuanian Sport University, Kaunas, Lithuania

Within the science area, more and more often the Entrepreneurship phenomenon to improve the enterprise even during the current crisis is being examined. Researchers point out that within often changing and complex surrounding companies, including tourism companies which do not take entrepreneurship actions are more likely to lower their strife within the market. Within this article the consumers' needs are examined in relation to entrepreneurship, i.e. the aim is to find out whether entrepreneurs create new tourism services being stimulated by the competence of the business and thus forming the market's needs or whether they create the new services by looking at the tourism services consumers' needs. In order to achieve this goal a qualitative case study has been done during which 36 of Lithuanian tourism businesses

representatives have been interviewed using a semi-structured method. The representatives' activity within Lithuania during the year 2011 has been named to be entrepreneur. Keywords: Entrepreneurship, needs, tourism, Lithuania.

FITNESS IN THE SPORT STRUCTURE OF LATVIA

A. Čuprika, A. Fernāte

Latvian Academy of Sport Education

Nowadays, the most critical factor for improving and strengthening health is the one's position, his/her attitude towards social, mental and physical health. The reasons for such rapid changes in the field of sport are related to physical activities in community, appearing of innovative forms of physical activities in Latvia, as well as to fast spreading of fitness. Therefore, the purpose of the article is to evaluate the possibilities to include fitness as a structural component in the Latvian Sport System. Methods: 1. Theoretical analysis of literature; 2. Document analysis. The study is based on the following information sources: Sporta politikas pamatnostādnes 2013.-2020.gadam. Projekts (Sporting Policy Guidelines for 2013 – 2020), Nacionālā sporta attīstības programma 2006. – 2012. gadam (National Sport Development Programme 2006-2012), Latvijas nacionālais attīstības plāns 2012. – 2020. gadam (Latvian National Development Plan 2012 – 2020), Global Strategy for the Diagnosis, Management, and Prevention of Chronic Obstructive Pulmonary Disease, 2006. Was investigated the place of Fitness in the Latvian Sport System, the necessity and possibility to include it in the National Sport Development Programme and in future in Sporting Policy Guidelines. Results: 1. One of the more important problems in the field of fitness in Latvia is the understanding of the term 'fitness' and its place in the field of sport. 2. Number of sport clubs in Latvia is 84, the number of capital companies whose activities are related to organization of sport lessons and sport events is 19, and the number of fitness clubs throughout Latvia is approximately 150, what is more than the number of sport clubs. 2. Commercial fitness clubs and Association of Fitness and Health Promotion of Latvia (LFVVNA) are not included in the overall sport structure in Latvia. 3. The section "Sports visiem" (Sport for all) of the National Sport Development Programme 2006-2012 is devoted to sport as a form of health lifestyle and meaningful leisure activity, for example, attendance of sport and fitness centres. 4. Association of Fitness and Health Promotion of Latvia can be included in the scheme of the Latvian Sport System as one more element since it has one very important function – popularization of healthy lifestyle and regular physical activities among Latvian people. 5. Fitness is a socially-cultural phenomenon that needs to be included in Latvian National Sport Development Programme. In the Structure of Latvian Sport Fitness clubs need to be added to structural component 'Sport Clubs'.

FUNCTIONAL ABILITIES OF CHILDREN WITH PSYCHONEUROLOGICAL DISTURBANCES

N. Sitņika, I. Kīsis

Latvian Academy of Sport Education, Riga, Latvia

Children are constantly growing and evolving. Forms of physical activity are an integral daily part of child's life at home and school. The practice of physical activity is natural and spontaneous, and it is considered synonymous with good health. Physical activity is necessary for children's general, staturponderal, motor, psychological and social development. Increased motor activity observed children with psychoneurological disorders indicates one of the exhaustion phases. In order to suggest a correct amount and intensity of physical activities, it is required to determine the level of body functional abilities. The purpose of this research was the evaluation of the functional abilities in pupils with psychoneurological disturbances, aged 10-15. We used the method of heart rhythm variability (HRV) analysis. This method is used to analyse and assess the regulatory system of the physiological functions of a human body. We also used a heart rhythm analysing computer software *Omega-S* as a diagnostic tool which was developed in the *Dinamika* laboratory. Conclusion: Pupils show a tendency to deviate from the normal functional status values. Slightly lower results were found in the group of pupils aged 10 – 11. In future research, the causes of an increased level of functional disturbances of physiologic functions and body's organ systems should be further investigated.

EVALUATION OF EMOTIONAL STATE IN RECREATION ACTIVITIES

G. Ulme, J. Grants, I. Kravalis

Latvian Academy of Sport Education, Riga, Latvia

Recreational activity improves one's mental, physical and emotional skills, it has positive impact on subjective well-being. However, the data suggest that recreational activities can adversely affect the person's emotional state. Therefore is important to clarify when and under what conditions, recreational activities have positive and negative impact on humans, athlete's emotional state. The aim of the study is to create the approach to evaluating emotional state in recreational outdoor activities. Subjects and methods: people who take part in recreational activities, Emotional state assessment using Sport Emotion Questionnaire and „FaceReader 3.0” software, interviews and observations. Results: developed and approbated in practice the approach to evaluating downhill skier and cyclist emotional state before and after recreational exercises; created several practical recommendations

for recreation specialists. Conclusions: data obtained by the Sports emotions questionnaire show that before the recreational activity, 41% felt happy, 39% felt the excitement. Statistical treatment of data showed the correlation between anxiety and happiness. Anxiety correlated negatively with happiness ($p < 0.05$). This means that people who experienced higher than mean level of anxiety, experienced also lower level of happiness. People who exhibited higher than mean happiness, showed also higher than mean depression, but lower than mean anxiety. The analysis of data, obtained with software "Face Reader 3.0., showed that 23% of respondents after physical activity experienced a neutral emotional state, but 21%: feelings of happiness. Sense of happiness statistically significantly negatively correlated with anger ($p < 0.05$) and sadness ($p < 0.05$). This means that respondents, who experienced higher than mean happiness, showed lower than mean sense of anger. Anger statistically significantly negatively correlated with happiness ($p < 0.05$). This means that individuals who showed higher than mean sense of anger experienced lower than mean happiness. Sadness or dejection statistically significantly negatively correlated with happiness ($p < 0.05$).

THE EFFECT OF INSPIRATORY MUSCLE WARM-UP ON SUBMAXIMAL ROWING PERFORMANCE

M. Arend, J. Mäestu, J. Kivastik, R. Rämson

University of Tartu, Estonia, Tartu, Estonia

The competitive sport is getting more demanding and the margin of winning gets smaller. One possible way to improve athletic performance is specific training of the respiratory system, in particular the inspiratory system. The aim of this study was to investigate the impact of inspiratory muscle warm-up to submaximal rowing performance and whether there is an effect on lactic acid accumulation and breathing parameters. Methods: Eleven competitive male rowers (age 23.1 ± 3.8 yrs; height 188.1 ± 6.3 cm; weight 85.6 ± 6.6 kg) visited the lab three times. During the first visit maximal inspiratory pressure (MIP) assessment was carried and then incremental rowing tests to measure the maximal oxygen consumption. Submaximal intensity (90% $P_{a_{max}}$) rowing tests were carried out twice: before test one subjects had to perform standard rowing warm-up (Test 1) and in the second test, subjects had to do standard rowing warm-up and specific inspiratory muscle warm-up of 2x30 inspirations at the intensity of 40% of MIP (Test 2). A preexercise and post exercise blood sample was collected from fingertip and analyzed for lactate concentration. Results: During the two experimental tests we measured distance, heart rate, breathing frequency, ventilation, VO_{2max} and blood lactate. Statistical measurements did not show any significant differences between the values we measured. The only value that showed a tendency of change was heart rate. Discussion: The main difference in our study compared to the previously conducted studies is the intensity of the tests. The submaximal intensity was used because the „all-out” tests rely more on subject motivation and willingness to perform maximally. We thought it possible that inspiratory muscle warm up might bring about a decrease in blood lactate concentration. Previous studies have shown a decrease in blood lactate (Romer et al., 2002; Boutellier, 1992; Spengler et al., 1999) and the reason might be a better reuse of lactate by increasing blood flow to the diaphragm (Brown et al., 2010). In our study we did not see any changes in lactate concentration between the two tests and the reason might be due to the small number of subjects.

EFFECT OF SHORT-TERM EXERCISE ON REGENERATIVE CAPACITY OF RAT SKELETAL MUSCLE

**M. Aru¹, K. Alev¹, P. Kaasik¹, R. Puhke¹, A. Pehme²,
J. Sagim¹, T. Seene¹, E. L. Rahu¹**

¹Institute of Exercise Biology and Physiotherapy,

²Institute of Pedagogy and Coaching, University of Tartu, Tartu, Estonia

The maintenance of a working skeletal musculature is conferred by its remarkable ability to regenerate. Skeletal muscle regeneration is a coordinate process in which several factors are sequentially activated to maintain and preserve muscle structure and function with the potential to restore its initial functional activity. The capacity of some local anesthetics, primarily bupivacaine, to cause pronounced degeneration of muscle fibers is often used in studies of the regenerative reactions of skeletal muscles. Intramuscular injection of bupivacaine results in reversible myonecrosis, with the extent of muscle damage being dose-dependent, thus allowing a controlled and consistent amount of damage. The histological pattern and the time course of skeletal muscle injury appears uniform; approximately 5 min after intramuscular injection, hypercontracted myofibrils are evident, followed by myocyte oedema and necrosis over the next 1 – 2 days. Myoblasts, basal laminae, and connective tissue elements remain intact, which ensures complete muscle restoration within 3 – 4 weeks. To study the process of muscle regeneration in a controlled and reproducible way, it has therefore been necessary to develop animal models of muscle injury. The goal of this study was to investigate whether short-term exercise on a treadmill causes changes in histological properties and myosin heavy chain (MyHC) composition of regenerated plantaris muscle (PLA). There are many causes of muscle damage, the healing processes are identical; therefore any improvement in the rate of recovery in the animal model can be directly applicable to muscle injury in humans. Muscle mass and muscle phenotype are determinants of contractile performance. The contractile phenotype is mainly determined by the expression of myosin heavy chain (MyHC) isoforms in skeletal muscle. Male rats of the Wistar strain were used in this study. Muscle damage was caused by intramuscular injection of 0.5% bupivacaine into the midbelly of the right PLA muscle, left PLA muscle was used as a control. This procedure for the initiation of necrosis-regeneration was performed carefully to avoid damage to the nerves and blood vessels. After induction of regeneration, rats were randomly assigned to one of two groups designated as either sedentary or exercised. Ten days after injection of the bupivacaine into the right PLA muscle, all animals in the exercised group underwent a short-term training program of treadmill running, which lasted for 5 days. 15 days after bupivacaine treatment the animals were anesthetized and sacrificed. PLA muscles of both hindlimbs were excised, cleaned of adipose and connective tissue, weighed and stored at –80°C until analyzed

further. Muscle samples from right (i.e. injected with the myotoxin) and left PLA muscles (i.e. nontreated) from each animal were analyzed histologically and histochemically. Serial cross-sections from PLA were cut from these samples by a cryostat microtome and were stained with Mayer's Hematoxylin-Eosin (H&E) and for mATPase activity, preincubated at alkaline or acid pH to measure the size of different types of skeletal muscle fibers. 5-7 sections of 20µm thickness were transferred to test tubes and were subjected to the analysis of MyHC isoforms. Our results showed that 0,5% injection of bupivacaine caused extensive and rapidly developing destruction of muscle tissue. 5 days after bupivacaine injection there were signs of ongoing degeneration and parallel intensive regeneration, 15 post-injection day small metabolically active cells with peripheral and central nuclei were present, as well survived hypertrophied cells showing characteristics similar to type IIB. Observation of H&E stained sections revealed the presence of degenerating and regenerating fibers in both control and post-exercised muscles. Degenerating fibers mostly appeared in the form of small, angular fibers. The contractile and metabolic properties of muscles need to be coordinately regulated during myofibre conversion in order to adapt to the functional requirements imposed on the muscle. Total protein content can be used as indices of muscle plasticity, regeneration and repair; the myosin/actin ratio is a reliable of the onset of muscle atrophy; MyHC composition is an indicator of regenerative events and adaptation to changing demands. The mean body weights of two groups were similar, short-term treadmill running had no significant effect on the body and PLA muscle weights of the rats. SDS-PAGE analysis showed neonatal MyHC expression in both groups. Silver staining of electrophoregrams prepared from regenerated PLA muscles revealed trace amounts of the neonatal MyHC isoform. We conclude that short-term contractile activity during muscle regeneration did not cause significant changes in regenerating skeletal muscle. The regeneration process following extensive muscle damage needs to be examined over long-term exercise program. Acknowledgement: This study was supported financially by the Ministry of Education and Research of Estonia, research project number TKKSB1787.

EFFECT OF DRAFTING ON HEART RATE, CYCLE LENGTH AND FREQUENCY IN CROSS-COUNTRY SKIING

I. Nikonovs, E. Bernāns, K. Ciekurs

Latvian Academy of Sport Education, Riga, Latvia

Cross-country skiing performance is affected by a wide range of factors that determine skier speed. The single most important physiological determinant of cross-country skiing performance is maximum oxygen uptake (Vo₂max). Unlike such endurance sport as running, where physiological capacities are the major determinants of performance, and where environmental conditions, equipment and

technique have relatively little effect, skiing performance is often influenced by mechanics. Across the wide range of skiing techniques, several general factors can be described, which directly determine skier motion. Forces acting against skier can be collectively grouped into forces which are resistive and those which are propulsive. One of those resistive forces is air drag force. While cross-country ski racing is an individual sport, often skiers may be in a position to ski close behind other competitors. In such circumstances, air drag forces can be slightly reduced on the trailing skier ('drafter'). Some previous studies showed that at similar speeds, the skier, 'drafting' behind the leader, maintained heart rate about 5% lower than the skier in the leading position. The aim of the study was to investigate the heart rate responses in different skiing positions (as a leading skier and as a drafter); determine changes in cycle length and cycle frequency in the same conditions. Subjects: Two 18 years old male skiers participated in research. Methods: To control and determine skier speed Microgate timing&Sport (Kit Racetime2 Light Radio) was used. To determine cycle length and cycle frequency each run was filmed and further calculations were made by video analysis. Results: Study confirmed that heart rate was lower for skiers in drafting position than in the leading position, but at the same time cycle frequency and cycle length maintained unchanged.

RESIDUAL FORCE DEPRESSION FOLLOWING MUSCLE SHORTENING IN FRESH AND FATIGUED HUMAN QUADRICEPS MUSCLE

**G. Dargeviciute, N. Masiulis, S. Kamandulis, H. Westerblad, A. Skurvydas,
D. Kiele, V. Aleknaviciute**

Lithuanian Sport University, Kaunas, Lithuania

Aim: We studied the relation between two common force modifications in skeletal muscle: the prolonged force depression induced by unaccustomed eccentric contractions and the residual force depression (rFD) observed immediately after active shortening. We tested two hypotheses: (1) the magnitude of rFD correlates to the mechanical work performed during shortening; (2) the eccentric contraction-induced force depression and rFD are caused by different, but interacting mechanisms. **Subjects:** Nine healthy young men participated in the study. **Methods:** rFD was studied in electrically stimulated knee extensor muscles. rFD was defined as the reduction in isometric torque after active shortening as compared to the torque in a purely isometric contraction. Eccentric contractions were performed as 50 repeated drop jumps with active deceleration to 90° knee angle, immediately followed by a maximal upward jump. rFD was assessed before and 5 min to 72 hours after drop jumps. **Results:** The series of drop jumps caused a prolonged force depression, which was more marked at 20 Hz than at 50 Hz stimulation. There was

a significant correlation between increasing rFD and increasing mechanical work performed during active shortening both before and after drop jumps. In addition, a given rFD was obtained at a markedly lower mechanical work after drop jumps. Conclusions: rFD, which decreases force during dynamic contractions, is determined by the mechanical work performed during active shortening. A series of eccentric contractions causes a prolonged decrease in isometric force and via exaggerated rFD, it imposes an additional weakness during dynamic contractions.

DISTURBANCES OF MUSLES NEURAL REGULATION IN CONNECTION WITH VEGETATIVE NERVOUS SYSTEM'S FUNCTIONAL STATE

Z. Galeja, A. Paeglitis

Latvian Academy of Sport Education, Riga, Latvia

In the practice of physiotherapy we often come across situations when sportsmen performing movements do not do it in optimal routine. Assisting muscles are involved in the realization of the movement, not forming an optimal stereotype of the movement. It is known from the literature that in these kinds of situations it is mostly found out that muscles agonists in the realization process of the movement operate only in the routine of phasic contraction. In the practice of applied kinesiology (AK) it has been empirically stated that, having neural regulation disturbance, the muscle cannot use the routine of tonic contraction. Such muscle neural regulation state in AK is called a functionally weak muscle. It is known from the literature that the reasons for muscle functional weakness can be on segmental, CNS talamus, CNS subcortical and cortical levels. In AK practice has been stated: if the source of the problem is irritated for a short time, muscle neural regulation is normalized for a while, letting it contract in tonic routine. The aim: to state the connection between neck muscles functional weakness and vegetative nervous system's disturbances. Subjects: 40 LSPA students (aged 20-25). Methods: AK tests; neurologic tests, mathematical statistics methods. Results: The source of neck flexors' muscles functional weakness mostly appears as disturbances connected with head's lymphatic circulation and with thyroid gland fixation. On M.scalenis right side the source of functional weakness mostly appears as disturbances connected with inhalation movement, head lymphatic circulation, thyroid gland fixation, but on the right side: as disturbances connected with inhalation movement and compression of neck vertebrae. M. sternocleidomastoideus (right and left side) source of the functional weakness mostly appears as disturbances connected with inhalation and exhalation movement, head lymphatic circulation and thyroid gland fixation. Evaluating vegetative nervous system – the weakness of contractions of pupils of the eye had 87.5% from the entire group, from them m.scalenis functional weakness (both

sides) had 42.5%. The weakness of the parasympathetic part after klino static test had 52.5% and from them m.scalenis functional weakness on the left side: 23.8%, on the right side: 47.6%. Increased function of the sympathetic part after orthostatic test had 47.5%, from them m.scalenis functional weakness on the left side had 52.6%, on the right side: 47.4%. Conclusions: From the obtained results we concluded that the source of neck muscle functional weakness mostly appears as disturbances connected with inhalation and exhalation movements, head lymphatic circulation, thyroid gland fixation, but the closest connection of m.scalenis functional state is with increased activity of sympathetic system, which can be seen in the pupils of the eyes test and orto static test.

RATE OF FORCE DEVELOPMENT IN ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTED PATIENTS

**D. Kielė^{1,2}, N. Masiulis¹, R. Gudas³, G. Dargevičiūtė¹,
V. Streckis¹, V. Dudonienė¹**

¹Lithuanian Sports University, Kaunas, Lithuania

²Vilnius College, Vilnius, Lithuania

³Lithuanian University of Health Sciences, Kaunas, Lithuania

After knee anterior cruciate ligament (ACL) rupture decreased neuromuscular and sensorimotor system control, muscle activation and muscle strength (Bonsfills et al., 2008; Ingersol et al., 2008). The aim of the study was to investigate difference in knee flexion and extension maximal isometric muscle torque (MVC) and rate of force development characteristics (RFD) during two different physiotherapy programmes in ACL-reconstructed individuals. Methods: Twelve untrained males participated in this study 3 months after ACL surgery. All participants were divided into 2 groups: i) Group 1 (n = 6) received conventional physiotherapy (3 times per week, 10 times in total); ii) Group 2 (n = 6) received conventional physiotherapy and leg-press training (3 times per week, 10 times in total). MVC and RFD were performed during flexion and extension on isokinetic dynamometer at 80°, 40° knee angles. The RFD was considered as the mean slope of the moment-time curve at time intervals of 0-30, 0-50, 0-100, 0-200 ms. Results. Flexion and extension RFD at knee angles 40° and 80° in uninjured leg was greater than that of the injured leg in both groups. Flexion and extension MVC torque in injured leg after intervention significantly increased in group 2. After intervention in Group 2 we did not find any significant difference in MVC torque between injured and uninjured legs. But in Group 1 before and after intervention the uninjured leg MVC torque was statistically significantly higher than that of the injured leg. Conclusion: After intervention significantly increased RFD and MVC in injured leg in Group 2, but in Group 1 we did not find significant difference.

BODY COMPOSITION, BONE MINERAL CONTENT AND SKELETAL MUSCLE QUALITY CHARACTERISTICS IN CYCLISTS AND POWER LIFTERS

**L. Lepasalu¹, E. Lätt², J. Jürimäe², J. Ereline¹, H. Gapeyeva¹, T. Kums¹,
M. Mumm¹, M. Pääsuke¹**

¹Institute of Exercise Biology and Physiotherapy, University of Tartu, Tartu, Estonia

²Institute of Sport Pedagogy and Coaching, University of Tartu, Tartu, Estonia

Aim: Cycling is a non-weight bearing activity, requiring negligible eccentric contractions, whereas in contrast strength training is highly associated with increase in bone mineral density (BMD) and content (BMC) (Warner et al., 2002). The aim of this study was to compare body composition, BMD, BMC and knee extensor (KE) muscle isometric strength characteristics in male endurance- and strength-trained athletes. Twelve male cyclists and twelve power lifters with the mean (\pm SD) age of 22.8 \pm 3.7 and 25.3 \pm 4.1 years, respectively, participated. Methods: Maximal voluntary contraction (MVC) torque of the KE muscles was assessed by custom-made dynamometer. BMC, BMD, and body composition were assessed using dual x-ray absorptiometry. Muscle quality of KE muscles was assessed by MVC torque/right leg lean mass ratio. Results: Power lifters had higher ($p < 0.05$) body and legs lean mass and body fat percentage than cyclists. Whole body and legs BMD and BMC were higher ($p < 0.05$) in power lifters compared with cyclists. Power lifters had higher ($p < 0.05$) isometric MVC torque. However, no significant differences in MVC torque/right leg lean mass ratio were established in the measured groups. Conclusions: Long-term adaptation to power lifting is associated with higher lean mass, fat percentage, BMD and BMC and greater voluntary force-generation capacity of KE muscles compared to cycling. However, the quality of KE muscles is similar in cyclists and power lifters.

FOOTBALL PLAYER BODY HYDRATION LEVEL CHANGES DURING TRAINING IN WINTER

L. Ozoliņa, I. Pontaga

Latvian Academy of Sport Education, Riga, Latvia

Body hypohydration degree significantly effects the athletes performance which is especially important for sport games players (male football players during the game in summer loose 0.99 – 1.93 l of water per hour, the mean loss of water is 1.46 l/h, but during training in winter: 0.71 – 1.77 l/h, the mean loss: 1.13 l/h. The hydration degree of athlete's body determines his aerobic endurance and the ability to perform psychomotor tests. Small degree of body hypohydration (loss of 1.5 –

2.0 % of the body weight caused by water loss) causes significant decrease of the performance of football players and their psychological state. Thirsty sensation cannot be good indicator to regulate water uptake, because if athlete relies only on it, water uptake will be twice smaller than necessary. Aim of this study was to find out changes in body hydration level during training in winter. Subjects: Forty three football players from the first league teams participated in the investigation voluntarily. Their mean age was 20.5 ± 3.5 years, height: 180.7 ± 6.2 cm, and body mass: 76.4 ± 8.2 kg. Methods: Data was collected before and after training. All athletes were weighed by the scales Midrics1 (Sartorius, Germany), precision 10g, max weight 150 kg. Every athlete collected mid – stream specimens of urine before and after training. Urine specific gravity was measured by urine refractometer PAL-10S (Atago, USA), precision ± 0.001 , $\pm 0.1^\circ\text{C}$. Results show that before training 34.8% athletes were euhydrated, 58.1% were hypohydrated and 7.1% were dehydrated. After training 9.3% athletes were euhydrated, 53.4% were hypohydrated and 37.3% were dehydrated. Even 1.5h training can change urine specific gravity values. Results show that more than half of all athletes tested were hypohydrated or dehydrated even before training and situation worsens after training. It is recommended to give more explanations for trainers and athletes about the necessity of water consumption during all day- before, during and after training.

CONTROLLABLE REPEATED PASSIVE HEATING EFFECT TO ACCLIMATION SYMPTOMS AND NEUROMUSCULAR FUNCTION

H. Paulauskas, M. Brazaitis

Lithuanian Sports University, Kaunas, Lithuania

Purpose – establish and investigate the controllable repeated effect of passive heating on acclimation symptoms and neuromuscular function. Subjects and methods – nine healthy subjects (9 males) were passively acclimated of 16 sessions with repeated passive lower body heating. On every heating session, the subjects were sitting immersed up to the waistline in a water bath at $\sim 44^\circ\text{C}$ (air temperature $\sim 22^\circ\text{C}$, rh $\sim 45\%$) while rectal temperature raised to 39.5°C or heating session reached 120 minutes (maximal heating time). Rectal (T_{re}), muscle (T_{muscle}), skin (T_{sk}) temperatures at four sites (back, thigh, forearm and calf) and body mass were measured before and after passive heating. Heart rate (HR) and T_{re} were collected every 5 min during passive heating. During the first (HA-1) and the last (HA-16) heat acclimation session, participants performed a 2-min muscular voluntary contraction (MVC-2min) of plantar flexors. Results – after acclimation, both the resting T_{re} , T_{sk} , prior to heat exposure and the final temperature measured at the end of passive heating were significantly reduced. Heat acclimation had a significant

effect on increased sweating and decreased HR and the physiological stress index (PSI). Furthermore, muscle contraction and relaxation time significantly prolonged (before HA-16). Central activation ratio (CAR) significantly increased (after HA-16) during MVC-2min. Conclusions – passively induced heat acclimation is reliable for lowering T_{re} and T_{muscle} at rest. Lower T_{muscle} prolonged muscle contraction and relaxation time of plantar flexors at rest. Furthermore, lower final T_{re} and lesser PSI increase CAR and decrease CAR fatigue index, but did not affect changes of muscle agonist/antagonist electrical activity and isometric torque during brief MVC and MVC-2min isometric load.

RELATIONSHIP BETWEEN LEG EXTENSOR MUSCLE STRENGTH, POSTURAL STABILITY AND RISK OF FALLING IN WOMEN WITH KNEE JOINT OSTEOARTHRITIS AFTER A 2-MONTH HOME EXERCISES PROGRAM

M. Rätsepsoo¹, H. Gapeyeva¹, J. Sökk¹, J. Ereline¹, T. Haviko², A. Märtson², M. Päsuke¹

¹Institute of Exercise Biology and Physiotherapy, University of Tartu, Tartu, Estonia

²Department of Traumatology and Orthopedics, University of Tartu, Tartu, Estonia

The relationship between leg extensor muscle strength, postural stability and risk of falling was studied in 17 women with late stage knee joint osteoarthritis (aged 46-72 years) before and after 2-month home exercise program (HEP). All patients were scheduled for total knee arthroplasty and performed HEP daily during 2 months. Isometric maximum voluntary contraction strength of leg extensors and postural stability center of pressure (COP) sway characteristics (eyes open (EO), eyes closed (EC); during 30 s standing) were recorded. Risks of falling and pain (VAS) were estimated. Significant improvement ($p < 0.01$) in peak torque (PT) of the involved leg and bilateral PT was found after HEP. An increase in PT: body mass (PT:BM) ratio of the involved leg and bilateral PT:BM ratio ($p < 0.05$) was noted. PT and PT:BM ratio of the involved leg was significantly lower ($p < 0.05$) compared to the uninvolved leg before HEP, but not after. COP trace length (EC) decreased significantly ($p < 0.05$) after HEP. Significant correlations were found between unilateral and bilateral PT and postural stability, VAS score, risk of falling before HEP as well as between postural stability and VAS score before and after HEP. Regression analysis demonstrated a significant relationship between unilateral PT and postural stability (EC). It was concluded that after 2-month HEP leg extensor muscle strength increased and COP trace length (EC) decreased remarkably. The results indicated that leg extensor muscle strength and knee joint

pain play an important role in postural stability and risk of falling in women with late stage knee joint osteoarthritis.

THE EFFECT OF POWER ENDURANCE AND HIGH-INTENSITY POWER TRAINING ON AEROBIC CAPACITY IN SPURTERS

S. Raubaitė, N. Baranauskienė, A. Stasiulis

Lithuanian Sports University, Kaunas, Lithuania

The aim of this study was to determine the influence of power-endurance and high-intensity power training on oxygen uptake ($\dot{V}O_2$) kinetics and aerobic capacity in competitive sprint athletes (SA). Methods: Twelve healthy young SA (males $n=7$, females $n=5$) with the following values of anthropometric indexes (means \pm SD): age (21 ± 4 years), height (179 ± 8 cm), weight (69.0 ± 9.5 kg), fat mass (8 ± 3 kg) and free fat mass (61 ± 11 kg). All subjects were competitive at the national or international level. The subjects accomplished individual 8 weeks training program composed of 3 weeks of power-endurance (PE) training, 1 week of recovery (R) and 4 weeks of high-intensity power (HIP) training periods. They performed four minutes constant running test (CRT) with the intensity of 7 km/h^{-1} and incremental treadmill (LE 200 CE, VIASYS, Germany) ramp running tests to exhaustion. Pulmonary gas exchange parameters were continuously recorded during CRT and IRT. All testing procedures were performed four times: before training program, after each period of training program. Results: The $\dot{V}O_2$ at the first (VT_1) and the second ventilator thresholds and maximal oxygen uptake were significantly increased ($p<0.05$) after PE and HIP training compared with control testing values. After power endurance training session the running speed at the VT_1 was improved ($p<0.05$) compared with control testing. During CRT τ of $\dot{V}O_2$ was increased ($p<0.05$) after R and HIP compared with PE training. Conclusion: Both PE and HIP training seems to have positive significant effect on aerobic capacity in SA.

CONCURRENT TRAINING VS. RESISTANCE TRAINING: EFFECTS ON SKELETAL MUSCLE MORPHO-FUNCTIONAL PARAMETERS

J. Sagim^{1,2}, K. Alev¹, P. Kaasik¹, R. Puhke¹, A. Pehme²

¹University of Tartu, Institute of Exercise Biology and Physiotherapy, Estonia

²University of Tartu, Institute of Sports Pedagogy and Coaching, Estonia

Adaptations to exercise training can be viewed as the modification of the content and/or enzyme activities of specific proteins induced by a given exercise training stimulus. Although each individual bout of exercise is necessary as a stimulus for adaptation, it alone is not sufficient to alter muscle phenotype. A single exercise session imposes a metabolic and physiological demand that acts as a stimulus eliciting a molecular signature typical and specific to the imposed demand. These signal transduction pathways allow integration from physiological stimuli into adaptive tissue responses to co-ordinate metabolic processes in response to exercise. Simultaneously training for both endurance and resistance results in a compromised adaptive gain compared with training with either exercise mode alone. This phenomenon has been explained by the specificity in intracellular signal transduction to endurance compared with strength activity. It has been suggested that concurrent endurance and strength training can lead to conflicting neuromuscular adaptations and might interfere or inhibit strength development. Whereas both endurance and resistance exercise share the same fundamental characteristics of „exercise“ in muscular contraction, elevated energy expenditure and changes in homeostasis, the metabolic and molecular responses to the different modalities are distinct and are reflected in the nature of adaptation. The aim of the present study was to evaluate the adaptive changes in the muscle hypertrophy, strength and MHC isoforms composition evoked by resistance training or concurrent training and to examine to what extent the expected gain in muscle strength is associated with muscle hypertrophy. Subjects: 16 – 18 weeks old male Wistar strain rats were used. Methods: Training programme consisted of aerobic exercise in treadmill and resistance exercise with extra weight in vertical treadmill. Myofibrillar proteins were analyzed using SDS-PAGE and characteristics using histochemical methods. In conclusion: resistance training resulted in the changes of muscle fibres cross-sectional area (CSA), selective regulation of myosin isoforms in skeletal muscles and leads to changes in grip strength. Concurrent training resulted to a lesser extent of changes in CSA, relative content of myosin isoforms and strength characteristics.

DOES PASSIVE HEATING AND COOLING INDUCE ANY MEMORY ALTERATIONS?

R. Solianik, A. Skurvydas, M. Brazaitis, V. Berneckė
Lithuanian Sports University, Kaunas, Lithuania

The aim of the study was to determine the effect of passive hyperthermia and hypothermia on short-term memory. Methods: Twenty four women participated in this study. Eleven women were exposed to heat ($44\pm 0.1^{\circ}\text{C}$) and thirteen women were exposed to cold ($14\pm 0.1^{\circ}\text{C}$) conditions until their core temperature fell to 35.5°C during cooling and increased to 39.5°C during heating. Before and after each condition, three memory tests (visual reconditioning, free and serial recall tests) were performed. Additionally was measured rectal and forearm skin temperature before and after each procedures. Results: Core and forearm temperature was significantly changed ($p<0.05$) during hot and cold conditions compared to control measurement. However, not all participants ($n=5$) reached target temperature during cold condition. Free recall task showed that test duration after heat exposure decreased ($p<0.05$), whereas no changes were observed after cold exposure. Correct answers during both conditions decreased ($p<0.05$) compared to control results. Serial recall and recognition tasks duration and correct answers span did not differ after heat and cold exposures. Conclusion: Research showed that more explicit effort demanding free recall task was impaired by hypo- and hyperthermia whereas simple and short-duration memory tasks (visual recognition and serial recall) were not affected.

AEROBIC AND ANAEROBIC CHARACTERISTICS IN FEMALE LACROSSE PLAYERS

A. Kursīte, I. Pontaga
*Department of Anatomy, Physiology, Biochemistry and Hygiene,
Latvian Academy of Sport Education, Riga, Latvia*

To achieve good results in lacrosse, the player needs high muscle power, good agility and sufficiently high aerobic endurance. The aim of our investigation is to determine female lacrosse players' aerobic and anaerobic physical characteristics and compare them with the same characteristics in women control group. Subjects and methods: Twelve LASE / taxi Lady female amateur lacrosse team players (20 – 25 year olds) and 12 same age untrained control group of healthy women participated in the investigation. The maximal height and power of the squat jump and leg muscles strength endurance during 30 second series of jumps were measured with Fitro Jumper (Slovakia). The absolute and relative maximum oxygen uptake was determined by indirect method performing the step load test on

the cycle ergometer (Ergoline, Germany). The heart rate recovery after the load test was estimated. Results and conclusions: The absolute and relative maximal oxygen uptake is higher, but the heart rate recovery from the maximal value to its value after four minutes of cool down period in lacrosse players is faster than in untrained women ($p < 0.05$). The mean maximal vertical jump height and power are significantly greater in the group of players than in untrained women ($p < 0.05$). The difference between the mean strength endurance in 30 s jumps series in the groups of athletes and untrained persons is not significant ($p > 0.05$). This can be explained by large variation of the results in both groups.

IMPACT OF STRENGTH TRAINING PROGRAM ON PHYSICAL FITNESS AND PSYCHICAL CONDITION OF ELDERLY WOMEN

V. Abramavičiūtė, K. Zaičenkovienė

Lithuanian Sports University, Kaunas, Lithuania

Aging is associated with the loss of muscle mass, muscle strength and muscle fibre mass. The decline in strength and muscle mass has a tight relation with functional limitations and worsening of health condition (Williams et al., 2002; Faulkner et al., 2007; Koster et al., 2011). It has been found that health related problems, living alone, poor communication and activity in social life, feeling of loneliness lead people to social disjuncture (Cornwell, Waite, 2009). There is a wide range of studies carried out investigating the impact of physical activity on physical abilities, but little is known how strength training program as a factor improves psychical condition and, at the same time, body composition, strength and endurance for elderly woman. *Research aim* was to study the impact of an 8-week strength training program on physical fitness and psychical condition for elderly women. *Method:* Research sample included thirteen volunteering women (aged 73.5 ± 7.2), who performed strength training program three times a week (1.5 h) and control group ($n=12$) (aged 74.7 ± 6.6) which did not. Participants of both groups were tested at the beginning and at the end of the study. BMI (Tanita TBF 300, JAV), body composition measures were made at crank web of the dominant hand, chest, waist, hip and femur at the dominant side of the body, psychical condition (HADS), upper body muscle strength (hydraulic hand dynamometer and a 30 s arm curl test), lower body muscle strength (30 s chair stand test) and aerobic endurance (6-min walk and a 2-min step tests) were recorded. *Results:* Significant changes were observed in psychical and in physical conditions only in the experimental group: anxiety symptoms decreased from 12.0 (2.3) to 9.8 (1.6) points ($p = 0.009$), depression symptom from 11.2 (2.9) to 9.2 (1.6) points ($p = 0.04$): the right hand dynamometry measurements increased from 21.3 (3.35) to 27.4 (2.2) kg ($p = 0.001$), and left hand ones: from 20 (3.7) to 25.4 (2.9) kg ($p=0.004$). 30 s arm curl test results changed significantly from 13 (3.3) to 16 (3.2) reps ($p = 0.01$) only in the right hand. Assessment of lower body strength improved statistically significantly from 10.5 (2.3) to 13.3 (2.2) stands ($p = 0.003$) in the experimental group. Significant changes in the aerobic endurance were measured during a 2-min step test ($p = 0.01$); results increased from 63.2 (13.6) to 76.1 (11.3). BMI, body composition indices and 6 – minute walk test for aerobic endurance did not change significantly. *Keywords:* physical fitness, psychical condition, elderly women, strength training.

EFFECT OF PASSIVE HEATING AND COOLING ON ATTENTION**V. Berneckė^{1, 2}, M. Brazaitis¹, A. Skurvydas¹, R. Solianik¹**¹ *Lithuanian Sports University, Kaunas, Lithuania*² *Šiauliai State College, Šiauliai, Lithuania*

The aim of this study was to assess the effect of passive heating and cooling on attention. Research methods: Young and healthy women ($n = 24$) participated in the research. Eleven women were exposed to heat ($44 \pm 0.1^\circ\text{C}$) and thirteen women were exposed to cold ($14 \pm 0.1^\circ\text{C}$) conditions until their core temperature fell to 35.5°C during cooling and increased to 39.5°C during heating. Before and after each condition, three attention tests (action switch to sample, visual sample search, and choice reaction time) were performed. Additionally was measured rectal and forearm skin temperature before and after each procedures. Results: Core and forearm temperature significantly changed ($p < 0.05$) during hot and cold conditions compared to control measurement. However, not all participants ($n=5$) reached target temperature during cold condition. Action switch to sample test time of performance did not change after heating, but significantly ($p < 0.05$) reduced after cooling procedure. More errors ($p < 0.05$) participants made after heating compared with cooling. Visual sample search test duration didn't change after heating compared with duration of testing results in neutral condition, whereas time duration after cooling significantly ($p < 0.05$) increased. Average of reaction time (ms) of choice reaction test did not change significantly after heating compared with duration of testing results in neutral condition, whereas average of reaction time after cooling significantly ($p < 0.05$) decreased. Percentage of correct answers have not been affected after neither heating, neither cooling conditions. Conclusion: Research results showed that heating did not significantly affect attention characteristics, whereas biggest effect of cooling has been found on complex and simple reaction time.

THE CHANGE IN RESULTS OF ELDERLY PEOPLE'S PHYSICAL ACTIVITY BETWEEN YEARS 2005 AND 2012**L. Kreivėnaitė, V. Streckis., K. Visagurskienė., A. Buliuolis***Lithuanian Sports University, Kaunas, Lithuania*

Aim of our study was to explore physical health assessments „Healthy Lithuanian lifestyle“ competition results in period of 2005 – 2012 years and reveal fundamental differences between age and time of the competition aspects. Methods: For data analysis were chosen 60 – 64 and 65 – 69 old participants: men and women. The number of subjects was 244. Analysis of anthropometric data

(Height, Weight, BMI) and different events (Waist flexion (cm), Sit – lie down (rep/30sek), Balance (penalty points) and 1000 meters run (min)) was done. Results: Data analysis among elderly women groups revealed that results of „Sit – lie down” event statistically significantly improved by 7rep/30sek in age group from 60 to 64 years. Also, statistically significant improvements by 5rep/30sek of this event were determined in age group: from 65 to 69 years ($p < 0.05$). The biggest dispersion and age difference among women results was established in “Balance” event. Women of age 60 – 64 demonstrated significantly better results than 65 – 69 old women, in time periods from 2005 – 2006 and 2011 – 2012 ($p < 0.05$). Analysis of elderly man results revealed that the results in „Balance“ and „Sit – lie down“ events of 65 – 69 age group was statistically significantly lower than 60 – 64 age group in time period from 2011 to 2012. Likewise, in the recent years, 65 – 69 age group men results of „Balance“ event was statistically significantly lower than in the previous years ($p < 0.05$). Over the trial period 60 – 64 age group results of „1000 meter run“ event was significant better than 65 – 69 age group results ($p < 0.05$). Margins between other competition results of different age men and women groups are not statistically significant. General features have been found: competition results among elderly women had the biggest dispersion and age difference in “Balance” event. The biggest difference among elderly men groups was determined in “Balance” and “Sit – lie down” events, especially in time period 2011 – 2012. In time period 2005 – 2012, results of „Sit – lie down“ event had tendency to increase between women groups as well as results of „Sit – lie down“ and „Waist flexion“ in 60 – 64 age men group. The minimum result fluctuations were determined in „Waist flexion” and „1000 meter run” events.

NON-FORMAL PHYSICAL EDUCATION IN SCHOOL AS FACTOR FOR INNATE PHYSICAL POWERS TRAINING

A. Šarkauskienė

Klaipėda University, Lithuania

The aim of the study was to investigate the influence of two-year non-formal physical education content on innate physical powers development of 11-13 years old children. Methods and subjects: The study continued for two years in four Klaipėda city comprehensive schools that were selected under the criterion method. Children from two schools were assigned to the experimental group E ($n=119$); children from the other two schools were assigned to the control group C ($n=120$). Considering young adolescents’ participation in non-formal physical education (NFPE) activities, children from experimental and control groups were appointed to one of three groups: E₁ and C₁, E₂ and C₂, E₃ and C₃. At the beginning (2007 – 10,11), in the middle (2008-05), and at the end (2009-05) of the pedagogical experiment, physical development measures and physical capacity

tests were taken and health indices were analyzed under the method of data analysis. Results: During experimental period, children of E₁ group were ill the least. During the second year, their morbidity rate was statistically significantly ($p=0,034$) lower than C₁ group's. Educational content did not affect the changes in height indices ($p>0.5$) but it positively influenced changes in normalization of body mass index of E₁ group girls and boys. Physical fitness results of experimental groups (E₁, E₂, E₃) children in many cases were statistically significantly ($p<0.05$) higher than children' from control groups (C₁, C₂, C₃). Conclusions: Education content as being implemented, while uniting and integrally developing knowledge, abilities, and attitudes as well as applying child activating education methods and forms, positively influences children physical health, physical development, and physical capacity. Keywords: non-formal physical education, 11-13 years old children, innate physical powers.

PHYSICAL ACTIVITY IS RELATED TO BONE MINERAL DENSITY IN UNDERWEIGHT ADOLESCENT BOYS

D. Vaitkeviciute^{1,2}, E. Lätt¹, J. Mäestu¹, M. Saar¹, P. Purge¹, T. Jürimäe¹, J. Jürimäe¹

University of Tartu¹, Tartu, Estonia

Lithuanian University of Educational Sciences², Vilnius, Lithuania

Bone growth reaches maximum velocity during adolescence with more than half of whole body lifetime bone mass accumulated. The aim of this study was to investigate possible relationships between BMD and physical activity values in underweight boys during pubertal growth spurt and to compare them with normal weight boys. Participants were 145 boys between the ages of 12 and 14 years. They were divided into the underweight ($BMI \leq 15.84 \text{ kg/m}^2$) and normal weight ($BMI \geq 15.85 - 21.91 \text{ kg/m}^2$) groups according to the criteria by Cole et al. (2007). Methods: Bone age was determined by left wrist X-ray according to the method of Greulich and Pyle (1959). BMD (whole body – BMD_{WB} , femoral neck – BMD_{FN} , lumbar spine – BMD_{LS}) and body composition parameters were measured using the DPX-IQ densitometer. A uniaxial accelerometer was used to assess physical activity for 7 consecutive days. Results: Underweight and normal weight pubertal boys significantly differed by maturity (pubertal stage), anthropometric (height, body mass), body composition (fat mass, fat free mass), and BMD parameters (BMD_{WB} , BMD_{FN} and BMD_{LS}) except for biological age and physical activity. BMD_{WB} , BMD_{FN} and BMD_{LS} were positively associated ($p<0.05$) with whole body physical activity (TPA) and moderate-to-vigorous physical activity (MVPA) in underweight group. Fat mass (FM) was negatively correlated with BMD_{FN} ($r = -0.577$, $p<0.05$) in underweight boys. Stepwise multiple regression analysis showed that MVPA ($R^2 = 0.336$, $p<0.05$) and fat mass ($R^2 = 0.289$, $p<0.05$) were

the best predictors of BMD_{FN} in underweight boys. Conclusions: In summary, FM was negatively associated with BMD in underweight boys. Moderate-to-vigorous physical activity should be kept as one of the major factors that increase BMD through increasing fat free mass in underweight adolescents.

THE EFFICACY OF A STRETCHING PROGRAM ON HAMSTRING IN STUDENTS OF BACCALAUREATE UTILIZING A BOUNCING STRETCH TECHNIC

**C. A. Becerra Fernandez¹, D. Mayorga-Vega²,
E. Fernández Rodríguez³, R. Merino Marban³**

¹*CES Sagrado Corazón, Málaga, Spain*

²*Physical Education and Sport Department, University of Granada, Spain*

³*Didactics Area of corporal expression, Faculty of Education, University of Málaga, Spain*

Limited hamstring flexibility has been proposed as a possible cause of low-back pain. Different hamstring stretching programmes have showed improvement, but few studies have been conducted in physical education classes. Purpose: The aim of this study was to evaluate the efficacy of a stretching program on hamstring in adolescents utilizing a bouncing stretch technic. Methods: A total of 59 girls belonging to four classes of Baccalaureate (age = 16 years) were assigned to control ($n = 26$) and experimental groups ($n = 33$). The experimental group performed hamstring bouncing stretches for 4 minutes over 8 weeks, two sessions per week, with a stretch duration of 60 seconds and a recovery time of 5 seconds among stretches. It was utilized the dynamic technique during warm-up and during cool-down. The control group followed the standard class program of physical education classes. Hamstring flexibility was measured using the sit and reach test before and after the program. Results: After the intervention period, significant ($p < 0.001$) increases in hamstring flexibility were observed in the experimental group. No significant differences were observed in the control group for the same variable. It was significant differences between experimental and control group ($p < 0.05$). Moreover it was observed a moderate effect size ($TE=0.74$) in the experimental group. Conclusions: The findings of this study shows periodic stretching programs over a 8-wk time frame produce significant changes in hamstring flexibility. Therefore, a hamstring flexibility programme should be incorporated to physical activities at school to prevent decrease of hamstring muscle extensibility.

**EVALUATION OF PHYSICAL DEVELOPMENT AND PHYSICAL
ACTIVITY INDICATORS AMONG VILNIUS SCHOOL CHILDREN
AGED 10 – 17**

V. Kavaliauskas

Lithuanian University of Educational Sciences, Vilnius, Lithuania

Regular physical activity is important for normal development and good health. Physical inactivity among school children has become one of the most acute problems in the world. Insufficient physical activity and sedentary behaviour causes asymmetric muscle development, overweight and other changes in body composition. Aim of the study is to evaluate physical activity among school children and to compare with physical development indicators. Methods: The survey involved 10 – 17 age group schoolchildren from Vilnius (n=100; boys n=53, girls n=47). Physical activity survey was done using Kasari (2007) questionnaire. Height to weight ratio was evaluated in percentiles. The symmetry of lumbar muscle force was measured by static muscular strength endurance in the lumbar area. Posture was evaluated according to Hoeger (1987) method. Flamingo balance test was conducted. Results: Evaluation of the variation in weight to height ratio in boys and girls in percentiles showed that 62% of subjects complied with the standard, 21% of school children had deviations that did not exceed the allowable limit and 17% of children had improper ratio. The static lumbar muscular strength and endurance ratio showed significant discrepancies in 40% of school children. The comparison of the symmetry of bilateral muscles in the lower lumbar region and static endurance showed inappropriate condition among 60% of school children. Posture survey revealed insignificant deviations from the norm (35%). Flamingo balance test showed positive results in the majority of subjects (87%). The evaluation of physical activity revealed that only 14% of schoolchildren were involved in sufficient physical activities. Conclusions: Physical activity among the subjects is low, however their height to weight ratio is satisfactory (62%). Most of the children have either disproportionally developing or asymmetric musculature. The symmetry of lateral musculature and static endurance was insufficient among 60% of school children. The asymmetry of lumbar muscular force did not have a significant effect on balance.

COMPARISON OF THE LIFESTYLE AND SUBJECTIVE HEALTH OF MASTER SWIMMERS AND PHYSICALLY INACTIVE LITHUANIAN ADULT POPULATION

V. Kriaučionienė¹, A. Laukė¹, B. Statkevičienė²

¹Lithuanian University of Health Sciences, Medical Academy, Kaunas, Lithuania

²Lithuanian Sport University, Kaunas, Lithuania

The aim: to compare lifestyle and subjective health between master swimmers and physically inactive Lithuanian adult population. Subjects and methods: The study material about master swimmers was collected by the self-administrated questionnaire, which was filled in by 197 swimmers in 2011. The response rate was 76.1 %. The data of master swimmers were compared to those of the physically inactive Lithuanian adult population. These data were taken from the cross-sectional postal surveys of randomly selected nationally representative sample of 3000 Lithuanian inhabitants aged 20 – 64 in 2010. In total, 1997 persons participated in this survey. Both questionnaires included similar questions on socio-demographic information, self-reported health and health behaviours. Results: A lifestyle of swimmers was healthier in comparison to physically inactive adults. The majority of swimmers exercised daily: swam 3 times a week (75%) and chose other physical activities 3 times a week (69%). The principal motives for exercising were the possibility to maintain their health and delay ageing, to have better shape and look. More master swimmers were non-smokers and they consumed alcohol less often if compared with physically inactive adults. The most of the swimmers (81%) and 42% of physically inactive adults assessed their health as good or reasonable well. Almost all health complaints: high blood pressure, headache, nuchal aches, backache (in women), articular aches (in women), insomnia and depression were less prevalent among swimmers compared to those in physically inactive adults. Conclusion. The study data highlight the need for future physical activity promotion programme targeting the whole population.

PHYSICAL ACTIVITY AND DIETARY HABITS OF UNIVERSITY STUDENTS

H. Vecenāne

Liepāja University, Liepāja, Latvia

The World Health Organization (WHO) particularly highlights the actions that need to be taken in account to draw attention to preventive health-promoting effects, with particular emphasis on healthy eating and physical activity. The aim of the research is to define University students` physical activity and dietary habits.

Materials and methods: Students` physical activity is defined using survey method based on Godin Leisure –Time Exercise questionnaire, adjusting it to the goals of our research. The questions were added about daily physical activities and opportunities to participate in physical activities organized by the university. Dietary habits were defined with questionnaires, in which were included healthy and unhealthy food variations (from previous day's food intake). For data analysis traditionally was employed SPSS 16.0 programme. The participants of the research: 158 full time and 52 part time students of Liepaja University and Riga Stradins University Branch of Liepaja. The research results indicate that full time and part time students have sufficient daily physical activity, but 53.8% of full-time students and 39.9% of part-time students are involved in physical activities, providing additional health benefits (WHO recommendations). According to student self-assessment, 31 % of full time students and 49.9% of part time students use good nutrition on daily basis. Key words: students, physical activity, dietary habits

ASPECTS OF EDUCATIONAL ACTIVITY OF THE LITHUANIAN SPORT MUSEUM IN THE EDUCATION OF SCHOOL CHILDREN

D. Majauskiene, A. Kuzmiene

Lithuanian Sport University, Kaunas, Lithuania

Research aim: to analyze the aspects of educational activity of the Lithuanian Sport Museum in the education of school children. Research methods: Analysis of documents of the museum, analysis of literature sources, systematization and generalization of the research material. The first exposition of the museum was opened on the 27th of December 1993. During the decade of activity of the museum, over twenty eight thousand students have visited the museum. On the basis of the visual material shown in the exposition, the workers of the museum prepared a survey sport history lesson for students with the presentation. Moreover, school children are shown films about events of the sport history of Lithuania in an educational classroom of the museum. Every year stationary and movable expositions are organized at the museum for the commemoration of different kinds of sport, anniversaries of sportspeople and commemoration of significant sport events. The museum organizes meetings with sport veterans and famous sportspeople for school children and contests of essays and sport competitions. The museum propagates ideas of physical culture and sport among school children, organizes educational lessons, issues publications, organizes meetings, contests and competitions and helps school children to write papers. Educational activity of the museum both encourages an interest of school children in physical culture, sport and a healthy way of life and pride in the own nation, so the cooperation and communication between school children of the Lithuanian Sport should be encouraged.

6TH BALTIC SCIENCE CONFERENCE

6TH BALTIC SCIENTIFIC CONFERENCE
SPORT SCIENCE FOR SUSTAINABLE SOCIETY
(ORAL AND POSTER PREZSENTATION)

Student Athletes' Perceptions of Career Transition in Sport and Higher Education

A. Fernate

Latvian Academy of Sport Education, Riga, Latvia

Student-athletes with a focus on combining sport and studies, especially on the university level, is the line of research, which is very often applied in terms of focusing on strategies for helping student-athletes to successfully combine sport and studies: to plan their careers in and outside sports, to develop and use transferable life skills, to prepare for athletic retirement (*Carr & Bauman, 2002; Mayocchi & Hanrahan, 2000; Petitpas, Champagne, Chartrand, Danish, & Murphy, 1997*). Coaches, professors and administrators working directly with student-athletes need to become aware of the details of their experiences in career development; this will help to prepare in a timely manner athletes for normative career transitions and to prevent athletes' crises. Aim of the study was to explore student athletes' perceptions of the athletic career transition process. Participants (n=64; 24 females, 40 males) were student athletes (age from 19 to 24 years) of Latvian Academy of Sport Education (LASE) who identify themselves as athletes. Methods: theoretical – analysis of scientific literature; data collection – a semi-structured online interview for obtaining qualitative data, based on Analytical athletic career model (Stambulova, 1994, 2000) with six normative career transitions of an elite athletic career; data processing methods – open and axial coding (AQUAD 6); mathematical statistics – One-Sample Kolmogorov-Smirnov Test, Spearman rank correlation, etc. Results, conclusions and discussion. Mostly LASE student-athletes successfully combine sport and studies. Participants expressed the opinion that for the process of career transition more important than academic success is athletic success. The student-athletes' transitions within the athletic career have been seen as a more important topic than athletic retirement. Only one student – athlete planned retirement in advance. West European athletes did this significantly more often than East European athletes, confirming that individualist cultures tend to be also planning cultures (Triandis, 2004).

**HOW TEACHER MOTIVATION IS RELATED TO THE STUDENTS
MOTIVATION AND PHYSICAL SELF ESTEEM: A CROSS-
CULTURAL EVALUATION**

V. Hein¹, A. Emeljanovas², J. H. Ekler³, I. Valantine²

¹Faculty of Exercise and Sports Sciences, University of Tartu, Estonia,

²Lithuanian Sport University, Kaunas, Lithuania

³Department of Sport Science, University of West Hungary, Hungary

The teaching learning is a mutual process between teachers and students. Whereas in previously, the links between different teaching styles and pupils' motivational goal orientations have been reported (Salvara et al., 2006), now evidence exists how the teachers' motivation to teach is related with students' motivation. Therefore, the aim of this study was to investigate the process by which the teachers' motivation will transfer to the students' motivation and how it is related with physical self-esteem. Methods: The samples of 69 teachers and 2154 students, 13-16 yrs. olds, from Estonia, Lithuania and Hungary were used for this study. The teacher motivation was assessed by the items developed by Roth et al (2007). The items presented by Standage et al., 2005 were used to measure students' motivation and perceived psychological needs for autonomy, competence and relatedness among students. Physical self-esteem was measured by scale of Marsh et al., 1994. Confirmatory factor analyses were used to test the appropriateness of the questionnaire and path model for predicting students' motivation and physical self-esteem. Results. Teacher motivation to teach was related with student's motivation via the autonomy need satisfaction only among female teachers and girls. Indirect effect from teachers' motivation to students motivation was statistically significant ($\phi=0.26$). No correlation was found between male teachers' motivation and boys' motivation. Estonian teachers were intrinsically lower motivated than Lithuanian and Hungarian teachers but students were higher motivated. No difference was followed in respect of physical self-esteem between Estonian and Lithuanian students. Physical self-esteem was significantly lower in Hungarian students than Estonian students.

THE DIRECTION OF FUNCTIONAL ASYMMETRY AND LEARNING PERFORMANCE IN CHILDREN AND YOUTH

C. Kuśnierz

Faculty of Physical Education and Physiotherapy, Technical University of Opole, Opole, Poland

The purpose of this work is to investigate the relationships between the functional asymmetry preference and the school performance among school children and youth. A question was stated regarding the direction of functional asymmetry in examined subjects and the potential relations between the direction of asymmetry and learning performance. Subjects and methods: Laterality preference test developed at Wrocław Academy of Physical Education was used as the study method. With the aid of this test the direction of the functional asymmetry was determined on the basis of the observation of the subject's free choice of his/her dominant eye, hand and leg. In addition, the study involved an analysis of school records and school grades were used as a measure of school performance. Results: The analysis of the results of functional test with regard to the eye and limbs revealed differences between pupils in primary and junior secondary school in terms of the course of laterality process. This difference mostly regards the determination of dominance in terms of handedness. The conducted tests partly confirm the assumed hypothesis about the positive effect of homogeneous laterality. A relation between the direction of functional asymmetry and learning performance was indicated. This in particular concerns primary school girls and boys in junior secondary school. Conclusions: The results indicate a necessity of examining the process of laterality and the need of controlling this process as a result of applying appropriate motor activities. Such a process could have an effect on the results gained by the children at school. Keywords: laterality, functional asymmetry, relationships with learning performance.

COOPERATION DIRECTED LEARNING IN INCLUSIVE PHYSICAL EDUCATION

A. Kļavina¹, L. Kristen², L. Hammar³, K. Jerlinder⁴, T. Soulie⁵

¹Department of Physiotherapy and Sport Medicine, Latvian Academy of Sport Education, Latvia

²School of Social and Health Sciences, Halmstad University, Sweden

³The National Agency for Special Needs Education and Schools, Sweden

⁴Faculty of Education and Business Studies, University of Gävle, Sweden

⁵Danish Disability Sport Information Centre, Denmark

Aim: In this study the implementation of cooperation directed learning of peer tutoring in elementary general inclusive physical education (GPE) setting in three elementary city schools in Sweden was studied. The purpose was to assess the impact of peer tutoring on the interaction behaviors between students with and without disabilities in GPE. **Subjects:** A design of multiple case study with elementary school age students with moderate disabilities (n=4) was used. Peer tutors (n=37) were students without disabilities who voluntarily participated in peer tutor training program. The program included the collaborative learning values, teaching instructions and communication skills served as the independent measure. Dependent measures were multiple interactions between students with and without disabilities. **Method:** Totally 43 observation sessions of inclusive GPE settings were collected on videotapes and analyzed using the Computerized Evaluation Protocol of Interactions in Physical Education (CEPI-PE). In addition, interviews with school personnel and children served as a complementary study outcome. **Results and Conclusions:** The percentage of interactions between target students and peer tutors significantly increased (3.2% to 11.8 % respectively, $p < .05$) during peer tutor intervention. This study indicated that peer tutor arrangements can contribute the successful cooperation between students with and without disabilities in inclusive GPE in Swedish elementary school. All four students with moderate disabilities maintained high percentage of activities done independently throughout baseline and intervention phase (50.5% and 57.6%, accordingly). Interviews confirmed a positive class climate change and improvement in peer relation culture.

LEARNING OUTCOMES ASSESSMENT IN SPORT TEACHER QUALIFICATION OBTAINING IN LATVIAN ACADEMY OF SPORT EDUCATION

R. Jansone, I. Immere, A. Fernāte

Latvian Academy of Sport Education, Riga, Latvia

Education process in Latvian Academy of Sport Education is directed to provide all education level teacher adequate preparation and qualification. Everyone in any country has the right to a quality education. The quality of education is determined by the contributions in pupil preparation, teacher qualification, environmental organization, investment in education, and the planned outcome. Contextual approach to quality is not determined; it depends on the creativity and continuous development. All members of the educational process should be aware of assessment goals and accordingly developed assessment criteria. Education International (Cape Town, 2011) accepts the role of the professional management in securing quality education. In education process it is essential to enhance current and future teacher autonomy and professional development. It requires a high degree of qualification, based on scientific and empirical research. The aim of the research: the assessment of future sport teacher learning outcomes in the context of the acquisition of basic qualification. Research object: measurable learning outcomes. Research subjects: students, obtaining the qualification of sports teachers. Hypothesis: the assessment of different learning outcomes will allow the adjustment of sport teacher qualification program in LASE and qualification descriptors, included in it. Learning outcomes assessment approach is the basis for an objective study achievement assessment. In the result of the research will be obtained assessments of future sports teacher's ability to develop lessons, choose their content, conduct them using holistic approach, critically analyze their performance and make decisions for the improvement of their qualification. Education leaders will use the obtained results in long-term program changes.

LATVIAN HANDBALL PLAYERS' EFFECTIVENESS IN COMPETITIONS DEPENDANCE ON PSYCHOLOGICAL INDICATORS

Z. Vazne¹, E. Politers²

¹Latvian Academy of Sport Education, Riga, Latvia

²Latvian National Handball Team, Latvian Academy of Sport Education

The research aim of this study was the evaluation of the effect of psychological factors on the place and goals scored in competitions by a

handball team. The research methods included: GEQ test (Widmeyer et al., 1985) adapted version, CSAI-2 (Martens et al., 1990), documental material analysis and mathematical statistics. The research subjects were Latvian handball male players who participated in Latvian Handball Championship 2012 (n=179). Three hypotheses were put forward in the research: the first, there are correlations between the team's cohesion scales, self-confidence, the place and the number of goals scored by the team; the second, the place got by the team in competitions is affected by self-confidence, and the indicators of the team cohesion scale content; the third, the number of goals scored by the team in competitions is affected by self-confidence and the indicators of the team cohesion scale content. Results and conclusions: The place won by the team weakly correlated with two cohesion scales of the team ATG-T, GI-T and self-confidence. The number of goals scored weakly correlated with GI-T and self-confidence. In the case of the games won there was positive correlation between the three cohesion scales of the team and the indicators of self-confidence ($p < 0.01$). The models of linear regression were not appropriate to describe the researched effect of psychological variables on the place won in the competitions. In our research the effect of psychological factors on the number of goals scored by the team varied from 19.1% (if the model included only self-confidence indicators) up to 59.7% (if the model included all five researched psychological factors: self-confidence and the team cohesion scales – ATG-T, ATG-S, GI-T, GI-S). Applying the backward regression method, the ATG-S scale was eliminated from the model. Only the first and the second hypotheses proved to be true ($p < 0.000$). Keywords: self-confidence, team cohesion, correlation analysis, regression analysis.

SPORT STUDENT FOREIGN LANGUAGE LEARNING AND USE HABITS

I. Rudzinska

Latvian Academy of Sport Education, Riga, Latvia

Numerous investigations show that female verbal skills are superior to those of males. However, several investigations about sport students reveal that verbal skills are gender unbiased (Omrčen, Bosnar, 2010; Rudzinska, 2011). Reasons can be physiological (sport student increased level of testosterone), psychological (increased self-esteem) and social (communicating in training, camp and competition international environment). The aim of the research is to analyze sport student foreign language (English) learning and use habits in longitudinal scale (past, present and future prospective). Subjects: 35 Latvian Academy of Sport Education Full and Part time students. Methods: mixed –

qualitative and quantitative. Initially were conducted free interviews with three students, qualitative analysis of which allowed designing a questionnaire, consisting of 12 statements with responses in 4-point Likert scale. Results were analyzed with SPSS 17.0. Results show that students learn and use English both in sportive and non-sportive environment. At present students use English more than in past, in future more than in present, and in future much more than in past ($r=0.5$, $p<0.001$). However, most of them self-assess their English use skills as moderate, and only about half of them admit that sport in the past helped learning English and at present helps learning English (45.7%). Conclusion: active sporting life promotes foreign language learning; however it cannot be the only cause for bridging gender gap in language use skills. Also psychological and physiological causes have to be investigated.

FORMATIVE ASSESSMENT – ASSESSMENT FOR LEARNING

L. Zeiberte

Latvian Academy of Sport Education, Riga, Latvia

Education, informed by humanistic ideas, has to be oriented towards personal autonomy and human solidarity. Essential part of learning-teaching process is assessment and evaluation of outcomes. *Formative assessment* is continuous process in which students and teachers engage to monitor learning and to inform future instruction, but *summative assessment* is the term usually given to measuring the amount of knowledge, skills, abilities student has at a particular point in time. The purpose of research is to examine theories of formative assessment: to identify what we mean by formative assessment, characterize the main tools and the impact it can have on student learning. The results. In educational literature formative assessment has been defined in a variety of ways, each providing slightly different insights into the concept. The characteristics of formative assessment include: intended teaching- learning outcomes are stated and shared with students; assessment opportunities are designed to collect evidence for information of improvement; formative feedback to each student; student involvement in the assessment process and planning their own next steps for learning.

EVOLUTION OF STUDENT OPINION ABOUT THEIR STUDIES AT LATVIAN ACADEMY OF SPORT EDUCATION

A. Rudzitis, U. Gravitis, A. Spunde

Latvian Academy of Sports Education, Riga, Latvia

The main purpose of the study was to determine the cyclical nature of problems the student's face, their opinion about their involvement in order to better inform changes made. This student-centered information is required as a basis for student-centered curriculum. Subjects and methodology: Eighty-two LSPA year one and seventy-six year three students anonymously answered twenty-six questions about their studies at Latvian Academy of Sport Education, evaluated the degree, to which their opinions changed with experience gained in the period of three years. Results: The answers were obtained to the questions about their courses during the three-year period, about the content of the courses, the barriers to obtaining knowledge, the division of lectures in semesters and weeks, about the evaluation of the lecturers, their attitude toward students, about the governance of LSPA, and student motivation for choosing LSPA. The analysis of the results showed that the third year students were much more critical about the curriculum and course content than the first years students. The first year students, in turn, were more critical of the work of the lecturers and governance. Third year students combine employment and studies. They are also more cautious in talking about their futures in the chosen professions. On the whole the answers to five questions in both groups differed for more than 40%, to nine questions: for more than 30%, to 8 questions: for more than 20%, to three questions: for more than 10%, and, finally, to one questions there was no significant difference between the answers of the two groups. Conclusions: The third year students give a more positive evaluation of the course content, curriculum and scheduling, but are more critical of the governance of LSPA. Besides, fewer respondents are positive about linking their futures to their chosen professions. First year students, in their turn, are more positive about the curriculum, but more critical in their evaluation of the work of the lecturers. Besides, most of them do not combine employment with their studies at LSPA.

PSYCHOLOGICAL SKILLS IN SPORT

I. Simonenkova

Latvian Association of Sport Psychologists, Riga, Latvia

The mental or psychological skills of athletes have always been of interest to practitioners and researchers. There are athletes who are said to have a lot of potential but never seem able to reach it (which means the athlete is physically skilled but does not have equivalent mental skills). On the other hand, there is the gamer, who does not excel in practice, but always seems to perform above expectations during actual competitions. When athletes are asked about how important the mental side of the game is, they usually say it is very important (95 %). There is little doubt from practical point of view that mental skills are critical to the success of athletes. Researchers are interested, whether athletes can learn these mental skills. If there are such things as mental skills, can these skills be measured and quantified? Players learn and practice mental skills in the same way as technical or tactical skills. The process of athletes learning these different self-regulation skills (imagery, relaxation, goal setting, self-talks) is known as psychological skills training. Similarly with physical skills, such psychological skills as maintaining and focusing concentration, regulating arousal levels, enhancing confidence, and maintaining motivation, require systematic practice and refinement. Psychological skill training has become a critical part of the sport psychology consultant's orientations. Of course, within this general orientation, there is diversity in the techniques for assessing the current strengths and weakness in psychological skills of a specific athlete. Several sport-specific inventories have been developed to measure different psychological skills. Most of initial scales assessed only one specific psychological skill or trait; more recently multidimensional inventories assessing variety of skills have been developed.

EVALUATION OF WORLD YOUTH OLYMPIC GAMES FROM THE PERSPECTIVE OF YOUNG LATVIAN ATHLETES

A. Gulbe

Latvian Academy of Sport Education, Riga, Latvia

World Youth Olympics games (YOG) are unique because, unlike the Olympics Games, alongside with sporting events take place special Culture and Education program (CEP), the aim of which is to promote the Olympic values, as well as the sharing of views and experiences among different cultures, making the world YOG a unique sports and culture festival. Up to now have been held

already two World Youth Olympic Games (YOG), in which participated 14 – 18 years old young people, who in August, 2010 in Singapore competed in summer sports, and in January, 2012 in Innsbruck: in winter sports. Aim: the development of events in CEP of World Youth Olympic Games and its role in young athlete life. The methods of the research: questionnaire, the method of mathematical statistics. Research Results: Latvian young athlete survey results showed that most of the athletes surveyed (91%) believe that the CEP is an integral part of the Olympic Games and it should be continued also in the future. All Latvian athletes – YOG participants - found time to participate not only in competitive sports, but also in the activities of CEP. All respondents believe that the organization of such games is necessary and for the majority of the respondents participation in YOG gives an opportunity to gain experience to further develop their sports career. Young people need their World Olympic games in order to be helped to see true life values in the age, when they undergo decisive stage of their lives. Young people should learn to plan and balance their time in the conditions of fierce competition, thus preparing Game participants for professional athlete life. YOG are an alternative to the classical Olympic Games, which become more and more commercialized, increasingly expensive and elitarian, therefore in YOG many competitions are held in a form, which is more accessible for young people. As the most significant benefit YOG participants mention the opportunity to gain experience necessary for further development of their sports career (86.4%). This result suggests that young athletes want to continue their career in the field of sports and seek the opportunity to participate in the Olympic Games, which is the biggest dream of all athletes.

Emotional experiences of adolescents in sport

A. Budreikaitė

Klaipeda University, Klaipeda, Lithuania

The aim of the research: to reveal, on the basis of the diagnostic study, adolescents' (11-13 years old) situational emotional experiences in relation to themselves and others. Research methods: analysis of relevant scientific research, used by the author of emotions, a questionnaire, statistical analysis. For determination of emotional level the author's questionnaire of emotions was used, which allowed to determine the expression of emotional experiences of the participants of the research, and the stability of their emotional experiences in relation to themselves, as well as to other people (a friend, a teacher, a team, a competitor). The most significant positive emotions (trust, joy, hope, admiration, compassion) and the most significant negative (anger, shame, fear, sadness, guilt) emotions were researched. Subjects: Adolescents (11-13 years old) were selected randomly from 8 schools of general education

from different parts of Lithuania and from different towns in size: Vilnius, Klaipeda, Plunge, Telsiai, Raseiniai, Sakiai, Vidukle. They were selected according to incidental convenient selection method. There was a diagnostic research carried out. The representative group consisted of 708 adolescents (11 – 13 years old): 11 – 12 years old (49.6%), 12 – 13 years old (50.4%). The results of the research revealed that emotions are closely linked to the moral values of fairness, generosity, responsibility, sensitivity, and revealed the stability of positive emotions in adolescents' relations with themselves and other people. A strong correlation was found between positive and negative emotional experiences that occur in relation to themselves and others (friend, physical education teacher, teammates, and competitors). A more detailed analysis revealed that the negative emotions (fear, shame, anger, sadness) are even more linked than the positive (joy, admiration, trust). Such common adolescent feelings as fear, shame, and anger can affect their emotional instability. Keywords: adolescents, situational emotional experiences in relation to oneself and others, emotional experiences in sport.

FACTORS INFLUENCING 5TH – 8TH GRADE STUDENTS' ABILITY TO PARTICIPATE AND ENJOY PHYSICAL EDUCATION

A. Emeljanovas, E. Petrylaitė, L. Trinkūnienė
Lithuanian Sport University, Kaunas, Lithuania

The paper analyses the factors that influence the 5th – 8th grade students' enjoyment in physical education class. Object: students' enjoyment in physical education class. Goal: to determine the factors that influences the 5th – 8th grade students' enjoyment in physical education class. In order to achieve the above goal, the following tasks are defined: 1. to determine the intrinsic factors of achievement and nonachievement in physical education class within the 5th – 8th grade students and according to their sex. 2. To determine the extrinsic factors of achievement and nonachievement in physical education class within the 5th – 8th grade students and according to their sex. Methods. The analysis is based on a questionnaire from the article 'The fun factor in physical activity' (2006) by C. Garn Alex and J. Donetta Cothran. Conclusions: 1) The intrinsic achievement factors are less important to boys than girls. Boys find success and confidence most significant while girls are more focused on learning new things, testing their own strength and also performing well compared to other classmates. The main factors of the intrinsic achievement that influenced both sexes are success and confidence. Boys find it critical for physical educations classes to be filled with fun activities that reduce stress; therefore, the intrinsic factors of nonachievement relate to satisfying their needs. The girls find it

crucial to realise their potential while having fun and to have an opportunity to choose the activity. 2) The extrinsic factors cause most fun in physical education class for both groups of students. They are associated with pride and personal achievements, i.e. achievement in physical education classes and chance to perform better than others. Girls are mainly influenced by achievement in physical education classes, an opportunity to perform better than others and recognition. While boys find winning in the class as the main factor of fun. The main factor of extrinsic nonachievement is the environment in the class and its elements such as teacher and friends.

COACH OPINION ON THE PROVISION OF COACH CONTINUING EDUCATION IN LATVIA

M. Jakovleva

Latvian Academy of Sport Education, Riga, Latvia

The aim: investigate and evaluate coach opinion about benefits and drawbacks of provided coach continuing education. Subjects: 191 sports coaches (aged 20 to 71, professional experience: 1 to 30 and more years, gender – 72 females (38%) and 119 males (62%) – coming from various regions of Latvia, working in different sports and having various levels of education), involved in the professional development program “Development of the competence of pedagogues involved in vocational education” of ESF project "Competent sports pedagogue", took part in the study. The following methods were applied: empirical methods: coaches' inquiry - questionnaire; data processing methods for qualitative data processing: coding, metacoding, cluster analysis (Jaccard similarity coefficient), and result interpretation, using QSR NVivo9 software. Results: Summarizing coach (n =191) opinion about the opportunities of continuing education in Latvia (the open question of the questionnaire), positive and negative aspects were found, which they consider important in the provision of continuing education. The analysis of coach opinion helped identifying two characteristic groups, expressing positive evaluation – benefits, and negative evaluation – drawbacks in the provision of continuing education. Coaches positively evaluate the organization of continuing education and the development of professional competence, but negatively: the contents and organization of the courses and attitude to sports coaches, based on society higher instances negative attitude towards sports. Conclusions: In coach continuing education not all coaches are satisfied with the provided offer, because in their opinion their needs are not taken into account. In the provision of coach continuing education should be considered coach needs, widening the range of themes and their content, organizing seminars in particular sports, as well as improving society higher instances attitude to sports and continuing education of sports coaches.

ATHLETES AND COACHES' EDUCATIONAL INTERACTION STRATEGIES IN ELITE SPORT

S. Sabaliauskas, S. Poteliūnienė

Lithuanian University of Educational Sciences, Vilnius, Lithuania

The aim of the work: to disclose athletes and coaches' educational interaction strategies in elite sport. Subjects and methods: Grounding theory method was applied in the research, which allowed investigation of interactions and phenomena under specific educational environment conditions. Data was collected applying semi-structured interview. The research embraced purposeful group, compiled of 13 elite athletes and their 9 coaches. Analysis on strategies, used by educational interaction participants, highlighted the fact that both coaches and athletes rather widely apply various strategies, encouraging an athlete's constant improvement in achieving high sport results. The results of this research showed: athletes in their strive for high sport results apply individual preparation strategies, targeted at (1) their own personal features' perfection and overcoming of stressful situations, (2) sport and professional career planning, as well as at searching for effective coach-athlete cooperation style. Coaches apply strategies, aimed at (1) sport preparation planning and organization (training process management strategies and various pedagogical impact means in motivating an athlete); (2) strategies, related to own competences development as a coach, as well as related to (3) athlete's personality understanding and athlete's personal features development. Conclusions: Educational factors which have negative influence of athlete's motivation for elite mastership achieving are the following: coach's non-professional behavior and poor communication skills, inadequate strategies application after athlete's failure in competitions, different athlete and coach's expectations, instability of sport training strategy, as well as coach's surrender to external factors.

CORRELATION AMONG BULLYING, SELF-ESTEEM AND ANXIETY OF 12 – 15 YEAR OLD ATHLETES

I. Tilindiene

Lithuanian sports university, Kaunas, Lithuania

The object of the study: bullying, self-esteem and anxiety of 12 – 15 year old adolescents. The aim of the research: to investigate correlation among bullying, self-esteem and anxiety in 12 – 15 year old athletes (swimmers, basketball players). Methods and subjects. The study applied I. Shostrom's modified self-esteem scale questionnaire which included 26 items; the adapted *Bullying Scale*

for *Schoolchildren* with 11 open and closed questions (United Kingdom, York) and Anxiety questionnaire (Petrulytė, 2003) with 30 closed questions (answers were grouped in three groups of anxiety: anxiety related with a group (team) work; anxiety related to interpersonal relations in group (team) and anxiety related to self-esteem). Survey was carried out in the year 2011 selecting randomly 250 participants, 12 – 15 year old athletes adolescents (120 girls and 130 boys; 128 swimmers and 122 basketball players) from various sports schools of various Lithuanian cities. The sports participants (athletes) no less than two times per week attended sports practice sessions at sports schools or clubs and no less than for one year they had been participating in competitions. Conclusions: 1. Half of the examined 12 – 15 year old adolescent athletes (48 proc.) suffer bullying. Basketball players experience bullying more often than swimmers ($p < 0.01$). Significance of gender factor for the frequency of experienced bullying in this study was unobserved. Half of the examined 12 – 15 year old adolescent sport participants (53 proc.) initiate bullying themselves. Boys initiate bullying themselves more often than girls ($p < 0.001$). Significance of sport factor for frequency of initiated bullying in this study is unidentified. 2. Boys ($p < 0.01$) (by the aspect of sport – swimmers ($p < 0.01$), who easily socialize with other intelligent people, do not experience bullying. Boys ($p < 0.01$) (by the aspect of sport - swimmers ($p < 0.001$), who do not succeed very often because of infirmity of purpose experienced bullying. Boys who do not succeed sometimes because of shortage of willpower were bullying themselves at coevals ($p < 0.05$). Both girls ($p < 0.001$), and boys ($p < 0.01$) and swimmers ($p < 0.01$) never experienced bullying and never felt themselves worse than class-fellows. Boys ($p < 0.01$), and basketball players ($p < 0.01$) never initiated bullying and felt themselves worse than class-fellows. Mostly bullying girls stated that always seek to perform their tasks perfectly ($p < 0.05$), the same asserted basketball players ($p < 0.01$). 3. A connection between jeers and anxiety related with interpersonal relationships in a group (team) may be linked to the factor of sex. Girls, who suffer from bullying more than boys, are characterized by anxiety related with interpersonal relationships in group (team) ($p < 0.04$). Swimmers suffer from jeers and anxiety related to self-evaluation more often than basketball players ($p < 0.01$). A connection between initiated bullying and anxiety related to group (team) work, which may be linked to factors of sex and sports, is statistically significant to girls ($p < 0.05$) and swimmers ($p < 0.01$). A connection between initiated bullying and anxiety related to self-esteem also may be linked with factors of sex and sports. In this study it is statistically significant for boys and swimmers. Boys, who initiate bullying more than girls are characterized by an anxiety related to self-esteem ($p < 0.05$), considering aspect of sports, swimmers initiating bullying more often than basketball players are characterized by anxiety related to self-esteem ($p < 0.05$). Keywords: bullying, self-esteem, anxiety, adolescents, sport.

FACTORS OF THE PROFESSIONAL MOTIVATION OF THE SPORT PEDAGOGUES IN BULGARIA

D. G. Tsonkova

Veliko Tarnovo University “St. St. Cyril and Methodius”, Bulgaria

The interest in the chosen topic is a result of the fact that the dynamic changes in the socio-economic life of Bulgaria logically lead to a change in the professional motivation of sports pedagogues. Therefore, it is necessary that the factors influencing it are permanently studied and analyzed. The main purpose of the current article is to determine the key factors of the sports pedagogues' professional motivation under the terms of the present educational reality in Bulgaria. Methodology and Organization: Data is used from a survey conducted in the period 2011 – 2012 with teachers of physical education and sports as well as personal observations on the professional activity, impressions of discussions with teachers, school principals and experts. Results: Based on the received results the key factors that are essential for the professional motivation have been brought out. They are considered into two groups – motivating and demotivating. They are supported by data and explained in terms of the theory of the unity of activity and personality. Conclusion: The analysis carried out and the conclusions are important in the search for effective mechanisms for maintaining the interest in the teachers' profession and in promoting professional development in the field of sports education.

THE STATE'S ROLE IN THE DEVELOPMENT OF PHYSICAL EDUCATION IN RUSSIA IN THE PRE-SOVIET PERIOD

D. Belyukov

*Velikiye Luki State Academy of Physical Education and Sport, Velikiye Luki,
Russia*

Aim: To study the state's role in the development of physical education in Russia in the pre-Soviet period. Methods: Analysis of historiography and unpublished sources. Results: The ideas of using various physical exercises necessary for education of the full-blooded person started to get into Russia from Western Europe during Catherine II epoch. In 1804 emperor Alexander I approved the Charter of educational establishments which provided the introduction of physical exercises. In the paragraph 8 of the Charter it was announced: «the Grammar school can also have teachers of Dancing, Music and Corporal Exercises (Gymnastics) if its incomes allow it». Gymnastics should be practiced in the middle of the day. After the Serfdom was cancelled

the public activity in physical education questions was increased. In 1862 the decision of the Ministry of national education on introduction of gymnastics in grammar schools was set up. In 1864 a new charter of grammar schools and pro-grammar schools of the Ministry of national education was published. It provided the introduction of the gymnastics teacher into the staff of educational establishments and purchase of gymnastic equipment. At the same time, gymnastics remained an optional subject and was taught only for students who were interested in it. In 1870 gymnastics was included in the program of teacher's seminars, and in 1872 – In the program of non-classical secondary school and all students were taught it free of charge. Military reforms of 1870s had great influence on the development of gymnastics at school. The problem of physical training of recruits was supposed to be solved by means of gymnastics that is why the leaders of the Military Ministry insisted these gymnastics classes became the compulsory at any secondary schools. Conclusion: The government was slowly introducing the elements of physical education in the system of education in Russia.

PERSONALITY OF LECTURER IN GYM CLASSES

A. Homiča, U. Jermakova

State Police College, Riga, Latvia

Aim: lecturer personality professional competence improvement in study process. Objectives: Lecturer personality growth in communicative, professional and management field. The development and improvement of lecturer skills in order to be able to use them in professional situations. Methods: sporting theory and methodology, pedagogy and psychology literature analysis. The quality of study process is defined not only by the content of studies and pedagogical proficiency of lecturers. The important aspect is what we teach and how we teach. We talk about the role of the lecturer personality in study process. The role of the lecturer personality in study process is directly connected to his authority, personality effect and tendency to tell the truth. Tendency to tell the truth is the mission of lecturer and his actualization area that promotes the development of students' creative thinking. We can mention such basic ethical requirements in lecturers' relationships with students as: exactingness, benevolence, naturalism, principality, self-control, pedagogical optimism and balanced behavior. In contact with the lecturer, students not only acquire knowledge but also develop their behavior and culture of thinking. Key words: lecturer, professional competence, study process

**PUPILS' PHYSICAL ACTIVITIES AT SCHOOL
(GRADE 2) (PILOT STUDY)**

I. Bula-Biteniece, E. Majore

Latvian Academy of Sport Education, Riga, Latvia

Pupils spend a significant part of their lives at school. In an elementary school pupils spend on average from 5 to 8 hours. Passivity and sedentary position there occur often. In the school environment, the necessary daily movement is barely provided, mostly only as much as to go to the cafeteria, gym, WC, library or the nearby classroom. The amount of physical activity is up to the pupils themselves and their motivation. According to scientific evidence, everyday physical activity is necessary at any age. The younger students (7 to 12 years old) need to have at least 1 hour of physical activity every day. One of the reasons of sedentary lifestyle among children and teens is that most of them (especially younger ones) are not provided with a safe pedestrian's path or bicycle track to reach their school. Tasks: Record physical daily activities of pupils at school with the use of pedometers; determine the expectations of the students in terms of improving the level of physical activities at school; fix pupils physical activity out of the school environment. Methods: pedometry, observations, interviews, survey. The process of the research: a pedometer was applied to the participants every morning at 8 am with me observing them throughout the day. I continued my observations also during extracurricular lessons (Physical Education, Rhythmic, Music). Pedometers were removed, when the lessons ended. Usually, it was at 1:30 pm. Pupils walked with a pedometer for five hours every day. The Basis of the Research: altogether 16 pupils took part in the research, 9 of them were males and 7 were females. The survey was carried out in terms of determining their physical activity. Summarizing the results it was found that 12 pupils consider themselves as active, 14 pupils would like to be more active at school. We found out that 10 of the participants carried out extracurricular physical activity. If the schools do not provide their students with a proper amount of physical activity, we can conclude that the students are physically inactive.

A BRIEF HISTORY OF VIBRATION AND VIBRATION DEVICES

V. Krauksts, K. Ciekurs

Latvian Academy of Sport Education, Riga, Latvia

The aim of this research is to state the beginnings and development of vibration devices and trainings. The first indications about the positive effect of vibration on

the human body are found in ancient Greece. Much later in the 18th century the abbot Pjerre invented a “trembling” chair, and used it to treat his patients. Later different constructions were made, which operated according to the sewing-machine or tonometer principle. These devices were applied both locally and to the whole body. Nowadays mechanic vibration has become as a permanent therapeutic or sports training means which from ancient times through centuries has been developed and gradually improved in different countries. Today vibration massage, based on vibration frequency, amplitude, acceleration and other specific vibration components, is becoming more popular than the classical massage. Russian scientists were the first to start real research in the field of body vibration. They also started the vibration device construction and production process. By using and developing vibration technologies they helped astronauts to rehabilitate when they returned from their space travels. Then vibration was researched also in the USA. Due to the great scientific and technological potential of the USA, intensive development and production of the vibration technique was started there with the aim to get income from selling this device.

COMPARISON OF LOWER LIMB ISOKINETIC MUSCLE PERFORMANCE BETWEEN ROAD CYCLISTS AND MIDDLE DISTANCE RUNNERS

I. Rannama, K. Baskin, M. Roosalu, V. Kunitson

Institute of Health Sciences and Sport, Tallinn University, Tallinn, Estonia

Aim: The purpose of this study was to compare the isokinetic muscle performance of lower limbs in middle distance runners and road cyclists. **Subjects:** 10 competitive Estonian middle distance runners (age 23.8 ± 3.8 yrs., height 181.8 ± 2.8 cm, mass 73.6 ± 7.4 kg) and 16 road cyclists (21.1 ± 3.5 yrs., 181.5 ± 5.0 cm, 74.8 ± 7.0 kg) volunteered in this study. **Methods:** Isokinetic strength of ankle plantar flexors (A-pf), ankle dorsal flexors (A-df), knee (K) and hip (H) extensors (ex) and flexors (fl) were measured with Humac NORM isokinetic dynamometer in angular speeds 60, 180 and 240 °/s. Isokinetic peak torque (PT), and power (P) values of best repetition and total work (ToW) of 15 repetitions in angular speed 240 °/s were expressed as a mean of dominant and non-dominant leg. The relative isokinetic values to body mass were compared between runners and cyclists. **Results:** The comparison of PT values shows that cyclists have significantly ($p < 0.05$) higher results in A-pf and K-fl in all testing speeds. No significant differences between A-df, K-ex, H-fl and H-ex PT values at any speed were found. Cyclists had also significantly higher P results in A-pf, K-fl and K-ex in all testing speeds and in H-ex 60 °/s. ToW values of A-pf, K-ex and K-fl were significantly higher in cyclists group, but runners had higher values in H-fl. **Conclusion:** Cyclists have higher isokinetic muscle performance values in A-pf, K-fl, K-ex and H-ex and runners have higher total work ability in H-fl. No significant differences in A-df performance between cyclists and runners were found

POSTURE SPECIFICS IN YOUNG ATHLETES IN DIFFERENT SPORTS

J. Solovjova¹, I. Upitis¹, J. Grants¹, J. J. Kalmikovs²

¹*Latvian Academy of Sport Education, Riga, Latvia,*

²*Aqualification & Fitness, Rockhampton, Australia*

Aim: The aim of the study was to determine if an express diagnostic programme could be used for early detection of muscular-skeletal changes in young athletes from different sports. It was expected that this method would also highlight changes characteristic to specific sports. **Subjects and methods:** By applying a visual diagnostic together with functional muscle testing, an express diagnostic programme was used to indicate the postural changes in 92

athletes aged 14 – 17years old in Latvia: 20 swimmers, 20 ice-hockey players, 19 basketball players, 17 handball players and 16 bike riders. Results: Common to all groups, it was found that the standing posture was falling forwards. Hockey players were found to fall 9.1cm (± 0.5 cm) forward from the vertical plane taken of the ankle, swimmers were 5.5cm (± 0.4 cm) while basketball players were 10.7cm (± 0.6 cm) forward. In all groups the upper pelvis point was found to tilt forwards: Hockey players fell 10.4cm (± 0.7 cm) forward, swimmers fell 7.8cm (± 0.5 cm) forward and basketball players fell 8.8cm (± 0.6 cm) forward. Swimmers (10.6 ± 0.4 cm) and bike riders (10.4 ± 0.4 cm) had the largest misalignment at the shoulders. Basketball players had the largest misalignment at the ears (10.7 ± 0.6 cm). Handball players had the largest misalignment at the outer points of the palm (11.7 ± 1.1 cm). Functional muscle testing highlighted changes of the postural muscles in all groups. Conclusions: It can be concluded that each sport leads to postural changes in athletes due to specific functional changes in muscles. Early detection of muscular-skeletal changes in young athletes can be identified by applying express diagnostics. Early detection should lead to prevention of injury.

LOCAL VIBRATION IN KAYAKING

V. Krauksts, K. Ciekurs, R. Vinogradovs

Latvian Academy of Sport Education, Riga, Latvia

Kayaking is a water sport in the stagnant or calm water. In sprint distance probably the most important factor for a good result is the athlete achievement in power of a row, because the athletes, who row with a very high frequency, but cannot put in a row strong force, rarely enter the finals of international competitions. Consequently there is a need for new resources or means to increase the strength expressions, to be able to compete successfully with high-level athletes. One of such means is local vibration. In our study we use local vibration in the development of kayaker strength expressions and power. The aim of the study is to determine influence of local vibration on kayaker peak anaerobic power and anaerobic power capacity. The subjects of the study were 18 – 23 years old 8 kayakers. To carry out experiment, we arranged kayaker group, carried out an anaerobic power test, when the athletes were given an unlimited time to warm up and achieve the highest possible power. Two minutes after the anaerobic power test athletes started anaerobic power capacity test, where the athletes had to row for 30 seconds with maximum power. Results: Maximum power test results before the local vibration showed that the average power of the test group was 425 ± 12 W, after application of local vibration peak power was 483 ± 7 W. Conclusions: A study has confirmed our allegation that application of local vibration can significantly improve the results of sprint canoeing. Local vibration as an innovative training mean has proved its

reliability in training process, as the random-level athletes improved their anaerobic power and power capacity.

TRAINING CHARACTERISTICS OF NORWEGIAN DISTANCE RUNNERS AT AN INTERNATIONAL LEVEL

L. I. Tjelta

University of Stavanger,

Department of Education and Sports Science, Stavanger, Norway

Aim: The aim of this study is to describe the training characteristics of Norwegian junior- and senior runners who have competed at an international level on distances from 1500 m to marathon the last decade. **Subjects and method:** There has been done the analysis of the training diaries of 11 runners. The recorded training has been classified according to an intensity scale consisting of three aerobic and two anaerobic zones. **Results:** Junior runners, senior track runners and marathon runners ran an average of 131, 159 and 180 km/week, respectively, during a year. The runners performed between 68 and 84 % of the weekly training volume as continuous running in zone 1 (HR between 62-82% of HR_{max}). The track runners increased the proportion of intensive sessions in specific race pace in the pre competition season and the competition season. The marathon runners increased the weekly training volume in the period leading up to a marathon race. **Conclusion:** Weekly training volume ranging between 150-240 km/week turned out to be successful for marathon runners. The training volume for track runners ranged between 130-200 km/week. Track runners combined this training volume with two to four weekly sessions in zone 2 (82-92 % of HR_{max}), and one session in zone 3 (92-97 % of HR_{max}) or 4 (> 97 % of HR_{max}) per week during the preparation period. As a result of more running in competition speed, the volume of zone 2 training was reduced in the pre competition period and the competition season. **Keywords:** Elite distance runners, training volume, training intensity.

DYNAMICS OF CONCATENATION BETWEEN MUSCULAR BLOOD FLOW AND FUNCTIONAL INDICES OF CARDIOVASCULAR SYSTEM IN ENDURANCE OR SPRINT COHORTS DURING GRADED EXERCISE STRESS

J. Poderys, V. Papievienė, E. Trinkūnas, A. Buliuolis, A. Grūnovas
Lithuanian Sports University, Kaunas, Lithuania

Traditional time series analysis methods fail to reveal the changes of interactions of the recorded indices associated with the investigated object's multiscale structure and stability in the dynamics, which allows the issue of temporary or long-term structural and functional changes. The new methodology for assessment of concatenation between biological processes was developed by group of Lithuanian scientists. This methodology based on matrix theory. The aim of this research was to find out the peculiarities in concatenation between central and peripheral cardiovascular changes under conditions of increasing fatigue in sprint and endurance cohorts. Subjects and methods: Well-trained endurance and sprint runners underwent a 50 W increase in workload (bicycle ergometry) every 6 minutes and they exercised until inability to continue the task. Dynamics of concatenation between cardiac indices arterial blood pressure and arterial blood flow in thigh muscles was analyzed. The results obtained during the research showed the importance of peripheral factors, i.e. decrease of diastolic blood pressure, the reduction of total peripheral vascular resistance plays an increasingly significant role for cardiac output during the continuous exercising. All participants of the study were able to perform the workload up to 200 W, and only the one participant was able to continue the workload at stage of 350 W. The ability to perform endurance type of exercising related with the increase of concatenation between the changes in muscular blood supply and cardiac output or other important cardiovascular indices and the loss of these concatenations leads to inability to continue of exercising.

THE EFFICIENCY OF FREE THROWS OF YOUNG 13–14 YEAR OLD BASKETBALL PLAYERS ADJUSTING THE DIFFERENT PROGRAMS OF PERFECTION

A. K. Zuoza, I. J. Zuozienė, E. Voronovas
Lithuanian Sports University, Kaunas, Lithuania

The research sought to analyse the accuracy of free throws of young basketball players and its change, when applying various free throw shooting improvement programs. The sample of research consisted of 13-14 year old young basketball players. Tasks of research: 1. To assess the change of effectiveness of free throw shooting by applying free throw shooting improvement programs under invariable conditions; 2. To assess the change of accuracy of free throw shooting by applying free throw shooting improvement programs under variable conditions. Methods: The research was carried out during the two seasons. Players were tested three times a year. One of two free throw shooting improvement programs was applied in each week practice: program I in two practices and program II in the remaining two practices. The mean and standard deviations as well as significance of differences between mean values, according to t-criterion, were calculated. Results: At the beginning of the research the accuracy of 13-14 year old player 3x30 free throw shooting test under invariable conditions, while applying a special free throw shooting improvement program, was 62.2, after research: 67.8 percent ($p<0.05$), and season at the beginning of the next season: 63.3, after research: 71.1 percent ($p<0.05$). The indicators of second test under variable conditions during first testing were 18 points at the beginning of research, while after research: 24 points ($p<0.05$), and in the next season at the beginning: 20 and 26 points, respectively ($p<0.05$).

LOCAL VIBRATION INFLUENCE ON ANAEROBIC POWER AND ANAEROBIC POWER CAPACITY IN ROWERS

K. Ciekurs, V. Krauksts
Latvian Academy of Sport Education, Riga, Latvia

Whole body and local vibration is a worldwide innovation as a part of training method that helps athletes to regain the power and get ready for next training faster. However less attention is paid to local vibration where an isolated muscle or muscle group is stimulated by the use of a vibration device. Subjects and methods: For the reason to determine the effect of local vibration on anaerobic power and anaerobic power capacity of rowers, two research groups were assembled from the students

of Murjāņi Sport Gymnasium (MSG) during the period of time from November 13, 2010 to March 20, 2011 – the experimental group (EG) and control group (CG). We managed tests with stationary Concept-II ergometer, EMG and goniometry before and after the sessions of local vibrations. Results and conclusions: After the local vibration sessions for experimental group, the anaerobic tests results prove considerable increase on the stationary rowing ergometer Concept – II. As for the control group, there was no considerable increase observed. EMG proves considerable Triceps Brachii muscle activity improvement for the experimental group, yet the activity improvement was not observed for the control group

RELATIONSHIP BETWEEN ISOKINETIC MUSCLE STRENGTH AND FINSWIMMING TIME

V. Kunitsõn, I. Rannamaa

Institute of Health Sciences and Sport, Tallinn University, Estonia

Aim of the study was to characterize lower body muscles strength among finswimmers and examine the relationship between isokinetic muscle strength and finswimming time. Subjects and methods: eleven top level junior male finswimmers (age 15.7 ± 1.9 yrs., height 177.8 ± 7.8 cm, and mass 72.2 ± 9.0 kg) performed 50 m apnea and 200 m finswimming on Tallinn open championship. Isokinetic muscle strength of knee extensors and flexors were measured with isokinetic dynamometer in angular speeds $60^\circ/s$, $180^\circ/s$ and $240^\circ/s$ for peak torque, power and total work of 15 repetitions. Results: Correlation was established between strength of knee extensors on all angular speeds ($60^\circ/s$, $180^\circ/s$, $240^\circ/s$) and finswimming time. The data showed that strongest correlation $r = -0.92$ (absolute values) was between knee extensors power and 200 m finswimming time ($240^\circ/s$). At angular speed of $60^\circ/s$ the peak torque and time correlation was substantial $r = -0.88$. The correlation with finswimming time and angular speed $60^\circ/s$ and $180^\circ/s$ power were both $r = -0.85$. Also strong correlation ($r = -0.81$) was found between knee extensors at $180^\circ/s$ power and 50 m apnea finswimming time. Correlation between 50 m apnea time and peak torque $60^\circ/s$ was $r = -0.79$. All correlations were statistically significant ($p < 0.05$). Correlation between knee flexors and finswimming time was not established. Conclusion: This study suggests that knee extensors strength is related to finswimming time but knee flexors strength did not demonstrate significant impact on finswimming time.

CHANGES IN MORPHOLOGICAL CHARACTERISTICS AND INDICATORS OF EXPLOSIVE POWER IN YOUNG BASKETBALL PLAYERS

A. K. Zuoza, I. J. Zuozienė, L. Beniušis
Lithuanian Sports University, Kaunas, Lithuania

Aim of the study is to determine and evaluate morphological characteristics and indicators of explosive power, their change and correlation during the period of puberty. Objectives: to determine and evaluate the main morphological characteristics; to determine and evaluate indicators of velocity power; to determine relationship between morphological characteristics and the indicators of explosive power. Research methods: anthropometry, bioelectric impedance, tensometrics, statistical analysis. Studies have been conducted with 13-16 years old basketball players, the studies lasted for 3 years. Results: fat mass (7.84 %) correspond to a very good level of physical fitness in basketball players. Changes in the height during puberty confirm the assumption that adolescents, aged 13–16 years, grow quickly ($p < 0.01$). BMI had a tendency to increase ($p < 0.05$). The changes of fat mass were noticeable ($p < 0.001$). The changes of explosive power are uneven and the increase observed (3.43 cm) was lower than indicated by other authors. One of the reasons is significantly lower initial indicators of explosive power in athletes aged 13 observed by other authors. Correlation between morphological characteristics and the indicators of velocity power during different age periods was different. Conclusions: mean height and body mass indexes in basketball players essentially correspond to indexes of trained basketball players; explosive power in basketball players corresponded or even exceeded the respective results from other studies of the same age; strong correlation was observed between two explosive power tests: vertical jump without and with arm movement ($r = 0.89$), standing vertical jump with no arm movement and body mass index ($r = -0.87$); correlation between morphological characteristics and indicators of explosive power is moderate ($r = 0.63$).

CHARACTERISTIC OF FUTURE OLYMPIC CHAMPION AND OTHER YOUNG LITHUANIAN WOMEN SWIMMERS OF AGE 12

R. Dadelienė, K. Milašius, J. Skernevičius
Lithuanian University of Educational Sciences, Vilnius, Lithuania

Swimmers are trained starting at very early age and when young swimmers reach age 12 – 13, it is possible to anticipate future talents in them. The aim of

the research was to establish the level of physical development, physical preparedness, and particular functional capacity indices of young swimmers of age 12 – 13 and to compare the results to Olympic champion's R. M. analogical data when she was 12. Subjects and methods: 16 best Lithuanian women swimmers of age 12 with future Olympic champion among them were tested in 2009. Physical development were measured, single muscular contraction power and anaerobic alactic muscular power were established as well. Special glycolytic power of arms work was analysed with swimmers ergometer when executing 60 s loads. Functional capacity of blood circulation system was tested also. Normalized indices profile, when using standardization method, was formed for visual comparison of exceptional swimmer's data to averages of other women swimmers. Results: Researchers have revealed that height of Lithuanian women swimmers of age 12 matched the height of students of age 18-19. Swimmers' VLC average exceeded averages of adult girls; fat mass was significantly smaller, it was particularly small in R. M. Our established exceptional R. M. muscle contraction speed leads to a statement that her muscle contain a large amount of rapidly contracting fibres and this was the basis to develop high single muscular contraction power leading her to gain advantage when taking starts from swimming tower. Exceptional R. M. functional capacity of blood circulation system comparing to other swimmers of her age ensured possibilities for her to execute intensive physical loads.

AEROBIC CAPACITY TRAINING OF HIGH PERFORMANCE ROWERS

A. Raslanas, R. Dadeliene, E. Petkus

Lithuanian University of Educational Sciences, Vilnius, Lithuania

The aim of the research: to analyze the content of a pre-competition mesocycle of high performance double scull rowers and to assess the effectiveness of aerobic capacity training. Methods: The preparation content of a pre-competition mesocycle of European champions – double scull – has been analyzed. The mesocycle consisted of five microcycles: introductory – aerobic and creatine phosphate capacity and endurance training, aerobic critical capacity and endurance training, pre-competition and competition microcycles. During the introductory microcycle, the intensity of aerobic training was close to the anaerobic threshold limit (ATL), $La=2-3\text{mmol/l}$ and was combined with muscle power training exercises. Through the second microcycle, the intensity of aerobic training was $ATL \pm 5\%$, $La=3-6\text{mmol/l}$ combining with creatine phosphate capacity training exercises. At the third microcycle, dominated the work intensity between ATL and critical intensity limit (CIL), $La=4-9\text{ mmol/l}$. Over the fourth – pre-competition microcycle, work load was decreased by 30%, intensity was various, $La=3-14\text{ mmol/l}$, the rowing speed and technique

of start simulations was being improved. The fifth – competition microcycle comprised four days before competition and three competition days. Results. Tests performed with gas analyzer “Oxycon Mobile”, when rowing on “Concept 2”, indicated that during the analyzed period aerobic capacity was increasing. VO_{2max} for sportsman M. was increasing from 62.3 to 65.3 ml/min/kg and for sportsman R.: from 61.3 to 65.2 ml/min/kg. Conclusions. Our research has demonstrated that high performance rowers who during a pre-competition mesocycle performed work close to ATL and between ATL and CIL, performing little work in the glycolytic zone, have significantly increased aerobic capacity and the input of the latter into the sports result was about 80%.

THE REVIEW OF HIGH PERFORMANCE WOMEN TRACK CYCLISTS OF 3 KM TEAM PURSUIT RACE TRAINING PROCESS FOR EUROPEAN CHAMPIONSHIP 2012

L. Tubelis^{1,2}, A. Jakimavičius²

¹Lithuanian University of Educational Sciences, Vilnius, Lithuania

²Lithuanian Olympic Sports Centre, Vilnius, Lithuania

Track cycling competitions are very popular on a worldwide level. Track cyclists' training for competitions has its own specifics. During the latter four-year Olympic training cycle Lithuanian women track cyclists achieved high results in World and European Championships, became champions and prize-winners. The intention of the research was to reveal specific features of women cyclists training as well as the level of physical and functional powers in separate intensity zones, and this would serve as model characteristics for training high performance women track cyclists. The aim of our research was to reveal high performance women track cyclists' of 3 km team pursuit race training and preparedness changes before participation in European Championship 2012. The subject of the research was three high performance women track cyclists, who had won European Championship 2012 in 3 km pursuit race event. Methods: We had analyzed athletes' physical development, the level of physical powers in various intensity zones, functional capacity of respiratory and blood circulation systems and its changes on the last stage of training for European Championship. Women track cyclists were analyzed before alpine training camp on September, 2012 and after it as two weeks left to European Track Cycling Championship 2012. Results: Our researches revealed that most physical development indices were stable, but muscular mass as the main motions generator fluctuated significantly in single athletes. Indices of physical and functional capacity had improved and corresponded to the level of world elite women athletes. Conclusions: We believe that positive

changes in analyzed athletes' physical and functional powers during pre-competition period were determined by the programme for cyclists' training in pre-competition mesocycle the was designed professionally, basing on the analysis of the results and the conclusions formed and implemented; and naturally it conditioned great performance in European Championship 2012. Keywords: women track cyclists, power, training program.

FORCED MODE TRAINING IN BASKETBALL

U. Grāvītis, J. Rimbenieks, A. Andersons, M. Pliens

Latvian Academy of Sport Education, Riga, Latvia

In basketball competition season is eight month long. Therefore it is very important to find means and methods for maintenance and preservation of athletic shape during the whole period, and, it is recommended, to increase the form for the final phase of the competition – during play off. Aim: To study the influence of forced mode training on preservation and improvement of athletic shape of basketball players in long-term. Subjects and methods: Study was performed on LASE men's basketball team which participated in Latvian Basketball League 2 and Latvian Student Basketball League competitions from October 2012 to April 2013. The forced training mode was developed with the following programme: 4 astronomical hours of training with 45 min rest after first 2.5 hours. The first part of training began with 45 min run in the forest in aerobe mode, general shape up exercises, which were followed by speed and speed endurance training exercises. During the rest basketball players drank tea with honey and ate biscuits. The forced mode training was finished with exercises for basketball speed techniques, shots and tactical exercises. Practical experiment was carried out seven days in September – during the final preparation training for the season, as well as on 9th February and 2nd March 2013 – before playoff games. Results and discussion: The analyses of player workout results show the definite stability of indices during the whole season. For example, the rebounds were in range between 30 – 35%, what can be explained with different levels of opponent team performance. Analogue is also dynamics of other competition performance ratios during the whole season. Dynamics of player game performance ratio did not show statically significant decline in two or six days after forced mode training, but such tendency of decrease can be observed, therefore we will check its existence in further studies. Conclusion: In our pilot study the use of forced mode training in basketball has shown positive tendency of competition performance ratio stabilization during the season and it does not show any significant decline within one week after the training.

EFFECT OF ATTENTION CONCENTRATION ON THE ACCURACY OF FREE THROWS

R. Kreivyte

Lithuanian Sport University, Kaunas, Lithuania

Aim of the study was to investigate the application of attention concentration in sports skills at different ages. Subjects and methods: The subjects were 14–15-year-old young basketball players (n=18) and 20–22-year-old Lithuanian Sports University basketball players (n=16). The research methods applied: experiment; testing free throws. Results: The first testing before teaching showed that the accuracy of both groups of young female basketball players was: 62.3% in the first group and 64.7% in the second group. After a month of learning: 59.7% and 56.7%. The results of the third testing showed: 60.7% and 63.7%. The first testing before teaching showed that the accuracy of both groups of student female basketball players was: 74.3% in the first group and 73.3% in the second group. After a month of learning first group: 76.3% and 85.3%. The results of the third testing showed: 83.0% and 76.7%. Conclusions: Attention concentration, focusing attention to specific external factor (the front part of the basketball hoop) before carrying out an independent movement – a free throw – improved the accuracy of free throws for skilled female basketball players, and attention concentration to the internal factor (the final movement of the wrist) did not have a positive effect on the accuracy of free throws. For young basketball players, attention concentration both to external and internal factors did not have any positive effect on the efficiency of throws or the stability of movements.

RELATIONSHIP BETWEEN LOWER LIMB ISOKINETIC STRENGTH AND 60m SPRINT RUNNING TIME

M. Misjuk, I. Rannama, E. Niglas

Institute of Health Sciences and Sport, Tallinn University, Tallinn, Estonia

Aim: The purpose of this study was to investigate relationship between lower limb isokinetic strength and 60m sprint running time. Subjects: 9 male competitive Estonian sprinters (age 20.7 ± 2.6 yrs, height 181.2 ± 5.7 cm, mass 76.0 ± 7.1 kg) volunteered to participate in the study. Methods: Peak torque (PT) of ankle plantar flexors (A-pf), ankle dorsal flexors (A-df), knee (K) and hip (H) extensors (ex) and flexors (fl) were measured with Humac NORM isokinetic dynamometer in angular speeds 60, 180 and $240^\circ/\text{s}$. The sprint performance, 60m from blocks (7.100 ± 0.129 sec), was fixed in competition conditions during the winter season 2013. The isokinetic testing took place

shortly after the competition season. The correlations between relative isokinetic PT values corrected with body mass and sprint times (ST) were calculated. Results: Statistically significant ($p < 0.05$) and strong negative correlation was detected between ST and H-fl PT at $180^\circ/\text{s}$ ($r = -0.82$) and at $240^\circ/\text{s}$ ($r = -0.80$), but no significant correlation was with PT at $60^\circ/\text{s}$. The relationship between ST and K-ex PT was also negative, but statistically less significant: at $60^\circ/\text{s}$ ($r = -0.68$; $p = 0.05$), at $180^\circ/\text{s}$, ($r = -0.65$; $p = 0.06$) and at $240^\circ/\text{s}$ ($r = 0.60$; $p = 0.08$). No statistically significant relationship was found between running time and PT in A-pf, A-df, K-fl and H-ex. Conclusion: The sprint running time was significantly related with H-fl isokinetic strength at speed 180 and $240^\circ/\text{s}$ and with K-ex strength at $60^\circ/\text{s}$.

INTERPRETATION OF PEAK OXYGEN CONSUMPTION IN 10-12-YEAR-OLD SOCCER PLAYERS: EFFECT OF BIOLOGICAL MATURATION AND BODY SIZE

P. Purge, U. Viickberg, T. Jürimäe, M. Saar, E. Lätt, J. Mäestu, J. Jürimäe
Institute of Sport Pedagogy and Coaching Sciences, Centre of Behavioural and Health Sciences, University of Tartu, Tartu, Estonia

The aim of this study was to investigate the effect of biological maturation and body size on aerobic capacity using appropriate scaling procedures in 10-12-year-old soccer players divided into late, average and early maturing boys. Subjects and methods: Sixty-four young soccer players volunteered to participate in this study. They were recruited from local training groups and had a training history of 4.5 ± 1.5 years and had trained for 4.6 ± 1.6 h per week for at least last two years. Data for participants included chronological age, skeletal age, predicted age at peak height velocity, pubertal development (Tanner stages), anthropometry, and VO_2peak . Results: Peak oxygen consumption (VO_2peak) was expressed as absolute values, ratio standards, theoretical exponents and experimentally observed exponents. VO_2peak was not directly proportional to body mass as the experimentally observed exponent for body mass calculated through linear regression analysis yielded to $b = 0.64$ ($R^2 = .62$; $p < .05$). The 95% confidence interval for the experimentally calculated body mass-related exponent (95% CI: 0.51 to 0.77) included the theoretical values of the exponents ($b = 0.67$ and $b = 0.75$). Linear regression analyses indicated that after adjusting for the effects of body mass using the theoretical exponent scales ($\text{ml}/\text{min}/\text{kg}^{0.67}$), biological maturation and body size had no effect on VO_2peak values in young soccer players. In conclusion, the theoretical exponent scale for body mass ($\text{ml}/\text{kg}^{0.67}/\text{min}$) control adequately for biological maturation and body size differences in VO_2peak in 10-12-year-old soccer

players. Therefore, more mature soccer players with better body size values should not be preferentially selected for young soccer teams.

INFLUENCE OF ACROBATIC SKILLS ON BASIC PHYSICAL AND COORDINATION ABILITIES

O. Romero Ramos¹, M. Gonzalez Dominguez²,

J.I. Álvarez de Toledo Rohe³, A. Ortega Linares⁴

⁴ *Secondary School Mirador del Genil, Cordoba, Spain*

^{1,2} *University of Malaga, Malaga, Spain*

³ *Higher School of Dramatic Art in Malaga, Malaga, Spain*

Our main concern was to investigate the transfer of acrobatic abilities towards basic physical capacities and coordination abilities arises from the ongoing cyclic yearly verification and systematic observation of motor skill increase levels in individuals who practice acrobatics. A sample: 28 individuals of which 5 were men and 23 women between 21 and 29 years of age. Methods: Data collection was processed with statistics software SPSS. As a general rule the repeated measures model has been used and hours of acrobatic activity were quantified to check normal performance according to Kolmogorov-Smirnov test. The Mauchly's sphericity test was used to assume this supposition at a significance level of $p > 0.05$, attaining a confidence level of 95%. The objective of the abovementioned test is to check if the physical-acrobatic activity performed in acrobatics training, increases the physical and coordination skills and if the sex implies a significant interaction. Results: Hypothesis is accepted, significant being the following skills: flexibility, explosive strength, trunk strength, dynamic strength, speed, coordination, general dynamic coordination and dynamic balance. Hypothesis is rejected for all other skills, resulting in no significant improvements in hand-eye coordination, balance and proprioceptive static equilibrium, even though the means improve in both groups. In conclusion, the acrobatic activity can be an excellent way to increase physical and coordination skills.

RELATIONSHIPS BETWEEN THROWING PERFORMANCE CHARACTERISTICS, ANTHROPOMETRICAL PARAMETERS AND MOTOR ABILITIES

M. Visnapuu, K. Karuauk

University of Tartu, Tartu, Tartu, Estonia

The aim of the study was to investigate the influence of anthropometrical parameters and motor abilities on the shooting efficiency of under 18 male handball players in competitive match setting. Subjects and methods: Estonian youth national team handball players participated in this study (n=18). The anthropometrical parameters measured were body height, body mass, arms span, body fat percentage and fat free mass. Medicine ball and handball over-arm throw with dominant hand in sitting position, handball pass to speed and precision, handgrip strength with dominant and non-dominant hand were used as upper body motor ability tests. The 30m sprint, 10x5m shuttle run, counter-movement jump, counter-movement jump with arm swing and vertical jump from one step run-up with take-off on opposite leg to throwing arm were used as lower body motor ability tests. The following game statistics was used (goals and shots): throws from 6m, from wing, from long distance, from 7m, from fast break, from breakthrough. The results of the study showed that long distance, 7m and all shots done and realized have significant correlations with body height ($r=0.58-0.70$) and arms span ($r=0.58-0.72$). Goals and shots from wing have negative correlations with all body mass components but significant relationship with fat-free mass ($r=-0.50$) only. Stepwise multiple regression analyses, where throwing parameters are dependent variables and motor abilities are independent variables, showed that pass to speed determined goals total by 50% ($R^2 \times 100$), long distance goals by 25.15% ($R^2 \times 100$), goals from fast break by 33.28% ($R^2 \times 100$), goals from breakthrough by 37.79% ($R^2 \times 100$), goals from 6m were determined with jump from one foot by 29.99% ($R^2 \times 100$), and goals from penalty were determined with handball throw with dominant hand by 27.50% ($R^2 \times 100$). Goals from wing were determined with counter-movement jump together with medicine throw with dominant hand by 38.72% ($R^2 \times 100$). Conclusion: According to the present study arm span was the most important anthropometrical parameter and pass to speed the most important motor ability for throwing performance in competitive match setting.

CHANGE IN SPORTS MOTION ABILITIES OF STUDENTS**N. Žilinskienė, D. Radžiukynas, D. Gražulis***Lithuanian University of Educational Sciences, Vilnius, Lithuania*

Aim of Research: To determine at various periods the sports motion abilities of Physical Education Students of the Lithuanian University of Educational Sciences (LUES) and accomplish comparative data analysis. Subjects and methods: The Physical Education Students (n=109, 19-20 years old) participated in the current study. The research was held during the studies period of 2001/2002 (men n = 40, women n = 12, 1st part) and 2011/2012 (men n = 39, women n = 18, 2nd part). Motion abilities were determined by means of the following tests carried out in: Javelin Throw (m), Long Jump (m), Triple Jump (m), Discus Throw (m), wherein women's discus weighs 1 kg and men's - 1.5 kg, Shot Put (m), wherein women's shot weighs 4 kg and men's - 6 kg, 400 m Hurdles Run (s), 200 m Run (s), 100 m Run (s), 400 m Run, 800 m Run (s), 1500 m Run (s). Tests were accomplished during the practical exercises according to the rules of Track and Field Events. Results: After comparison of results, which accounted for the period 2001/2002 and 2011/2012, it was determined that the results of the male Students in Javelin, 400 m Run and 1500 m Run became worse ($p < 0.05$). A slight regression was noticed in Triple Jump, Discus Throw, 400 m Hurdles Run and 100 m Run, yet Long Jump and Shot Put results during the ten years period improved, although all these results had no significant difference. At the same time it was determined that the results of the female Students in such disciplines as Long Jump, Triple Jump, Shot Put, 400 m Hurdles Run, 200 m Run, 100 m Run and 800 m Run regressed significantly ($p < 0.05$). The Javelin and Discus Throw results altered moderately and statistically did not reach any significant difference. As the final conclusion, we shall make a statement that sports motion abilities of male and female Physical Education Students has a tendency to regress.

**HOW MANY YEARS MUST PASS BEFORE WOMEN CAN
DEMONSTRATE SIMILAR SWIM COMPETITION RESULTS AS
MEN**

B. Statkeviciene*Lithuanian Sport University, Kaunas, Lithuania*

Work objective. To determine how much time must pass before Lithuania's women swimmers achieve similar competition results as Lithuania's men. Research methods. Analysis of published results. Research organization. We

analyzed Lithuanian Championship results in the years of 1935 through 2012 for the 100m free, back, breast and butterfly swim strokes. We determined the time span that will be needed for the women's results to be the same or very similar to those of the men. Research results: In 1935 L. Simonyte became Lithuania's champion in the 100 free with a time of 1.47 seconds. Men's champion, J. Astrauskas swam that same distance in 1:11.8 seconds. A woman achieved similar time in 1962. It took 27 years for women to close this gap. In 2011, G. Grigonyte's 100m free style result was 57.98 seconds. Men reached that result in 1971, a span of 40 years. 100m breaststroke for women started in 1935, the men in 1947. In 1947 M. Kuzminskaitė's time was 1.47.7. In that same year men's championship time was 1.29.4 seconds by R. Reingardas. In this event Z. Uzkuraityte reached a similar result in 1962yr. Time span of 15 years. In 2011yr. Lithuania's woman champion R. Dvariskyte established a time of 1.11.35 seconds. The men swam a similar result in 1985. Time span is 26 years. The 100 m back stroke for women started in 1946, the men in 1935. R. Bagdonavicius' result in 1946 was 1.31.5 seconds. Women equaled that result 10 years later (R. Leveryte). Champion for Lithuanian women in 2011 A. Drevinskaite's time of 1:07.23 was achieved by men in 1965, a span of 46 years. 2011 Lithuanian champion in the 100 m butterfly V. Gimbutyte achieved a time of 1.02.35 seconds. A similar result by men was reached in 1974. Time span 37 years. Conclusion: It is conceivable that after some 35-40 years the women's results will equal those of the current men swimmers. The exception of less time may be in the 100m breaststroke results.

INTERACTION BETWEEN AGE, BODY SOMATIC INDICATORS AND ATHLETIC RESULTS FOR MEN AND WOMEN IN ELITE PAIR FIGURE SKATING

B. Statkevičienė, A. Čepulėnas, V. Bružas
Lithuanian Sport University, Kaunas, Lithuania

The object of this research was the relation between the age and body somatic indicators of elite athletes in pair figure skating and their sports results. The aim of the investigation was to determine if the age and somatic body indicators of men and women in pair figure skating have the same influence on athletic results. We analyzed the age and somatic indicators of figure skaters (men and women) who took the 1st–20th place at the Vancouver Olympics pair figure skating in the short free programme and the total programme evaluation. Results: Our obtained data showed that elite pair skaters (men and women) differed greatly in their body somatic indicators: women were short having relatively low BMI indicators and their age indicators were high. Elite male skaters in pairs were tall athletes (177–180 cm) with medium body mass,

adequate BMI, and their age indicators were high. These were the most obvious indicators that determined pair skating success for males and females at the Olympic Games. Conclusion: In elite pair figure skating, correlations between body somatic indices and sports results might be low, but it does not mean that body somatic indices have no effect on athletic achievements. Thus, it is important to consider the average values of body somatic indices and the individual values of those indices for each athlete

ARE THERE THE DIFFERENCES BETWEEN MEN'S AND WOMEN'S BREASTSTROKE TECHNIQUE INDICATORS?

B. Statkevičienė, Ž. Bagdanavičiūtė

Lithuanian Sport University, Kaunas, Lithuania

The aim: To determine if there are differences between some men's and women's breaststroke swimmers techniques indicators. Methods and organization: Using videotapes of the Lithuanian swimming championships for the years 2010 - 2012 we determined the number of strokes, the length of stroke and the speed in the 100 m breaststroke event. The obtained data were compared with the data of the 100 m breaststroke swimmers finalists' at 2012 London Olympic games (LOG). Results: Lithuania's swimmers' number of strokes in the 100 m breaststroke hadn't changed statistically over the 3 years. Lithuanian swimmers perform fewer strokes in the first 50 m segment than in the second 50 meters. This situation was with LOG finalists. The LOG finalist's men perform fewer strokes than the men of Lithuanian Championships. The LOG finalist's women perform fewer strokes than the women of Lithuanian Championships. Lithuanian men's technical indicators do not significantly differ from women LOG finalists. The best Lithuanian swimmers G. Titenis' and R. Meilutyte's technical swim parameters differ from the Lithuania's swimmers averages and do not differs from LOG finalists'. Conclusion: The higher-level 100 m breaststroke swimmers' stroke count is lower than those of the lower level swimmers. Breaststroke swimmers to desiring to reach a higher proficiency level in the breaststroke it is necessary to seek to reduce the number of strokes over the distance and to increase the length of each stroke.

VISUALIZATION OF LOCAL VIBROSTIMULATION

U. Ciematnieks, L. Čupriks

Latvian Academy of Sport Education, Riga, Latvia

In today's sport coaches and athletes are looking for new tools to improve sports results without increasing the amount of time, dedicated to training process. Local vibrostimulation is a tool that provides both relaxing and tonic effects of the muscle group, however, action of local vibrostimulation mechanism is still not known yet; there is uncertainty, what effects occur in muscles, ligaments, tendons. Methods: The available equipment does not allow us to fully clarify effects of local vibrostimulation, therefore, we used a variety of structures of organic and inorganic materials to visualize vibrostimulation effect during different amplitudes, frequencies, and nozzles. We used water to visualize the vibrations caused by an oscillating nozzle and the resonant effects; we used a sponge to visualize the "pump" effect, caused by local vibrostimulation, necrotic organic tissue (pork leg muscle fragments) to visualize the reaction of affected organic tissue during different frequencies of vibrostimulation. During the experiment there has been obtained a quantity of visual material that demonstrates the effects in different frequencies in acquisition of resonant effect, as well as on the sponge was seen the "pump" effect. The results of experiment cannot be directly attributed to vibrostimulation effects on the human body, while the experiment explains positive and negative aspects of local vibrostimulation effects in improvement of the training process. Visualization shows that using too low local vibrostimulation frequency, the desired effect may not be achieved, but too high vibration frequency can cause damage to the target location, where local vibration has been applied and adversely affect the athlete's physical condition.

THE POSSIBILITIES FOR THE IMPROVEMENT OF ASSESSMENT OF EMPLOYEES' ACTIVITIES AT LEISURE AND SPORTS CLUBS

E. Jasinskas, B. Švagždienė

Lithuanian sports university, Kaunas, Lithuania

Aim of the study: to determine the possibilities of assessment improvement of employees' activities at leisure & sports clubs of Alytus city. Subject: the assessment of employees' activity at leisure & sports clubs of Alytus city. Methods: Analysis of scientific literature - applied to the analyses of the level of survey of employees' assessment in Lithuania and abroad. The questionnaire form was used to survey the employees of Alytus leisure & sports clubs about their activity evaluation. Statistical analysis was carried out using the applications SPSS 13.1 and EXCEL. In the analysis of data the descriptive statistics were calculated, the statistical hypotheses about the differences between frequencies of mean values and interdependence of features were verified. Results and conclusions: 1. After the analysis of survey data of employees of leisure & sports clubs at Alytus city, it was determined that the assessment of employees' activity of leisure & sports clubs is mostly performed on a team level with a help of special methods, however individual methods are not also rejected, therefore the method of evaluation should be chosen by each sports organisation individually. 2. Usually the function of activity assessment is performed by an immediate superior; therefore one of the possibilities for the improvement of employees' assessment is to combine this evaluation with assessment of others, in particular: colleagues. The other determined possibility for the improvement of employees' assessment is the presentation of exact information about assessment criteria to the employees. It was determined that employees lack information about their assessment criteria. Such situation negatively affects the attitude of employees to the process of assessment, not scientific approach does not ensure an effective process of assessment, does not initiate the employees to reach for the best result, but is one of the most important possibilities to improve the evaluation of employees. 3. The positive appropriate effect of assessment of employees' activity on the management and spread of experience and knowledge was determined, therefore it would be promising to analyse in future how a suitable assessment of activity may increase the effectiveness of knowledge management in the organisation.

QUALIFICATION “RECREATION SPECIALIST” FOR LIFELONG LEARNING STRATEGY

I. Kravalis, J. Grants, D. Krauksta

Latvian Academy of Sport Education, Riga, Latvia

Today in Latvian labor market there is a demand for qualitatively planned, organized and held recreation events. Required by the market demand, new study programmes have been developed at the Latvian Academy of Sport Education (LASE). Latvian Recreation Education Association was established, and the *Recreation Specialist* Profession Standard was confirmed by the terms of the Cabinet of Ministers. Professional Bachelor and Master study programmes in Sport Science with the qualification *Recreation Specialist* are being implemented at LASE. LASE together with the Latvian Recreation Education Association already for three successive years is organizing international Summer Schools. LASE Recreation Research Laboratory has been founded. The aim of the research is to analyze the development of recreation from market demands up to working out the recreation specialist study programme. Subjects and Methods: Recreation sector, analyses of literature from the point of development of recreation. Results: The competences of the recreation specialists are as follows: the ability to develop projects of recreation events, plans and contents of events for definite target group, to adapt recreation activities and means according the load components, methods and ways of working with different clients, to explain the effect of everyday habits on health and to give advice on leading a healthy lifestyle, to provide recreation safety, action in non-standard situations and to act adequately in unexpected situations etc. Conclusion: Following market demands the qualification *Recreation specialist* in Bachelor and Master study programmes have been established having the first graduates in 2011 and 2012. Training of recreation specialists at LASE is directed towards the renewal of man's physical, mental strength and emotional condition; towards man's activity from leisure to application of nature factors and outdoor activities.

THE INFLUENCE OF SPORT STRATEGICAL PLANNING ON SPORT DEVELOPMENT IN LATVIA

S. Luika, B. Luika

Latvian Academy of Sports Education, Riga, Latvia

In Latvia sports strategic planning is governed by Latvian Sports Policy Guidelines 2004 – 2012 and the Latvian National Sports Development Program 2006 – 2012. Since the programs will soon be finished and the work on the

development of a new strategy has been started, it is necessary to examine the impact of these documents on sports development. In Latvian Sports Policy Guidelines 2004 – 2012 (primarily Document was approved for the period 2004 – 2009) is given a description of the situation in Latvian sports sector; formulated problems, for the solution of which it is necessary to implement definite government policies; defined the basic principles of sports policy, sports policy goals and objectives; formulated expected results of the implementation of the policy; provided achievement indicators and the directions of activities, as well as the estimation of its impact on the State Budget, and described the expected follow-up, reporting and evaluation procedures. As the spheres of sports policy are defined – sports for all, children and youth sports, high-achievement sport and disabled sports. In Latvian National Sports Development Program 2006 – 2012, in its turn, objectives are outlined in the following areas – children's and youth sports, high-achievement sports, sports for all, disabled sport and sports facilities. In the Program for each objective are defined execution time, budget, responsible/involved person, as well as the planned outcome. Aim: to study the implementation of sport strategic planning documents and to state the influence of these documents on sport development in Latvia in years 2006 – 2010. Research methods: document analysis and survey. Subjects: were surveyed general secretaries of Latvian sports federations, employees responsible for sport in Latvian regions, and sports sector experts. Results: Using the method of survey we found that more than a half of the presidents/general secretaries of federations (67%) and sport work leaders of municipalities (52%) believe that the sport sector has developed partially, but the experts have chosen as the most popular answers both has and hasn't (31%).

OUTDOOR ACTIVITY INSTRUCTORS EDUCATION AND CERTIFICATION IN LATVIA AND OTHER COUNTRIES

I. Liepiņa, I. Smukā

Latvian Academy of Sport education, Riga, Latvia

Today in very many countries, including Latvia, more and more attention is being paid to human health and quality of life and the influencing factors, inviting people turn to an active and healthy lifestyle. Consequently, people are offered to enjoy more and more different kinds of outdoor activities, both traditional and those which offer to learn something completely new. Active recreation in Latvia is possible all year round, and it has many different kinds, everything depends on the interests and abilities – adventure parks, horse riding, go boating, skiing, sports, orienteering, parachuting and even nowhereelse in the world accessible entertainment as flying in a vertical wind

tunnel. Therefore, considering healthy and active recreation opportunities outside, urgent becomes the question of service quality, safety, and instructor or escort qualifications of the offer outdoor activities. After analyzing the literature about the experience of other countries of the outdoor activity instructors in the field, we can say that the experience of each country is different. In the inspected countries outdoor activity services and service legislation has started relatively recently. For example in the UK, these issues have been initiated to address at the end of 1992 and in the beginning of 1993, when started the development of safety standards for outdoor activities. In April 1994 the ACAC (Activity Centre Advisory Committee) published a Code of Practice, which" is a statement of principles and expectation for the responsible provision of the organized outdoor adventure activities. There are countries where the legislation is structured and the training of instructors is common, but there are countries, such as Latvia and Slovakia, where this problem has been solved and the single system is not constructed yet.

THE CHILD AS FAMILY ANIMATOR OF PHYSICAL ACTIVITY

K. Piech¹, I. Bula-Biteniece², R. Jansone², J. Grants²

¹Academy of Physical Education in Warsaw, Faculty of Physical Education in Biala Podlaska, Poland

²Latvian Academy of Sport Education, Riga, Latvia

Aim: Parents' participation in physical activities together with their children and the impact of children's physical activity on physical activity in the family. This applies mainly to families with young children. This phenomenon is described in the work of V. Staniszewski (2007), A. Iannotti (2005), K. Piech (2004, 2011), I. Bula-Biteniece (2011), and Z. Bironiene (2012). Research showing a child as an animator of physical activity in a family has been carried out for over 20 years. It involves participation of both parents and children in Kindergarten Olympic Games, recreational activities with homework as well as exercises for the whole family. Research methods: Empirical research methods: questionnaire method. The base of the research: families from Riga regions in Latvia and families from Biala Podlaska in Poland. Results: The obtained data revealed that parents have positive attitude and understanding about family sport as means in child development, but family sport is not always realized. Main contradictions: – Physical activities are mostly connected with physical development, paying less attention to psychical and social development. In these studies, it is clear that the child, especially in preschool, can be a great animator of physical activity in the family.

LEISURE CLUSTER: FROM THEORY TO PRACTICE**G. Zilaityte¹, G. Junevicius²***¹Lithuanian Sports University, Kaunas, Lithuania**²Lithuanian Innovation Centre, Kaunas, Lithuania*

In economic and innovation policy the term „cluster” is usually used to explain geographical concentrations of economic and innovation activities. A leisure cluster is a geographical concentration of diverse actors collaborating in the production of leisure experiences. These actors refer to entrepreneurs, governments and education/knowledge institutions (the triple helix). In addition, the consumer takes an active role within the cluster as he/she actively participates in the production process. Leisure experience production and consumption take place at the same time through which co-creation is stimulated and market-knowledge generated. The study was aimed to review leisure clusters from theory to practice. Subject: theoretical and practical analyses of leisure clusters. Methods: comparative analyses of scientific literature, survey. Results: The creation of an identifiable leisure cluster requires active intervention in order to stimulate the dynamic advantages of collaboration within the cluster. Within a dynamic cluster, there is an interactive distribution of knowledge among the relevant actors that leads to the progression of cluster into an arena of production as well as of knowledge circulation. This interactive way of cooperation and sharing of information, knowledge and know-how creates the added value of the cluster that can rather be considered as a „value-network“. The traditional value-chain becomes thus replaced by the value-cycle as the creation of value (products, services) is a permanent process between all production phases. Therefore it is especially the manner of cooperation among all necessary actors within the cluster that determines the successful functioning of a leisure/experience cluster. Conclusions: Clusters affect competition in three broad ways: by increasing the productivity of companies based in the area; by driving the direction and pace of innovation, which underpins future productivity growth; by stimulating the formation of new businesses, which expands and strengthens the cluster itself. Being part of a cluster allows companies to operate more productively in sourcing inputs, accessing information, technology and needed institutions, coordinating with related companies. Researchers have focused on the role of cultural factors, institutions, and individual leadership. There is strong view in the literature that cluster dynamics does not occur automatically, but it depends on and can be reinforced by purposeful action.

**ASSESSMENT OF SERVICE SKILLS IN THE COMPANIES
PROVIDING WITH LEISURE FACILITIES: RESEARCH IN
CUSTOMER APPROACH**

B. Švagždienė, K. Grigaitė, E. Jasinskas
Lithuanian Sports University, Kaunas, Lithuania

In the companies which provide with leisure service and where service sales are based on the contact between a service supplier and customer, service skills have a great significance. Staff facilitating customers, on whose behavioral culture, professionalism and flexibility are dependent customer satisfaction with the very service. During the following after-crisis period, great attention is paid to the satisfaction of customers' expectations. Companies, in order to achieve better results, have to better and develop customer service skills constantly. Consequently, in the current market there will be able to survive only those service companies, those will be able to respond to customers' expectations flexibly. In order to satisfy customers' needs comprehensively, the staff of leisure service companies, has to possess sufficient knowledge concerning the development of customer service skills, service culture and cognize the very customers. Customers' expectations encourage the interest in the development of customers' service skills. During the growth of needs, customer service staff is expected to professional and qualitative service. Concurrently, leisure service companies have to be interested in the process of customer service skills due to more and more intensifying competition. Being aware of the company's condition and having determined the service areas to be developed, it is necessary to plan which customer service skills problems it is necessary to solve first. *Problematic issue:* How do customers assess service skills in leisure service companies? How have to be solved service skills problems? What service skills problems do customers notice? *Research object* – customer service skills. Article aim- is to assess service skills in leisure service companies under the very customer approach. In order to achieve the aim there have been set the following objectives: 1. To present the concept, management and criteria of customer service skills and characterize the customer that is self-determined to use the service. 2. To research customer service skills in the companies, those provide with leisure service in Kaunas City. *Methods:* Analysis of literature, questionnaire survey.

URBAN IMAGE-MAKING IN BUSINESS PERSPECTIVE**R. Andriukaitiene¹, B. Svagzdiene¹, A. Pabedinskiene²,***¹Lithuanian Sports University, Kaunas, Lithuania**²Marijampole, Lithuania*

In the context of urban competitiveness the important role for its image has attractive instruments by which it is formed or strengthened. Image strategy development and implementation is one of the instruments which can ensure a high quality of life for the residents and provide an attractive environment for foreign investment and business development. The objective of the investigation – define the elements affecting the city's attractiveness and competitiveness, carry out the city's image assessment study in terms of the business community. The object of the investigation – the image of Marijampole city. The methods of the investigation – analysis of scientific literature and other information sources, survey. The results of the investigation highlighted the weakest image formation factors – city publicity policy, parking opportunities, city trademark, local business policy encouraging direct foreign investment (TUI), and absence of tourist information centre, scientific research and experimental development facilities. Respondents appreciated accommodations, multi-sports center opportunity exploitation, transportation opportunities and catering services. Today's image shaping of the city at the national level requires the city marketing strategy, city trademark, qualitatively functioning local business policy, city government contribution in shaping an attractive environment for business. There is not enough international business in the international level, international Web advertising, city trademark, attractive local business policy, business publications presenting. Conclusions. The investigation shows that it is necessary to establish a long-term strategy for shaping the city's image, to attract investment into the entertainment business, to organize exhibitions, business and cultural events, to promote the business, education and government partnership in the image formation process. Shaping the image of the city in the national and international level, it is suggested to apply these communicative means: business enterprises participation in trade shows, fairs, and business events, urban economic opportunities for publicizing in the media, advertising publications on business opportunities in Marijampole, ongoing communication with foreign embassies, city advertising in the online space and information publications for tourists.

COACHES' LOYALTY IMPORTANCE ON THE ORGANIZATIONS PROVIDING WITH RECREATIONAL SPORT SERVICE

V. B. Fominienė, D. Bulotienė, R. Mikalauskas
Lithuanian Sport University, Kaunas, Lithuania

Human resources quality turns out to be the crucial factor of organizational success in modern sport organizations. In other words the mission and aims of such organizations will be implemented only in case there work competitive and dedicated employees. In the following article there is discussed employees' loyalty as a significant activity part in sport organizations that determines the awareness, service quality and customer satisfaction with the organizations providing recreational sport service. Due to the fact that one of the employee's disloyalty expressions towards the organization is his/her job turnover intention; there are also reviewed the reasons for changing a job and the links of such a wish to the demonstrated loyalty towards the organization. There is presented empiric research, the aim of which is to identify coaches' loyalty expression towards the organization in martial arts clubs and a link towards job turnover intention. Research sample – 79 coaches, employed in different martial arts clubs in the largest cities of Lithuania. Methods: The anonymous questionnaire was used to determinate the employees' continuance, economical, affective and normative expression of loyalty, to disclose job turnover intention and determine their links towards socially demographic variables. The result has been calculated and analyzed with SPSS. Results: The research disclosed that the investigated coaches are not tied with sport clubs which they work in as they do not have any moral commitment to the organization based on a strong sense of duty, and their link to the organization is not based on financial, career or professionalism ladder interests. During the analysis of the coaches' preparation to change an organization there was disclosed weak intention to change a job. Also there was found a trend that those employees whose affective and normative loyalty is higher are distinguished by a lower wish to change their job. Key words: loyalty, turnover intentions, sport organization, employee.

SPORT ORGANIZATIONS BRAND-BUILDING MODELS: THEORETICAL VIEW

S. Kromalcas, I. Valantine

Lithuanian sports university, Kaunas, Lithuania

In recent years, scientists actively involved in analyzing and developing brand-building models, trying to fill in the missing gaps in sports branding strategy theory. Most of the currently existing differences of opinion between scientists show how complex and scientific sense of fun is a brand-building process that helps organizations to acquire, or to highlight the advantage over other brands of sports organizations. Research aim – to compare brand-building models of sport organizations detected in scientific literature. Research methods – researching and analyzing theoretical sport organizations brand-building models, general science research methods are used: systematic, comparative and logical analysis. Results: Sports branding concepts by macro level analysis revealed that in the literature dominates two main provisions: some theorists consider an activity designed to create, maintain or change people's attitude towards certain sports, others think that it design the development, planning and communication delivery name and identity to form and manage reputation. The analysis proposed by the authors branding concepts, it can be said that there is no consensus on sports branding and brand development concepts of consumption. Conclusions: The research of sport organizations brand-building models and their elements done revealed that most of the models has clearly defined the elements, but they are often intermittent nature, uncertain design consistency; sports brand-building models are not sufficiently detailed and informative, limited amount of the factors analyzed often impose finite sports brand-building actions that leads to sports brand-building model incompleteness and limited practical use.

DEVELOPMENT OF INOVATIVE HEALTH TOURISM SERVICE IN LEARNING ORGANIZATION

G. Zilaityte, B. Svagzdiene, I. Valantine

Lithuanian Sports University, Kaunas, Lithuania

In order to maintain growth and stability in dynamic and changing environment companies and countries have to be innovative, adoptive to innovation, tend to learn. Health (medical) tourism service is one of the most innovative services in Lithuania. These types of service in other countries have already established themselves in the market and generate relatively high revenues from inbound tourism sphere. The study was aimed to reveal characteristics of a learning

organization resolution in potential health tourism enterprises and assess the readiness of these companies to provide a service. Subject: the development of innovative health tourism service in learning organization. Methods: analyses of systemic and comparative scientific literature, survey, descriptive statistical analysis of the data. The results revealed that the expression of characteristics of a learning organization is particularly strong at inbound tourism enterprises. Researched companies tend to work in a team; the staff is able to communicate with each other, to share experiences, to perform common tasks, to analyze their experiences, to generate new ideas related with company's goals and vision. Conclusions: The organizations are broadly consistent with the development of an innovative service features, but the lack of specific knowledge could affect unsustainable process of the service development. After the assessment of readiness to provide innovative health tourism services could be said that the companies were able to do it, have potential and are able to create a new service, but for one or another lack of specific knowledge in the future organizations may encounter unforeseen problems: unexpected additional costs, unidentified user needs etc.

BASIC UNDERSTANDING ASPECTS OF SPORT RECREATION, AS A COMPLICATED SOCIAL PHENOMENON

R. Mikalauskas, B. Švagždienė

Lithuanian Sports University, Kaunas, Lithuania

The leisure and sport industry is changing at a quickening pace. Understanding sport recreation is very important, because professionals and academics should find it a useful text, helping to contribute towards a more informed understanding of existing challenges, perception and essentiality of sport recreation. This article is aimed at those with a degree of prior knowledge in sport recreation area and seeks to apply received wisdom to the leisure and sport context. Topicality and novelty of issue. Recreation has become one of the major social and economic factors in society. Currently in Lithuania there is the formation process of industry, which relies on a certain set of resources, have their specialists, links to other industries and in the future will bring tangible social and economic effect. Problem: Organization of recreational activities is difficult, because often in each system there operate several factors: consumer groups, the natural complex, technical infrastructure, service and industrial areas, and labor resources. Today, emerged recreation's, as a science, problem, because recreation activities are closely related to the particular social and cultural environment. So recreation – a set of relationships and phenomena, emerged in the process when there is used leisure, which is for health

promotion, knowledge, people's sporting and cultural activities to develop in specialized structures and areas (Dudenhoeffer, 1990; Mallen & Adams, 2008; Mull, Bayless, Ross Jamieson, 1997; Torkildsen, 2000). In this context, there is a need for a clear understanding of sportive recreation, as a difficult social phenomenon. When trying to reveal the social essence of sportive recreation, research on this subject, no doubt, provide a solid basis not only for further knowledge development about the phenomenon of sportive recreation, but also create presumptions for the theory creation of such a phenomenon. The article aim is – to determine the essential theoretical and practical activity description aspects of the sportive recreation, as a difficult social phenomenon. Research methods: Analysis of scientific literature, comparison and review. Keywords: sport recreation, sport recreation aspects, functions, elements, physical education, needs.

THE INFLUENCE OF SERVICE CLOTHING SETS ON THE WORKING CAPACITY

V. Larins, A. Rudzitis, Z. Pavare

Latvian Academy of Sport Education, Riga, Latvia

The aim of this study was to determine the State Police of Latvia clothing sets impact on physical working capacity. Subjects and methods: Repeated tests of body's working capacity were conducted on Latvian police officers` summer and winter wear clothing sets (uniforms), in order to assess the changes in physical working capacity under the influence of specially designed garment sets. Step-ergometry and physical fitness testing according to EUROFIT test methodology was used to evaluate the working capacity under certain dynamic conditions. Psychophysiological changes were assessed using "Omega S" tests. Results: Physical working capacity in Harvard steptest by HSTI index averaged out to 78.6 ± 1.3 , which indicates mediocre working capacity of participants. The fitness of the experiment participants by EIROFIT test results is evaluated as average or below average, but by separate indicators (static muscle strength, abdominal muscle strength, cardiorespiratory system functional capability) as low. Under influence of the clothing sets, physical work ability decrement was determined in the winter uniform of an average of 29.8% ($P < 0.05$) compared to the summer uniform. The set of winter clothing significantly ($P < 0.05$) decreases body's strength indicators that are involving large amplitude motions, as body's flexors dynamic strength (17.6%), leg muscle explosive power indicators (5.4%). The movement speed agility (3.5%) and body flexibility reduces significantly. Insignificant ($P > 0.05$) changes appear in static muscle strength, arm movement speed, hand's dynamometry indicators, as well as a static body balance. Conclusions: Comparing the changes of body's physical fitness indicators under the influence of summer and winter wear uniforms, it can be concluded that significant performance decrease of policemen working capacity was detected while wearing winter uniforms. That was caused by too tightly designed clothing restricting body and arm movements, especially in wide range body and arm motion, but practically does not affect the performance of small range motions of body and arms or static body muscle tension. Significant deterioration of physical working capacity and the result deterioration of cardiorespiratory or endurance running tests with gradually increasing speed, are caused by the movements limiting effects of winter clothing kit, total weight of winter uniform, as well as the loss of thermoregulatory efficiency shown by the gathering of excreted sweat in winter clothing.

MITOCHONDRIAL RESPIRATION CAPACITY IN RELATION TO SKELETAL MUSCLE MASS, INFLAMMATORY MARKERS AND FUNCTIONAL PERFORMANCE IN RECREATIONALLY ACTIVE OLDER WOMEN

M. Pääsuke¹, J. Ereline¹, H. Gapeyeva¹, T. Kums¹, K. Alev¹, R. Puhke¹, P. Kaasik¹, R. Pääsuke^{2,3}, K. Paju², M. Eimre², L. Kadaja², E. Seppet²

¹Institute of Exercise Biology and Physiotherapy, Tartu, Estonia

²Institute of Biomedicine, University of Tartu, Tartu, Estonia

³Tartu University Hospital, Tartu, Estonia

Aim: the effect of aging on skeletal muscle mitochondrial respiration capacity in recreationally active women in association with muscle mass, fibre type distribution, inflammatory markers and functional performance was examined. **Methods:** Twelve older (aged 69 – 81 yrs) and 9 young (aged 20 – 26 yrs) women participated. Muscle biopsies from the vastus lateralis muscle were obtained by transcutaneous biopsy. Oxygraphic method was used for measurements of mitochondrial respiration rates in muscle fibres in the presence of different substrates (Vg, Vs, Vc). Myosin heavy chain (MHC) isoform composition was measured by electrophoresis. Magnetic resonance imaging was used to determine volume of the quadriceps femoris (QF) muscle. Functional performance was assessed by 6-min walking test (6MWT) distance. Serum levels of interleukin-6 (IL-6) and tumor necrosis factor-alpha (TNF-alpha) were determined from blood samples. **Results:** Older women had reduced ($p<0.05$) Vg, Vs and Vc, and shortened 6MWT distance as compared to young women. They also had a lower ($p<0.05$) volume and MVC torque of the QF muscle, and a higher ($p<0.05$) relative content of MHC I isoform compared to young women. In older women, Vg correlated positively with the relative content of MHC IIx isoform ($r=0.62$; $p<0.05$). Multiple regression analysis revealed that in older women, Vc is significantly associated with body fat, TNF-alpha and 6MWT distance, whereas Vs is associated with skeletal muscle mass. **Conclusions:** In recreationally physically active women, aging is characterized by markedly reduced skeletal muscle capacity of oxidative phosphorylation. Lower mitochondrial respiration capacity was associated with lower walking endurance and skeletal muscle mass, and increased inflammation.

CHANGES IN EMG OF M. M. VASTUS LATERALIS AND MEDIALIS DURING INCREMENTAL CYCLING 24 HOURS AFTER PRIOR DROP JUMPS EXERCISE

N. Baranauskienė, S. Raubaitė, A. Stasiulis,
Lithuanian Sports University, Kaunas, Lithuania

The aim of the study was to assess differences of the residual effect of prior drop jumps (PDJ) EMG parameters during incremental cycling exercise (ICE) in male students. Methods: On two different days 10 male students performed control and under fatigue conditions ICE on an electronically braked cycle ergometer (Ergoline-800, Germany). The pedal cadence were 70 rpm. 100 PDJ were performed as a prior eccentric – concentric exercise from a 0.70 m stage with 20 s of recovery between every drop jump. EMG (Biometrics Ltd, USA) parameters of thigh m. vastus lateralis and m. vastus medialis were continuously recorded during ICE. Capillary blood samples were collected in order to measure serum creatine kinase (CK) activity before and 24 hours after PDJ. Subjects rated perceived exertion and DOMS using 20 and 10 points scales, respectively. Results: Subjects felt moderate muscle pain (5.0 (1.5)) according to Borg's CR-10 scale and the creatine kinase (CK) activity in blood had increased ($p < 0.05$) up to 506.7 (210.3) IU/ L 24 hours after PDJ (pre-exercise CK 106.3 (53.1) IU/ L). The EMG root mean square amplitude significantly increased in m. vastus lateralis 24 hour after PDJ ($P < 0.05$). Conclusion: Prior drop jumps seem to have significant effect on EMG root mean square amplitude in thigh muscle during incremental cycling exercise within 24 hours of recovery in male students.

THE INFLUENCE OF DIFFERENT PHYSICAL LOADS ON YOUNG ATHLETES LUNG FUNCTION

E. Kemerytė-Riaubienė, N. Jaščaninienė, A. Kepežėnas, R. Tamulevičius
Lithuanian University of Educational Sciences, Vilnius, Lithuania

Many researches show the positive effect of exercise on young athletes lung function, but there is a lack of data on how aerobic and anaerobic physical load influenced these breathing indices. The aim of the research was to investigate the state of young girl lung function and to estimate the dynamics of these indices in different training periods. The subjects of the research were 11 – 12 years age girls, engaged in tennis (n – 7), football n-8), sports gymnastics (n – 8). Practicing sports 3 times per week, for 1,5 hour. Research methods: Spirometric variables measured were lungs function (Vital capacity (VC), Forced vital capacity in liters (FVC), Forced expiratory volume in one second

in liters (FEV1), Peak expiratory flow (PEF l/s), Maximum expiratory flow after exhalation 75 – 25 % FVC (MEF75, MEF50, MEF25). Also were measured anthropometrical data (Height, weight, BMI, Muscle mass %, Fat mass %) and Rhytmography (Heart rate, Breathing arrhythmia, Roufier index). To evaluate physical loads in different training period we analyzed the program and the documents provided by the coaches of every sport: tennis, football players and spots gymnastics. The results reveal that 11 – 12 years girl lung function differs, depending on physical loads in all studied sports groups. Higher anaerobic stress preconditioned by deterioration in lung function parameters and after competition period this function is again improved. Conclusion: Physical loads, which young athletes have to perform, holding the breath or working more in anaerobic zone, does not have a positive effect on young athlete lung function.

IS THERE ANY ASSOCIATION BETWEEN HUMAN *ACE I/D* POLYMORPHISM AND INDIVIDUAL DIFFERENCES IN EXERCISE HEAT STRESS TOLERANCE?

V. Ööpik, S. Timpmann, K. Kreegipuu, M. Tamm, E. Unt
University of Tartu, Tartu, Estonia

There is a wide range of inter-individual variability in response to acute exercise in the heat, as well as in the extent of improvement in exercise heat stress tolerance occurring due to acclimation. Human *ACE I* allele has been proposed as a candidate prediction marker for better tolerance of acute exercise heat stress. This study was intended to examine whether acclimation-induced improvements in the efficiency of physiological thermoregulatory system and prolonged exercise performance in the heat are associated with *ACE I/D* polymorphism. Subjects and methods: Young male subjects ($n = 40$, age 23.7 ± 3.6 years, $VO_2\text{peak}$ 54.1 ± 6.2 $\text{ml} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$) walked on a treadmill until exhaustion at 60% $VO_2\text{peak}$ in a hot dry environment (42 °C, relative humidity 18%) before (H1) and after (H2) 10-day heat acclimation program. In both H1 and H2 heart rate (HR), skin (T_{sk}) and core (T_c) and endurance capacity were measured. Genomic DNA was extracted from leucocytes and genotyping of the *ACE I/D* polymorphism was performed using PCR method. Results: There were no significant differences in HR, T_{sk} , T_c or endurance capacity in H1 and H2 between *DD* ($n = 13$) and *I+* groups ($n = 27$). In conclusion, these result suggest that acute exercise heat stress tolerance as well as improvement in exercise heat stress tolerance due to acclimation are not associated with *ACE I/D* polymorphism.

MUSCLE BLOOD SUPPLY DURING PROLONGED STATIC VOLUNTARY CONTRACTIONS

A. Paeglītis, I. Kukulis, E. Eglītis, Z. Galeja
Latvian Academy of Sport Education, Riga, Latvia

It is known that metabolic activity of muscle cells even in one separate muscle differs. If VO₂ rate differs between muscle's motor units, then blood flow through capillaries supplying muscle cells must be regulated according to their metabolic activity. The aim of this study was to evaluate muscle blood flow and compare it with active muscle cell metabolic activity during muscle prolonged static voluntary contraction with different contraction forces. Subjects: In this study participated 37 healthy untrained people, aged 24 – 36 years. Methods: Investigations were performed on the forearm muscles using hand grip exercises with 10% and 15% of maximal voluntary contraction (MVC) Volume blood flow in the forearm segment (I) and capillary filtration coefficient (CFC) were measured using venous occlusion plethysmographic device "KPOBOTOK – 4". VO₂ and lactate delivery (La) were calculated from pO₂ and lactate concentration arterio-venous differences and I in every controlled moment. pH and pO₂ was measured using bioanalyser ABC-1 "RADIOMETER". Lactate concentration was measured using BIOSEN C-line "EKF diagnostic" device. Results: During 10% MVC it was shown that I, VO₂, La and CFC till the cessation of exercise caused by exhaustion, which takes 42±1.1 min, stabilize on appropriate level, not reaching maximal possible values. Increasing contraction force only for 5%, i.e., to 15%MVC, all examined parameters during exercise till exhaustion, which takes 12±0.8 min, increase, and at the moment of cessation of exercise reach their maximal values. Increase of blood supply and VO₂ during 15%MVC did not provide prolonged forearm contraction, and exhaustion occurs more than 3 times quicker than during 10% MVC.

RELATIONSHIPS BETWEEN SHOULDER MUSCLE STRENGTH AND ENDURANCE IN PATIENTS WITH FROZEN SHOULDER SYNDROME BEFORE AND AFTER MANIPULATION UNDER GENERAL ANESTHESIA

J. Sökk¹, H. Gapeyeva¹, J. Ereline¹, M. Merila², M. Pääsuke¹

¹Institute of Exercise Biology and Physiotherapy,

²Department of Orthopaedics and Traumatology,

Tartu University Hospital, Tartu, Estonia

Aim: This study was to evaluate the relationships between shoulder muscle isometric strength (MVC), and shoulder muscle isometric endurance test time (ETT) and working capacity (NI) in patients with frozen shoulder syndrome (FSS). **Subjects:** Fifteen FSS patients with mean (\pm SE) age of 53.6 \pm 9.7 years participated in this study. **Methods:** Shoulder muscle MVC during flexion (FL), extension (EXT), abduction (ABD), adduction (ADD), internal (INR) and external (EXR) rotation was measured by a hand-held dynamometer. Shoulder muscle isometric endurance was characterized by ETT and NI which was assessed during holding a weight in hand until exhaustion. Data were collected before manipulation under general anesthesia (MUA), one and six months after MUA. **Results:** Before MUA in patients with FSS shoulder muscle ETT was correlated with MVC during FL, EXT, ABD, ADD, INR ($r=0.62-0.78$, $p<0.05$), whereas NI correlated with MVC during EXT, ABD, ADD, INR ($r=0.63-0.74$, $p<0.05$). One month after MUA correlations were found between ETT and MVC during FL, INR, EXR ($r=0.59-0.68$, $p<0.05$), whereas NI correlated with MVC during FL, INR, EXR ($r=0.65-0.76$, $p<0.05$). Six months after MUA ETT was correlated with MVC during FL, ADD, EXR ($r=0.63-0.84$, $p<0.05$), whereas NI correlated with MVC during EXT, ADD, EXR ($r=0.73-0.87$, $p<0.05$). Multiple regression analysis indicated that one month after MUA ETT was associated with MVC during FL, whereas NI was associated with MVC during EXR one month and with FL six months after MUA. **Conclusion:** These findings suggest that shoulder muscle strength and endurance exercises had an important part in shoulder function recovery after MUA.

PHYSIOLOGICAL RESPONSES AND ENERGETICS DURING DIFFERENT MODES OF PILATES SESSIONS WITH REFORMER: A PILOT STUDY

K. Zaicenkoviene, A. Stasiulis

Lithuanian Sports University, Lithuania, Kaunas

Introduction: The interest and popularity of Pilates is increasing worldwide. Pilates exercise has been claimed to be a successful program for health promotion, rehabilitation and athletic training (Sureeporn P., Aatit P., Ubon P., Patraporn S. 2011). Pilates exercises can be performed with or without specific equipment (de Luz et al., 2013). The aim of this study was to measure the energy response and physiological changes during different modes of Pilates training session with equipment Reformer. **Subject:** In this pilot study participated experienced Pilates trainer (height – 1.68 m; weight – 64 kg; age – 37 years, VO₂max- 45.1 ml/kg/min; HR max - 184 beats/min). **Methods:** Heart rate (HR) was continuously recorded using portable HR monitor (Polar S810i, Finland). Pulmonary gas exchange parameters were continuously measured breath-by-breath with a portable telemetric system (Oxycon Mobile, Jaeger, Germany). Capillary blood samples were obtained before the routine and at the end of first, third, 5th and 7th minutes of recovery and analyzed for blood lactate concentration using a portable lactate analyzer “Accutrend” (Germany). The net aerobic energy (W_{AER}) was calculated from VO₂ consumed during exercise above resting values, body mass and caloric equivalent. Anaerobic alactic energy was calculated from the fast component of the post – exercise oxygen uptake, body mass and caloric equivalent. The caloric equivalent of 21.131 Jml⁻¹ was used (Beneke et al., 2004). Anaerobic lactic energy was determined from the highest change in the blood lactate concentration after exercise subtracting the lactate value before exercise, O₂-lactate equivalent and caloric equivalent. The subject performed three 15 min Pilates exercise sessions in the lying (legs, arms) and sitting positions (LL, LA, S, respectively). **Results:** The mean HR was 92.7, 92.4 and 102.5 beats/min during LL, LA and S sessions, respectively. The relative intensity of them equaled to 50.3, 50.2 and 55.7 % of HRmax, respectively. The total net energy requirement was 146, 153 and 185 kJ, respectively. The contribution of W_{AER} was more than 90 % (range 91 – 94 %). **Conclusion:** The Pilates sessions performed with equipment Reformer seem to be light or very light aerobic exercises with absolute intensity of 3.0 – 3.5 metabolic equivalent units.

THE IMPACT OF DIETARY SUPPLEMENT MULTI MACA ON ATHLETES' ORGANISM

K. Milašius, R. Dadelienė

Lithuanian University of Educational Sciences

In the process of training high performance athletes it is relevant to be aware of scientifically based recommendations on the consuming options for particular dietary supplements considering athletes' age, sex, performance in sport, and specifics of sport discipline (Jeukendrup, Gleeson, 2010). The goal of the research was to analyze the impact of dietary supplement Multi Maca on athletes' physical preparedness and on their functional capacity when performing various duration works. Subjects and methods: 24 students of physical education from Lithuanian University of Educational Sciences (LUES) who combine studies with their sport trainings were tested. By the method of accidental sampling students were assigned to two – experimental (E) and control (C) groups. Athletes were tested before the beginning of consuming the dietary supplement (Research I) and 20 days after consuming the supplement (Research II). Athletes' physical development level, physical capacity for work, and functional capacity parameters were analyzed in the laboratories of LUES Sport Science Institute. Research results have revealed that the consumption of dietary supplement Multi Maca had positive influence on athletes' physical capacity when performing short-duration work; however this increase was not considered to be statistically reliable. Experimental group testees' single muscle capacity power, anaerobic alactic muscle power, maximum instantaneous power when performing 10-s duration work, and average power of this work had increased. Our research results demonstrate that consumption of dietary supplement Multi Maca had more influence on experimental group participants' functional capacity of blood circulation and on indices of aerobic endurance than it had on control group participants.

STRENGTH DEVELOPMENT CAPACITY THROUGH THE LIFE – SPAN: PHYSIOLOGICAL LIMITING FACTORS

T. Seene, J. Lellep, P. Kaasik

*Institute of Exercise Biology and Physiotherapy, Institute of Mathematics,
University of Tartu, Tartu, Estonia*

The accepted standpoint is that the human organism is ready for strength development from late puberty. Really, a newborn infant starts to fight gravitation at birth and this is the actual strength implementation, which

ensures strength development. Posture control and its integration with the movements of extremities shows that, success of motor activity depends on muscle strength. Muscle weakness is the main factor in the dysfunction of human motor activity and balance during life. The aim of the present study is to give an overview of strength development phases and physiological limiting factors during the life – span. The statement that strength development starts at birth requires discursive reasoning. Changes in the force moment of neck muscles during five months after birth were as follows: 0.64 N x m in the 1st month, 1.73 N x m in the 4th month and 1.89 N x m in the 5th month. The head perimeter and neck muscles force moment ratio decreased from 54 (1st month) to 25 (4th month) and 24 (5th month), which shows that the influence of generalized muscle strength increases relatively quickly after birth. Muscle contractions have already been observed in the 17th fetal week and this is the time when nerve-muscle contact develops. At birth, about 60% of limb muscle fibers are type II fibers and muscles have almost the same contraction velocity. Regulation of fiber cross-sectional area and real differentiation into fast and slow types starts after birth. With the increase in the secretion of anabolic hormones (testosterone, growth hormone, insulin), muscle mass, the number of neuromuscular junctions and muscle strength increases. With the reduction in hormone level, muscle mass and quality also decrease. If muscle strength increases about 300% during the first 5 months of life, 180% during 15-20 y, 15% during 20-30 y, then it decreases 7% during 30-40 y, 30% during 50-70 y and about 25% during 70 – 80y. The age-related decline in muscle mass primarily results from type II fiber atrophy and loss of the number of the fibers accompanied with the decrease in myosin heavy chain IIX and IIA isoforms' relative content. Variability in fiber size, accumulation of non-grouping, scattered and angulated fibers, and expansion of extracellular space are characteristic of muscle atrophy. Impairments in neural activation as well as potential alterations in other muscular properties that may reduce contractile quality are defined as a reduction in voluntary force production per unit muscle size. In conclusion: strength development capacity of skeletal muscle depends on physiological, neurological, mechanical factors, on capacity of hyperplasia/hypertrophy and atrophy through the life-span and on changes in fine architectonics and molecular composition of the contractile machinery.

**VOLUNTARY AND ELECTRICALLY EVOKED FORCE-
GENERATION CAPACITY OF QUADRICEPS FEMORIS MUSCLE IN
YOUNG AND ELDERLY WOMEN WITH SIMILAR PHYSICAL
ACTIVITY**

**H. Gapeyeva¹, J. Ereline¹, T. Kums¹, H. Aibast¹, E. Seppet², K. Paju²,
J. S. McPhee³, M. Pääsuke¹**

¹Institute of Exercise Biology and Physiotherapy and

²Institute of Biomedicine, University of Tartu, Tartu, Estonia

*³Institute for Biomedical Research into Human Movement and Health,
Manchester Metropolitan University, England*

The quantitative loss of muscle mass is the most important factor underlying the decline in muscle strength and power with ageing. The aim of the present study was to compare the isometric voluntary force-generating capacity and twitch contractile properties of quadriceps femoris (QF) muscle between young and elderly women with similar level of physical activity. Subjects and methods. Twelve young women aged 21 – 26 years and 12 elderly women aged 67-80 years participated in the study. A questionnaire was used to determine habitual physical activity levels which included a Sport Activity score (Baecke *et al.*, 1991). Peak torque (PT) of isometric maximal voluntary contraction (MVC), rate of torque development (RTD) at 25%, 50 % and 75 % of MVC were measured. The PT of electrically stimulated twitch contraction were recorded before and immediately after 5-s MVC contraction and postactivation potentiation index (PAP) was calculated as % of resting twitch. Results: Young and older groups had similar Sport Activity scores. Elderly women had significantly lower isometric voluntary PT and RTD at 50% MVC compared to young women (30% and 20%, respectively) as well as lower PT of the resting and potentiated isometric twitch (17 and 18 %, respectively). No significant difference in PAP between groups was noted. Physically active elderly women demonstrated greater decrease (10%) of maximal than explosive strength and produced lower twitch contraction of QF muscle at rest and potentiation as compared to young women. Acknowledgements: This study was partly supported by the EC FP7 project GA-223576.

BIOMECHANICAL ANALYSIS OF FOREHAND HIGH AND LOW SERVE IN BADMINTON PLAYERS WITH DIFFERENT TRAINING EXPERIENCE

J. Ereline, H. Reino, H. Gapeyeva, T. Kums, M. Pääsuke

Institute of Exercise Biology and Physiotherapy, University of Tartu, Tartu, Estonia

Aim of the study. The purpose of the present study was to compare the biomechanical characteristics of forehand low and high serve in badminton players with different training experience. Subjects: Seventeen Estonian youth- and adult-class male badminton players aged 15 – 30 years participated in this study. Badminton players were distributed into two groups (A and B) according to the players' ranking in Estonian single chart. Mean training period in badminton was 12 ± 1.9 (mean \pm SD) years and 5.5 ± 1.2 years in group A and B, respectively. Methods: Biomechanical analysis of the forehand low and high badminton serve was performed using 3-D movement analysis system (BTS S.p.A., Italy) with 6 infrared cameras. Each player served 6 low and 6 high serves and in both kinds of serve the best one was analysed. Range of motion of upper arm and ulnar bone as well as body inclination were measured. The time of movement of the racket, arm movement velocity and the stroke energy were calculated. Conclusions: High-level players had longer racket movement time in high serve than lower-level players. In forehand high serve, all players had greater hip movement ahead of side of stroke arm, the angle of body inclination, angle of upper arm and ulna, arm movement velocity in the room and stroke energy than in forehand low serve. Arm movement velocity in the ahead direction in low and high serve is negatively related to appointed stroke energy of the respective serve.

INFLUENCE OF 3-MONTH THERAPY USING THE NEURO-ORTHOPEDIC PNEUMOSUIT ATLANT ON GAIT CHARACTERISTICS IN PRESCHOOL CHILDREN WITH SPASTIC CEREBRAL PALSY

H. Gapeyeva, P. Mitt, J. Ereline, M. Pääsuke

Institute of Exercise Biology and Physiotherapy, University of Tartu, Tartu, Estonia

Different kinds of kinesitherapy are used in medical rehabilitation of neurologic patients with motor deficiency: partial body weight-supported treadmill training, driven gait orthosis, neuromuscular electrical stimulation, neuro-orthopedic suit therapies. Neuro-orthopedic pneumosuit (NOPS) Atlant

(Dynaforce, Russia) creates a muscle framework by dynamic proprioceptive stimulation stabilizing the trunk and the extremities, reducing pathological synergies and normalizing patient's motor activity. The aim of the present study was to investigate the influence of 3-month therapy using the NOPS Atlant on gait characteristics in preschool children with spastic cerebral palsy (CP). Subjects and methods: Six CP children with spasticity of lower extremities with (mean \pm SE) age of 5.2 ± 0.8 year participated in the present study before and 3 months after therapy using the NOPS Atlant. The kinematic and kinetic characteristics of gait were measured using 3-D movement analysis system Elite Clinic. Children had NOPS therapy sessions during three months by supervision of experienced physiotherapy specialist. Results: after 3-month therapy using the NOPS Atlant significant ($p < 0.05$) increase (7.9 %) of the stride length of gait was found as compared with initial data. Children with spastic CP demonstrated significant improvement of range of motion of hip joint adduction, decrease of knee joint external rotation, as well as positive changes in foot progression angle during gait. In conclusion, motor function re-activation during gait in preschool children with spasticity caused by cerebral palsy was noted after 3-month therapy using the NOPS Atlant. However, future research is needed to elucidate mechanisms of neurodynamic therapy effect on motor ability in children with CP.

INFLUENCE OF PASSIVE FOOT FLEXION MOVEMENTS APPLIED AFTER EXERTION ISOMETRIC WORKOUTS ON MUSCULAR BLOOD FLOW

A. Grūnovas, J. Poderys, E. Trinkūnas, V. Silinskas

Lithuanian Sports University, Kinesiology Laboratory, Kaunas, Lithuania

Blood flow intensity plays an important role in the recovery of muscular performance abilities. The task of this study was to find out the influence of passive flexion movements applied after exertion isometric workouts on muscular blood flow parameters. The participants of this study were 18 adult males adapted to endurance type of training. All participants were divided into two sub-groups. Participants of the study performed two isometric 30-s workouts at 75% of MVC. Between the workouts was 20 minutes interval for recovery. During the first stage one of the sub-groups performed workout and a passive recovery was applied while to subjects of the second sub-group the passive foot flexion movements were applied. During the second stage the form of recovery was changed. Arterial blood flow intensity was registered venous occlusion plethysmography and passive foot flexion movements were performed by special mechanical equipment. The results obtained during the study showed that maximal increase of blood flow at 21 second after the

workout was registered (52.0 ± 2.9 ml/min/100ml), while the application of passive movement before the workout decreased the blood flow intensity (45.0 ± 2.6 ml/min/100ml). This was significantly ($p < 0.05$) lower compared with passive rest. The same tendency of lower blood flow intensity was observed in the measurements up to 40 seconds after workouts. These effects can be explained by reduced venous filling and increased venous vascular reserve capacity in the calves. The results obtained during this research allow concluding that passive foot flexion maneuver applied before the isometric workload decrease the blood flow intensity during the recovery.

THE RELATIONSHIP BETWEEN THE QUADRICEPS FEMORIS THICKNESS AND FUNCTION IN FRAIL ELDERLY IN CLINICAL SETTING

**V. Juodzbalienė, D. Imbrasiene, R. Sakaliene, V. Dudoniene,
M. Baranauskiene**

Lithuanian sports university, Kaunas, Lithuania

Aim of study: to determine the impact of different physiotherapy programs on quadriceps femoris thickness and strength in frail elderly in clinical setting. **Subjects and methods:** 30 subjects (24 women and 6 men, the mean age 76.7 ± 3.63) with normal bone density and requiring minimal assistance in activities of daily living participated in the study. Participants were divided into three groups (10 subjects in each). The 8-week protocol of progressive-resistant training at 60% of repetition maximum of quadriceps femoris was applied for the first group, the 8-week protocol of the combination of electrical muscle stimulation and strengthening exercises of quadriceps femoris were applied for the second group and the 8-week protocol of single electrical muscle stimulation was applied for the third group. The thickness of quadriceps femoris and subcutaneous adipose tissue was measured by blinded trained person using ultrasonography, anthropometry was used for the measurement of circumference of thigh and dynamometry for muscle function assessment, body mass index was calculated. Outcomes were taken before, after four and eight weeks of intervention. **Results:** Electrical stimulation applied separately had no positive effect on quadriceps femoris strength ($P > 0.05$) and thigh circumference ($P > 0.05$) compare to strengthening exercises or combined intervention. The strengthening exercises and electrical muscle stimulation applied together and separately has positive effect on quadriceps femoris thickness ($P < 0.05$). **Conclusion:** The greatest increase in muscle thickness was observed after applying exercise together with electrical stimulation.

DEPENDENCE OF PSYCHOMOTOR REACTION TIME ON GENDER AND TASK COMPLEXITY FOR ELDERLY DEAF PEOPLE

D. Mickevičienė, D. Karanauskienė, A. Skurvydas, K. Čapkauskas
Lithuanian Sports University, Kaunas, Lithuania

Research aim was to assess the psychomotor reaction time in dependence of gender and task complexity for deaf elderly people. Research methods: The sample of the research included 23 deaf elderly persons (13 women and 10 men). The study was conducted using Dynamic Parameter Analyzer DPA-1 for arm and leg movements. The subjects performed the task with their right hand. During each task the subject set the handle symbol, 0.0035 m wide, at the start zone on the computer screen. The programme generated a flashlight signal every 1-3 seconds, and at the same time the subject had to react and to push the handle so that he/she could hit the target. The cycle of measurement ended when the handle symbol hit the target. Research results showed that gender had statistically significant effect on reaction time ($p < 0.05$), maximal speed ($p < 0.05$) and path of movement ($p < 0.05$). The interaction of repeated trials was statistically significant. Deaf women reacted faster than men both in simple reaction (RTs) and complex reaction (RTc) tasks. Learning effect occurred during the whole task and it was significant to both men and women. Discussion and conclusions: Gender had a statistically significant effect on reaction time; maximal speed and path of movement, i.e. reaction time, maximal speed and path of movement for deaf elderly women were statistically significantly better compared to those of deaf elderly men. During the simple reaction task and complex reaction task reaction time for both elderly deaf men and women was longer than that of women. Our research results reject the hypothesis that psychomotor reaction of elderly deaf men was better than that of elderly deaf women.

THE EFFECT OF WARM-UP AND DIFFERENT STRETCHING EXERCISES ON BICEPS BRACHII MUSCLE FUNCTION

E. M. Riso, M. Veevo, J. Ereline, H. Gapeyeva
Institute of Exercise Biology and Physiotherapy, University of Tartu, Tartu, Estonia

The aim of this study was to evaluate and compare the acute effect of warm-up, static and dynamic stretching exercises on *biceps brachii* muscle function. Different type of stretching exercises are frequently used in sports before

physical efforts. Recent studies have demonstrated different effects of dynamic and static exercises on physical performance capacity. Subjects: Nine healthy adult female basketball players, training experience 13.5 years were participated voluntarily in this study. Methods: participants were examined twice in different days: after performing static and dynamic stretching exercise. Isometric maximal voluntary contraction characteristics were measured using dynamometry; muscle tone, elasticity and stiffness characteristics were measured using myotonometer. All measurements were performed before and after 5-min warm-up jogging, immediately after 30-s stretching exercise and after 10-min rest. Results: warm-up did not cause any changes in the isometric maximal voluntary contraction, strength of elbow muscle as well as in muscle tone and elasticity. Static stretching was effective to increase elasticity of *biceps brachii* muscle, but did not influence the isometric strength characteristics of elbow flexor muscles. Shortening of isometric contraction latency of elbow flexor muscles after dynamic stretching exercise and increase of strength after 10 min rest were noted. Conclusion: Dynamic type of stretching exercise can be recommended to prepare muscles for explosive maximal exercise.

CONNECTION BETWEEN THE 1ST YEAR STUDENTS' NUTRITION PECULIARITIES AND BODY FAT WEIGHT

D. Vizbaraitė, S. Čapkauskienė, I. Sedliorienė
Lithuanian Sports University, Kaunas, Lithuania

Students' physical activity is not sufficient in Lithuanian universities, so while the physical activity is decreasing and a lot of high-calorie food is used, the body fat mass is increasing. That is why a problematic question if there is a connection between the LAPE (Lithuanian Academy of Physical Education) exercising and not exercising students' body fat mass and their food ration arises. The aim of the research is to define the connection between exercising and not exercising students' nutrition peculiarities and their body fat mass. To reach this aim these tasks were defined: To define some indexes of body composition (fatty folds, BMI, body fat mass) and to compare them between exercising and not exercising students. To analyze nutrition peculiarities and compare them between the exercising and not exercising students. To evaluate the aspects of connection between nutrition peculiarities and body fat mass. There were 310 1st year students of Lithuanian Academy of Physical Education as subjects of the research. They were divided into four groups of research. One group consisted of not exercising women (n=63) whose mean age was 19.4 (±0.5). The second group contained exercising women (n=81) whose mean age was 19.5 (±0.6). The third group consisted of not exercising men (n=76) whose

mean age was 19.5 (± 0.6) and the fourth group contained exercising men ($n=90$) whose mean age was 19.7 (± 0.7). The following methods were used during the research: questionnaire, frequency of exercising, anthropometric measurements, register of food ration, BMI, percentage of fat amount, measurements of fatty acids. The analysis showed that the BMI of both exercising and not exercising students was standard. The percentage of fat amount and the sum of fatty acids were bigger at not exercising students. According to the data of the research, exercising students consume confectionary, crisps, pizzas and other low-nutrient products more frequently than not exercising students. Meat products are more often consumed by exercising than not exercising students and fruit are also more frequently used by exercising students. Conclusion: The comparative connection between nutrition and body fat mass was defined. It showed that only the group of exercising men had a connection between a big amount of carbohydrates (sugar) in their ration and the percentage of body fat amount.

THE CHOISEN ELEMENTS OF LIFESTYLE OF THE POLISH STUDENTS OF THE UNIVERSITY OF PHYSICAL EDUCATION AND SPORT IN BIALA PODLASKA AND STUDNEST OF LATVIAN ACADEMY OF SPORT EDUCATION IN RIGA

**A. Litwiniuk¹, R. Cieśliński¹, E. Huk-Wieliczuk¹, A. Daniluk¹,
J. Grants², I. Kundzina²**

¹Josef Pilsudski Academy of Physical Education Warsaw, Faculty of Physical Education and Sport, Biala Podlaska, Poland

²Latvian Academy of Sport Education, Riga, Latvia

Lifestyle is a very important factor in everyday behaviour of people. Regular physical activity, nutrition habits and not following patterns of behaviour risky for our health contribute to a decrease in social pathology and an increase in level of health state. The main subject of the research is to diagnose the lifestyle of students (regular physical activity, nutritional habits and risk behaviour for health) of University of Physical Education and Sport in Biala Podlaska (Poland). The research comprised 280 students of University of PE and Sport and 90 students of LASE in Riga. The average age of respondents was (M=20,9 years) The subjected were interviewed of IPAQ and HBUSQ questionnaire. The very high percentage of students leading healthy lifestyle calls for promoting health-directed behaviour among youths. Most of students represented high level of physical fitness and practiced many of different form of activities. Students prefer sport as a sport for all character on his pleasure values rather. It with introduced compositions results that good-sized divergence exists among consciousness of needs which in case of academics environment is enough high and real part in different form of physical activity. Graduating from universities, apart from becoming teachers of physical education, they also should promote a healthy lifestyle, that why regular physical activity it's very important for quality his life during the study. Active lifestyle gives well-being, fitness at the old age and possibility to keep his organism in good health.

TAILORING PHYSICAL ACTIVITY PRESCRIPTION: EFFECT OF REGULATORY FOCUS ON ACUTE AFFECTIVE RESPONSES TO EXERCISE

D. Bondarev,

Lund University, Lund, Sweden

Aim of the study. According to regulatory focus theory (Higgins, 1997), goal orientation can be achieved by either keeping a promotion or prevention focus. Individuals can be classified as either promotion-oriented, having a focus on accomplishments and aspirations, or prevention-oriented – having focus on safety and responsibilities. Drawing from this perspective this study examined whether the individual-difference variable regulatory fit could moderate exercise-affect relationship during bouts of treadmill running, and whether persuasive communications targeting regulatory fit of the participants would mediate this relationship and influence future physical activity participation. Subjects and Methods: Fifty-two participants (23 males and 29 females) rated their affect at five minute intervals while maintaining their respiratory exchange ratio corresponding to 1.0 running on a treadmill for 10 minutes. Regulatory focus was assessed using the 11-item Regulatory Focus Questionnaire (RFQ; Higgins et al., 2001). To examine the association between tailoring message to regulatory fit and future physical activity participation two persuasive communications were developed to target regulatory fit of the participants. The International Physical Activity Questionnaire (IPAQ) was administered at baseline and six months later. Results: Participants who were predominantly prevention-oriented reported significantly less pleasure than those who were promotion-oriented at minutes 5 and 10, after controlling for VO_{2max} . Furthermore, positive affect responses to the bouts of exercise mediated the effects of the tailored messages on physical activity. Conclusion: These findings provide additional evidence for regulatory focus theory and might help health professionals to create communications that produce positive feelings associated with physical activity. Key words: Regulatory focus, affective responses, physical activity

A GENE FOR SPORTS: THE EFFECT OF TEN GENETIC VARIANTS ON THE PHYSICAL PERFORMANCE OF LITHUANIAN ATHLETES

V. Ginevičienė

*Department of Human and Medical Genetics, Faculty of Medicine,
Vilnius University, Vilnius, Lithuania*

The knowledge concerning the individual genomes of the athletes is especially important for sports theory, practice and medicine. Progress in molecular genetic techniques gave us molecular markers to determine specific genes and their implications for endurance and other physical performance phenotypes. Methods and subjects: Based on current research 10 potential biomarkers known to have influence on human physical capacity were chosen for the genetic analysis of the Lithuanian athletes (n=250) and general population (controls, n=250): AMPD1(C34T), ACTN3(C1747T), ACE(I/D), AGT(C704T), AGTR1(A1166C), PPARGC1A(G1444A), PPARA(G2528C), PPARG(C34G), HIF1A(Pro582Ser), MB(A79G). Anthropometric measurements, anaerobic muscle strength and VO₂max were evaluated. The results showed that the athletes' genotypes were different with respect to gender and associated with phenotypic indexes. The athletes, carriers of the MB G/G, ACTN3 T/T, ACE I/I, PPARGC1A A/A, PPARA C/C, AMPD1 C/C genotypes, have better ability to achieve high muscle capacity indexes when exercising short-term explosive muscle power tasks. The athletes, carriers of the MB A/A, HIF1A Pro/Ser, ACTN3 C/T, AGTR1 A/A, ACE D/D, PPARGC1A G/G, PPARA G/G, PPARG C/C genotypes, typically have better cardiovascular system indexes which are associated with aerobic capacity. Conclusions: Thus, according to the analysis, the gene variants we have used constitute essential fraction of the genetic factors that influence physical performance of athletes. Significance and relevance of our work is supported by the fact that understanding of molecular physiological processes through genetic analysis is essential to the creation of a perfect health care system for athletes. Moreover, the results would be valuable for the creation and implementation of personalized training programs for Lithuanian athletes. Key Words: physical performance, genetic variants, phenotypic indexes.

**PREVALENCE OF GENERALIZED JOINT HYPERMOBILITY IN
VILNIUS SCHOOL-AGED CHILDREN****A. Gocentas^{1,2}, D. Mieliauskaitė²**¹ *Lithuanian University of Educational Sciences*² *State Research Institute Center of Innovative Medicine*

Objective: The aim of this study was to assess the prevalence of generalized joint hypermobility (GJH) in school-aged children from Vilnius, and to identify possible patients with joint hypermobility syndrome. **Subjects and methods:** A total of 778 children (age range 10-18 years) were screened for the mobility of joints. The medical examination included an assessment of joints' hypermobility according to the Beighton score (BS). Mann-Whitney and Wilcoxon tests were used for statistical comparisons. Statistical significance was set at $p < 0.05$. **Results:** This was the first study researching the prevalence of GJH in school-aged children from Lithuania. Therefore, there were no studies which were researching the prevalence of GJH in the population of the Central and Eastern Europe. The prevalence of GJH in school-aged children from Vilnius, depending on the BS cut-off value, was 19.2% ($BS \geq 4$), 9.5% ($BS \geq 5$) or 5.7% ($BS \geq 6$). The total BS was higher in girls ($Z = -6.05$, $p < 0.001$). The increased range of motion was most frequently detected in thumbs of school-aged children. The frequency of hypermobility in knees was seven to eightfold less than in thumb. Left and right sides were evaluated the same in 87.4% cases of thumb opposition, 90.1% cases of hyperextension of fifth finger, 87.9% cases of elbow manoeuvres, and 94.8% attempts to hyperextend knee. **Conclusion:** The prevalence of GJH in school-aged children from Vilnius depends on the Beighton score cut-off value and ranges from 19.2% to 5.7%. The found features could be applicable in planning and performing of physical activity among school-aged children.

**EARLY EXPOSURE TO RECREATIONAL GYMNASTICS BENEFITS
GEOMETRIC AND BONE ARCHITECTURE PROPERTIES: A 4-
YEAR LONGITUDINAL HIP STRUCTURAL ANALYSIS STUDY**

**R. Gruodyte-Raciene¹, M. C. Erlandson^{2,3}, S. A. Jackowski⁴,
A. D.G. Baxter-Jones⁴**

¹Lithuanian Sports University, Kaunas, Lithuania

*²University Health Network, Osteoporosis and Women's Health, Toronto ON,
Canada*

³University of Toronto, Department of Medicine, Toronto, ON, Canada

⁴College of Kinesiology, University of Saskatchewan, Saskatoon, SK, Canada

In young children, it has been demonstrated that regular participation in physical activity is associated with greater bone strength at the femoral neck. The aim of this study was to investigate whether low-level gymnastics training influenced the estimated structural geometry development at the proximal femur. Subjects: 165 children (28 gymnasts, 64 ex-gymnasts, and 73 non-gymnasts) between the ages of 4 and 6 years were recruited into this study and assessed annually for 4 years. Methods: A dual-energy X-ray absorptiometry (DXA) image of their hip was obtained. Values of cross-sectional area (CSA), section modulus (Z) and cortical thickness (CT) at the narrow neck (NN), intertrochanter (IT), and shaft (S) were estimated using the hip structural analysis (HSA) program. Multilevel random-effects models were constructed and used to develop bone strength development trajectories (Estimate \pm SEE). Results: Once the confounders of size and lifestyle were controlled it was found that gymnasts had 6% more NN CSA than non-gymnasts ($0.09 \pm 0.03 \text{ cm}^2$, $p < 0.05$), 7% more NN Z ($0.04 \pm 0.01 \text{ cm}^3$, $p < 0.05$), 5% more IT CSA ($0.11 \pm 0.04 \text{ cm}^3$, $p < 0.05$), 6% more IT Z ($0.07 \pm 0.03 \text{ cm}^3$, $p < 0.05$), and 3% more S CSA ($0.06 \pm 0.03 \text{ cm}^3$, $p < 0.05$). Conclusions: These results suggest that early exposure to low-level gymnastics participation confers benefits related to geometric and bone architecture properties. Participation in recreational gymnastics offers important benefits for bone strength development in childhood and if maintained may improve bone health in adolescence and adulthood.

ACE I/D POLYMORPHISM IS ASSOCIATED WITH PHYSICAL ACTIVITY IN PUBERTAL BOYS

J. Mäestu¹, E. Lätt¹, T. Rääsk¹, K. Laas¹, T. Jürimäe¹, K. Sak², J. Jürimäe¹

1 University of Tartu, Tartu, Estonia

2 ASPER Biotech, Tartu, Estonia

The aim of was to investigate the association between ACE I/D polymorphism and physical activity in 12 year old boys. In total, 265 boys (calendar age 12.04 ± 0.77 years) were investigated. Body composition, cardiovascular fitness and physical activity (PA) were measured. Also, several possible cofactors (screen time, participating in sport clubs) that might have association with PA were considered. Sedentary PA was significantly lower in DD subjects compared to I allele carriers, while light PA was significantly higher in DD subjects compared to II subjects. Using the model with three genotypes, there was a trendline effect on light PA ($F(2,256)=2,49$; $p=0.085$; $\eta^2=0.015$). A significant main effect of the D allele was found on total PA ($F(1,256)=5,453$; $p=0.020$; $\eta^2=0.021$). Adding screen time as a covariate did not change ACE I/D polymorphism effect on total PA levels ($F(2,256) = 3,326$; $p=0.041$; $\eta^2=0.025$). Carriers of the D allele had significantly higher light PA ($F(1,256)=4.710$; $p=0.031$; $\eta^2= 0.20$), with screen time as covariate. In conclusion, ACE I/D polymorphism is associated with different levels of PA in healthy boys, accounting with confounding factor screen time.

THE EFFECT OF PHYSICAL ACTIVITY AND BODY COMPOSITION ON HEALTH-RELATED PHYSICAL FITNESS IN WOMEN AGED 20 – 49

A. Mihailova, I. Kaminska, A. Bernāne, O. Ivanova,

Daugavpils University, Daugavpils, Latvia

Physical activity has been shown to be related to health. The aim of the research was to determine the effect of physical activity and body composition on health-related physical fitness parameters in women of two age groups: 20-39 and 40-49 years. Subjects and methods: A total of 80 women (mean age 24.3 ± 5.03 years and 44.5 ± 2.9 years) were tested. Health related physical fitness tests included evaluation of body composition, abdominal muscles and handgrip strength, elasticity of hamstrings and quadratus lumborum muscles and submaximal veloergometry testing. Physical activity was measured using International Physical Activity Questionnaire Long Form. Results showed that higher weekly amount of vigorous physical activity determines higher handgrip strength in both age groups ($p<0.05$), higher body water amount ($p=0.013$) in

women aged 40-49 and higher relative maximal oxygen consumption ($p=0.013$) and physical work capacity ($p<0.001$) in younger age group (20-39). Lower waist girth is a predictor of higher abdominal muscle strength ($p<0.01$) and higher relative maximal oxygen consumption in both age groups ($p=0.001$). Additionally, in both age groups higher body water amount is determined by lower body fat ($p<0.001$). In conclusion, main determinants of stronger abdominal muscles, higher handgrip strength and aerobic capacity, and healthier body water are higher weekly amount of vigorous physical activity and healthier body composition parameters (lower waist girth and body fat).

EFFECT OF KINESIO TAPING ON THE TOE TOUCH TEST RESULTS AFTER SKIING

R. Merino, O. Romero, E. Fernandez, I. Smuka

University of Malaga, Malaga, Spain

Latvian Academy of Sport Education, Riga, Latvia

Cross-country skiing exercises affect most of the joints and muscles of the body. Lower back pain is a common complaint among cross-country skiers and we assume that trunk flexibility is related to the painful process of the lower back. Subjects and methods: The study was done with fifty four volunteer college students (34 men, aged 21.40 ± 0.60 years, body mass 80 ± 12.31 kg, height 182 ± 7.91 cm, and 20 women, aged 21.20 ± 0.52 years, body mass 65.77 ± 8.84 kg, height 171 ± 7.18 cm). After 3 days of ski practical lessons during the winter camp, volunteers were randomly divided into 3 groups (KT in the lower back, placebo tape and control group). Five to six hours after the practice students painless flexibility was measured using the Toe Touch Test (TT), before and after the KT application, after 24h and again after 72h with the KT remaining in situ. The statistical sample is homogeneous between groups in relation to sex, age, height and weight. To the variable TT was applied ANOVA test, after checking the homogeneity of variances using the Levene test, with a significance level of $\alpha = 0.05$. Results: There are statistically significant differences in painless flexibility, measured using TT test, just after applying KT strips ($\alpha = 0.039$) and after 72 h ($\alpha = 0.043$). Furthermore, this study did not found significant differences in the TT results in relation to sex, age, height, weight or BMI.

**COMPLEX ASSESSMENT AND CORRECTION OF CEREBRAL
HEMODYNAMICS DISORDERS AMONG WRESTLERS WITH
CERVICAL OSTEochondrosis BY MEANS OF
BIOINFORMATIONAL TECHNOLOGIES**

L.V. Sharova, N. M. Belokrylov, Y. I. Kravtsov

Perm State Humanitarian-Pedagogical University, Perma, Russia

Aim of the study: reveal and carry out correction of cerebral hemodynamics disorders among highly qualified wrestlers with cervical osteochondrosis by means of bioinformational technologies. Subjects and methods: BRT was carried out with the use of 'BRT IMEDIS-FOLL' apparatus, with the help of electromagnetic oscillation in the bandwidth of 10 – 500 000 Hz. Cerebral hemodynamics research was carried out according to transcranial dopplerography data before and after course of electropharmaceutical spectrum of oscillation (EphSO+BRT) (Sharova L. V, (Usatcheva L.V.), patent RF # 2204374 dated 05.20.2003). All observed patients were divided into 3 groups. BRT with EphSO was used in the first group (15 people); the second group (12 people) included patients who did not get BRT with EphSO; the third group – placebo (10 people). Results: tendency to cerebral hemodynamics improvement was revealed in the course of EphSO + BRT developed by average linear speed of blood flow (ALSBF) increase in medium cerebral artery (MCA) and basilar artery (BA). Conclusion: thereby, BRT and EphSO, having resonant characteristics, analgesic, prolong effect; contribute to CO exacerbation prophylaxis and more rapid curative effect by means of adaptation-compensational mechanisms.

**BONE MINERAL DENSITY IN 11–13-YEAR-OLD BOYS: RELATIVE
IMPORTANCE OF THE WEIGHT STATUS AND BODY
COMPOSITION FACTORS**

**A. Ivuškāns, E. Lätt, J. Mäestu, M. Saar, P. Purge, K. Maasalu,
T. Jürimäe, J. Jürimäe**

University of Tartu, Faculty of Exercise and Sport Sciences, Tartu, Estonia

Main aim of this study was to investigate the influence of being overweight on bone mineral status in 11–13- year-old boys, who were divided into overweight (OW; n = 110) and normal weight (NW; n = 154) groups. Bone mineral density (BMD) at the whole body (WB), lumbar spine (LS) and femoral neck (FN), bone mineral content (BMC) at the WB, and body composition were assessed. All bone mineral parameters were measured by dual-energy X-ray absorptiometry (DXA) using the DPX-IQ densitometer. Calculation of the bone

mineral apparent density (BMAD) was completed for the WB, LS and FN. The BMC/height ratio was also computed. Results: OW boys displayed similar values ($P>0.05$) for LS and FN BMAD and lower ($P<0.05$) WB BMAD, despite significantly higher values ($P<0.05$) for more widely used WB and LS BMD, WB BMC and WB BMC/height in comparison with NW boys. Fat-free mass index (FFMI; kg/m²) had the highest correlation coefficients in OW boys only with FN BMD, while other measured bone mineral values had highest correlations with either BMI or FMI indices. In conclusion, OW boys have higher crude WB BMD, BMC and BMC/ height ratio in comparison with NW boys. However, the bone growth appears to be insufficient to compensate for the higher mechanical load applied on the bone by higher FM and also FFM values in OW boys

REHABILITATION IN SHOULDER JOINT INSTABILITY AMONG WRESTLERS

N. M. Belokrylov, L. V. Sharova

Perm State Humanitarian-Pedagogical University, Perm, Russia

Aim of the study: to raise rehabilitation effectiveness in shoulder joint instability among sportsmen-wrestlers. Materials and methods: rehabilitation results over the last 15 years in shoulder joint injury among high qualification judo and sambo wrestlers: masters of sports (25 sportsmen) were received. The following methods were used in diagnostics: clinical testing, radiography, ultrasonography, magnetic resonance imaging and computerized tomography according to indications. Impingement syndrome, developed in situational shoulder instability in a definite position with algesthesia (13 people) turned out to be widely spread professional disease. This subgroup received conservative treatment including medicamental, physiotherapy courses, consisting of 2 – 3 stages, specially selected exercises for muscle cramp elimination, rotatory cuff strengthening and joint stabilization. Extreme instability revealed in repeating subluxation during wrestling or shoulder-slip forming – second subgroup. Conservative treatment among these sportsmen was ineffective, 12 people needed surgical intervention for joint stability restoration. Postsurgical rehabilitation stages were developed and carried out. Photodynamic, laser therapy, magnetic pulse and electrostimulation of para-articular muscle groups and exercise therapy were used; medical advice for training process was given. Results: developed system of conservative treatment and postsurgical rehabilitation helps sportsmen to restore shoulder joint stability, eliminate algesic contracture, and return to active sport. Conclusion: combination of developed complex of medical rehabilitation and evident surgical intervention helps to achieve shoulder joint stability restoration practically among 100 % of

sportsmen-wrestlers. Key words: judo and sambo wrestlers, shoulder joint instability, usual shoulder dislocation, and impingement syndrome.

PHYSICAL ACTIVITY AS A DETERMINANT OF PHYSICAL AND PSYCHO EMOTIONAL WELLBEING IN LATE ADOLESCENCE

V. Juškeliėnė, S. Ustilaitė, A. Raslanas

Lithuanian University of Educational Sciences, Vilnius, Lithuania

Aim: to identify the impact of physical activity (PA) of 16-19 year Lithuanian adolescences on their physical health and emotional wellbeing. Subjects and methods: The study sample represents Lithuanian schoolchildren of secondary schools. Study population consisted of 1035 persons. Anonymous questionnaire was used. Evaluating physical health prevalence of chronic diseases, scoliosis, impaired sight, incidence of acute diseases, and frequent somatic symptoms were measured. Psycho emotional wellbeing was defined as the feelings of happiness, school anxiety and feelings of angriness or aggressiveness. To establish the impact of insufficient PA on health χ^2 -test and the Odds Ratio (OR) were used. Results: In the study population one fifth part of respondents were found to have different chronic diseases; 28.8% were diagnosed scoliosis or asymmetric posture, 36.1% – farsightedness or other sight disorder, but significant difference by PA level was not established. Frequent acute morbidity was characteristic for 16.1% of the study population, frequent somatic ailments – for 73.3%. Relative risk of these health disorders for students whose PA level is low was 1.7 times higher compared to those who exercised at least 2 – 3 times a week. 29.4% reported feeling not completely happy or totally unhappy in their lives, and their psycho emotional state was significantly associated with low PA. School anxiety was characteristic for 9.3% of students, feeling of angriness, aggressiveness for 11.2%, no difference by PA was found. Conclusions: Insufficient PA has the essential impact on students' incidence of acute morbidity, somatic symptoms and feeling unhappy in their lives.

STIMULATION OF PHYSICAL ACTIVITY IN FAMILIES WITH PRESCHOOL CHILDREN

Z. Birontienė

Klaipėda University, Klaipėda, Lithuania

The research aim is to assess the effectiveness of the educational programme of physical activity stimulation in a family (PASF) in Klaipėda City preschool institutions. The following methods were applied: PASF quasi-experiment, a

questionnaire for parents, group conversations with children. Content analysis and descriptive statistical methods were applied for the research data analysis. 17 teachers from Klaipėda City preschool institutions and families of 278 five-six year-old children volunteered in the quasi-experiment. The children participated in Physical Education lessons twice a week. They got three pieces of „homework“ (physical activities, tasks, games), which were to be performed together with their parents or other family members every week. Physical activity (PA) stimulation events were organised in every institution during the quasi-experiment. A health day of all the participating families with 5-6 year-old children were held at the end of the quasi-experiment. The research data show that half of the parents had mental jobs, only one tenth played sport systematically before the PASF quasi-experiment. The majority of the children were physically active; a third of them attended sport or dance clubs and often asked their family members to play sport together. During the PASF quasi-experiment the majority of the children liked Physical Education lessons and willingly told their family members about their content. Mother or father mostly played sport with their child unsystematically, though quite often (1-3 times a week). The main reason for parents not to play sport together with their child both before and during the quasi-experiment was the lack of time. The children, who were systematically physically trained at a preschool institution, liked being their family's PA stimulators. They often asked their parents to perform the games and activities, learnt in the kindergarten, together at home; they were able to reveal to their teacher PA situation in their family, however, they were not always able to overcome their parents' unwillingness to play sport at home. Although the majority of the parents positively assessed their children's physical education in the kindergarten, more than four thirds did not assist in organising health and sport events. During the PASF quasi-experiment teachers and children collaborated more actively than parents.

THE EFFECT OF SPECIAL VOLLEYBALL TRAINING ON BODY STRUCTURE AND COMPOSITION OF FEMALE VOLLEYBALL PLAYERS

M. Charmas, A. Bodasińska, M. Zając

Józef Piłsudski University of Physical Education in Warsaw, Faculty of Physical Education and Sport in Białą Podlaska, Poland

Aim of study: The purpose of the presented study was the assessment of the changes of body structure and composition induced by 12 weeks of special volleyball training. **Subjects and methods:** Two groups of young women – exercising and non exercising performed 12 – week special volleyball training (3 times a week, 90 min./class). Body height, waist and hip circumference were

measured. Body cell mass (BCM), total body water (TBW), extracellular (ECW) and intracellular water (ICW), fat mass (FM), lean body mass (FFM) and muscle mass (MM) were measured using the method of bioelectrical electrical impedance analysis. Results: The 12-week training elicited a slight decrease in BCM, TBW, ICW, FFM and MM and a slight increase in body mass, hip circumference, ECW and FM. The 12 weeks of inactivity caused a modest decrease in body mass, hip circumference, TBW, ECW, FFM, MM and an increase in waist circumference and FM. Conclusions: The 12 week special volleyball training resulted in enhancing the effectiveness of organism adaptation to this kind of effort by increasing the efficiency of the use of oxygen in ATP resynthesis in working muscles. The training resulted in adipose tissue deposition changes in the examined women but it did not bring about statistically significant changes in the contents of it and FFM. The lack of activity caused FM gain with a concurrent shift to upper parts of body. The lack of activity resulted in a decrease in FFM content including MM.

LASE STUDENTS OPINION ABOUT MOVEMENT GAMES AT SCHOOL AND IN TRAINING PROCESS

I. Dravniece, S. Anisimova

Latvian Academie of Sport Education, Riga, Latvia

The aim of the study is to find out student opinion and knowledge about movement games, research the use of movement games at school and in training process. A game is a very necessary part of movement activity, especially in work with pupils and teenagers. The methods of research was a questionnaire, discussions with students of LASE, and statistical methods. The study was conducted in academic year 2012/2013, in Riga, LASE. There were 101 participants: 88 Full-time Year 3 and Year 4 students and 13 Part-time Year 3 students, studying to obtain the qualification of sport teacher. In the questionnaire were included 8 questions about the use of games in sport lessons at school and in training process, as well as about educative, developmental and upbringing functions of games. Results: In the study process we found out student opinion on movement games and the experience of using movement games in lessons at school and in training process. Movement games at school used 99% of students in Grades 1 – 4, 86% of students in Grades 5 – 6, and 44% of students in Grades 10 – 12. In training process movement games played 71% of pupils in the age group of 7-10 years, 69% of pupils in the age group of 11 – 15 years, and 50% of pupils in the age group of 16-19 years. 97% of students admit necessity to play movement games at school in Grades 1 – 4, 92% of students: in Grades 5-9, and 77% of students: in Grades 10-12. The opinion that it is necessary to include games in training process for the age

group of 7 – 10 year old pupils expressed 97% of respondents, for the age group of 11 – 15 year old pupils: 93% of respondents, and for the age group of 16-19 year old pupils: 68% of respondents. The students admit that games improve physical characteristics (99%), sporting skills (97%), and social skills (97%). Conclusions: The questionnaire showed that students are positively disposed towards movement games and are increasingly willing to use them.

**LITHUANIAN 11 – 12 YEARS SCHOOLCHILDREN'S
CHARACTERISTICS OF PHYSICAL ACTIVITY DEPENDING ON
THE CONTENT OF THE PHYSICAL EDUCATION LESSON**

A. Emeljanovas, B. Mieziene, V. Putriute, M. Liepa
Lithuanian Sports University, Kaunas, Lithuania

The aim is to evaluate and compare 11 – 12 years Lithuanian schoolchildren physical activity (PA), time spent in moderate-to-vigorous PA (MVPA) and passively in Motor skills practice and Game play physical education (PE) lessons. Subjects and methods: This pilot study involved 32 schoolchildren (20 (62.5 %) boys and 12 (37.5 %) girls from 6th grade. Their age ranged from 11 to 12 years ($M = 11.24$; $SD = 0.25$). PA indicators were assessed using Tri-axis ActiTrainer Activity Monitor accelerometer. Pedagogical observation was also performed in Game play and Motor skills practice lessons. Results: The comparison of indicators in the group of both genders and boys revealed that PA and time engaged in MVPA was significantly higher and time spent passively lower in Game play than the Motor skills practice lesson ($p < 0.05$). In the group of girls indicators of PA did not differ significantly ($p > 0.05$). Though the average time spent in MVPA indicators did not reach 50% in neither of the lessons. Conclusions: 1. PA and health related MVPA is higher in Game play than in Motor skills practice lesson, though in both lessons MVPA was lower than recommended (50% of PE lesson time). 2. In order to achieve goal of physical education – encouraging lifelong engagement in PA, health related MVPA should be emphasized, games, other enjoyable and engaging activities should dominate in the curriculum of PE lesson for 11 – 12 years children. 3. Further research should examine PA indicators in PE lessons with different content in other age groups and identify most favorable resources that could help to increase schoolchildren's MVPA.

SHOE CHARACTERISTICS AND BALANCE IN YOUNG WOMEN

T. Kums, S. Valgemäe, J. Ereline, H. Gapeyeva, H. Aibast, M. Pääsuke
Institute of Exercise Biology and Physiotherapy, University of Tartu, Estonia

Most women have worn high-heeled shoes at some time in their lives and despite the discomfort; many wear them regularly because fashion seems to be more important. The purpose of this study was to investigate the influence of shoes with different heel height on posture, postural control characteristics and muscle tone in young healthy females. Subjects and methods: The study involved 10 young 22 – 24-year-old women (mean 23.2 SD=0.8), who claimed to be physically healthy and wore high heels occasionally. The subjects underwent assessments of posture, static balance (body sway) and postural muscle tone under five conditions: (1) barefoot; (2) in sports shoes; (3) in low-heeled shoes (3.5cm); (4) in high-heeled shoes (10 cm) and (5) in platform shoes (13cm). Results: No significant alterations in the indicators of lumbar lordosis and thoracic kyphosis in different shoes were found compared to standing barefoot. The function of postural control in sports shoes and low heels was similar to barefoot. Significant differences occurred while standing in high heels and platforms compared to the aforementioned options, where bigger sway was noted in the centre of pressure in the mediolateral and anterior-posterior direction with both eyes open and eyes closed. The tension on m. tibialis anterior increased while standing barefoot and wearing low heels; the tension on m. erector spinae increased while wearing sports shoes. The tension on m. tibialis anterior and m. erector spinae increased while standing in high heels. In case of platforms, no excess tension occurred on the muscles observed. It can be concluded that low heels are optimal for fulfilling the function of postural control. Consistent with our hypothesis, postural strategy affects with high-heeled shoes and could contribute to muscle tension increasing in low back and forefoot, but the advantage of platforms over other types of shoes is the optimal muscle tension distribution in restraining static balance of the body.

**PHYSICAL ACTIVITY RELATIONS WITH BODY FATNESS IN BOYS
WITH DIFFERENT WEIGHT STATUS**

**E. Lätt¹, J. Mäestu¹, T. Rääsk¹, D.A. Rubin², P. Purge¹, M. Saar¹, K.
Maasalu¹, T. Jürimäe¹, J. Jürimäe¹**

¹University of Tartu, Tartu, Estonia

²California State University Fullerton, Fullerton, USA

Aim of the study: The aim of the study was to examine the associations between physical activity (PA) and fatness in pubertal boys (age: 12.04±0.77 years) and to assess if weight status influences these associations. Subjects and methods: Two hundred sixty-five boys participated in the study. PA was measured objectively by accelerometry for seven consecutive days. Body fatness estimators included body mass index (BMI), body fat%, sum of five skinfolds and waist circumference. Results: The results of the ANOVA indicated that the normal weight group had significantly higher amount of vigorous PA and MVPA compared to the overweight group ($p<0.05$) and higher amount of moderate PA, vigorous PA, MVPA and total PA compared to the obese group ($p<0.05$). For those of normal weight, vigorous PA, MVPA and total PA were negatively associated with body fat% ($p<0.003$) and with sum of five skinfolds ($p<0.023$). In obese boys, moderate PA and MVPA were negatively associated with BMI and body fat% ($p<0.034$). In addition, vigorous PA was associated with body fat% in obese boys ($p=0.011$). Conclusions: Time spent in vigorous PA and MVPA was associated with fatness parameters in normal weight and obese boys. Normal weight boys spent more time in vigorous PA and MVPA than overweight and obese. As we did not find any relationships between fatness parameters and PA in overweight boys, it may be suggested that increasing their physical activity level might not necessarily have the influence on fatness because they probably compensate for the energy expenditure with higher energy intake.

EFFECT OF 9 WEEKS SCHOOL-BASED PROGRAM WITH 1 MINUTE OF STRETCHING PER EACH PHYSICAL EDUCATION LESSON ON HAMSTRINGS FLEXIBILITY

R. Merino Marban¹, C. A. Becerra Fernandez², D. Mayorga-Vega³, E. Fernández Rodríguez¹

¹Faculty of Educational Sciences, University of Málaga

²CES Sagrado Corazón, Málaga

³Physical Education and Sport Department, University of Granada, Spain

Purposes: a) to know if a 9 weeks school-based stretching program of one minute during the physical education (PE) classes is sufficient to increase flexibility; b) to examine the effects of four weeks of detraining on flexibility. Methods: Forty-five elementary schoolchildren 5-6 year olds from two different 1st grade groups were cluster-randomized into an experimental group (EG) or a control group (CG). The EG performed hamstring stretches for 1 minute during each PE class over 9 weeks, two sessions per week, utilizing the static-passive technique during the cool-down period. The CG followed the standard classes of PE program. Hamstring flexibility was measured using the sit-and-reach (SR) test before and after the intervention program. Finally, after four weeks without stretching a reassessment was performed in order to observe the levels of retention. Results: The results of the two-way ANCOVA on the average obtained in the SR showed interaction effects between the group and time variables ($F(2, 84) = 15.679$; $p < 0.001$; $\eta^2_p = 0.272$). For post hoc analysis, the ANCOVA with the Bonferroni adjustment showed that the EG increased significantly from pretest to posttest ($p < 0.001$) and decreased from posttest to retest ($p < 0.001$). However, from pretest to retest was no found any significant difference ($p = 0.102$). For the CG no significant differences were found ($p = 1.000$). Conclusions: A 1-minute stretching program over nine weeks during PE classes improves hamstring flexibility in schoolchildren. After four weeks without stretching the EG returns to baseline levels.

HEALTH BEHAVIORS OF FEMALE STUDENTS OF PHYSICAL EDUCATION FROM POLAND AND LITHUANIA

Z. M. Ossowski¹, V. Juškelienė², V. J. Česnaitienė³

¹Gdansk University of Physical Education and Sport, Gdansk, Poland

²Lithuanian University of Educational Sciences, Vilnius, Lithuania

³Lithuanian Sports University, Kaunas, Lithuania

Aim of the study: Health behaviors assessment of female students of Physical Education in selected Universities from Poland and Lithuania. Subjects and methods: 77 women were subjects of this research. They were students of 3rd year of Physical Education Bachelor from three Universities: Gdansk University of Physical Education and Sport in Poland (AWFiS), Lithuanian University of Educational Sciences in Vilnius (LEU), Lithuanian Sports University in Kaunas (LSU). Two research tools were used: survey questionnaire and the Health Behavior Inventory (HBI) (Juczyński, 2009). HBI consisted of 24 statements, describing various behaviors in relation to health. This inventory allowed determining the intensity of overall health behavior indicator (OHBI) and detailed indicators (DHBI) in 4 categories: the right nutrition habits (NH), prevention behaviors (PB), positive mental attitude (MA) and health practice (HP). Every statement was rated in 5-point scale. The larger number of points (pt), the greater indicator of health behavior. Results: Analysis showed that mean OHBI result was 79.4 pt, what can be interpreted as ordinary result. The greatest indicators of activities beneficial for health were in the following order: MA, NH, HP, PB. Conclusions: The present research shows that women participation in physical activities has beneficial influence on their health attitudes (Nowak, 2005; Ossowski, Taraszkiewicz, 2011). High level of health behaviors in prospective teachers of physical education should favor their future activities for health promotion in pupils. It is worth to add some more tests for this research, to show relation between health behaviors and fitness and physical efficiency of students. Received results should be taken into consideration in preparing educations programs for prospective promoters of health lifestyle.

PURPOSEFUL PHYSICAL EDUCATION PROGRAM EFFECT ON PHYSICAL FITNESS AND MOTOR ABILITIES CHANGES OF PRESCHOOL CHILDREN**R. Rutkauskaite, S. Dambrauskaite, L. Kliokodujeva***Lithuanian Sports University, Kaunas, Lithuania*

Children preschool age is a period of emergence motion and rapid development. Children physical fitness is directly interrelated with physical development and physical activity. The preschool age is especially important for the formation of child's motor potential (Owczarek, 2005, Robinson, Page, 2009). Later on this base child is only improving the physical abilities and physical fitness. Children physical fitness is directly interrelated with physical development and physical activity. Child physical development and physical activity is improving when his physical activity is growing and its quality is changing (Malina et al., 2005). The aim of the research was to identify the effect of different physical education programs on preschool children physical fitness and body composition. Material and Methods: The study was undertaken in 3 kindergartens of Kaunas, which had different physical education programs. The experiment resulted in the modeling of 6 month physical education program for two experimental groups: E1 – program focused on a variety of movements with different tools, E2 – program based on gymnastics exercises. Third group children were working according to the usual physical education program (K). Subjects (n=88): 6-7 years aged boys and girls: E1 group (n = 31), E2 group (n = 31), K group (n = 26). Before the experiment both groups performed physical fitness tests to measure their *flexibility (sit and reach test (Eurofit, 1993), power (long jump (Eurofit, 1993), coordination abilities (30 seconds jumping into the rope (Rutkauskaite, 2007; Ikeda, Fukumoto, 2009), speed – 20 m running, agility (10 x 5 m shuttle run (Eurofit, 1993). Appropriate statistical methods (mean, (x) and the standard deviation (SD), t test, chi square test), based upon the experimental design were applied. Pearson's product moment correlation was used to examine relationships between total volume of PA and health-related physical fitness components. The level of significance was set at $p < 0.05$. Results and Conclusions: Boys from program, focused on a variety of movements with different tools, statistically significantly improved their agility, coordination and speed abilities ($p < 0.001$). Program, focused on gymnastics exercises, helped to improve boy results in agility, coordination and flexibility ($p < 0.001$). Control group boys showed better results in coordination and agility ($p < 0.001$). All physical fitness components of preschool girls significantly improved. Girls from program, focused on a variety of movements with different tools, statistically significantly improved leg muscle power and coordination ($p < 0.05$). All the components of physical fitness were closely related, but*

stronger correlation was determined after the experiment. A statistically significant correlation was identified between leg muscle power, coordination and flexibility ($p < 0.01$). The key words: physical fitness, body composition, physical education program, preschool age children.

OBJECTIVELY MEASURED WEEKLY PHYSICAL ACTIVITY AMONG ADOLESCENT BOYS AND THEIR RELATION TO BODY COMPOSITION AND PHYSICAL FITNESS

R. Rutkauskaite, E. Maciuleviciene, R. Sadzeviciene

Lithuanian Academy of Physical Education, Kaunas, Lithuania

Introduction: Physical activity is suggested to be an essential part of everyday life, especially during growth and rapid development of school-aged children. The benefits of PA are numerous: it has a positive effect on the prevention of various diseases in schoolchildren (Rankinen, Bouchard, 2002) and on their cognitive development (Burdette, Whitaker, 2005), it increases self-esteem and controls the levels of anxiety and stress (Dunn et al., 2001; O'Neal et al. 2000; Taylor, 2000), normalizes the state of mind (Burdette, Whitaker, 2005), and certainly it affects the level of physical fitness (PF) (Malina et al., 2004; Dencker et al., 2006, Sarr, 2008). Most physical activity data are available for children and adolescents 10 years of age and older and are based largely on questionnaires and interviews. The objective methods of measuring PA are used more and more widely in various research studies all over the world. *The aim* of this study was to analyse the objectively measured adolescent boy's weekly physical activity and their relation to their body composition and physical fitness. *Material and methods:* The participants of this study were 104 healthy adolescent boys (15.3 ± 0.06 yrs of age; 63.0 ± 1.32 kg of weight, and 175.8 ± 0.78 cm of height). The boys were selected using cluster screening, i.e. the schools were randomly selected, and their 9th grade schoolboys were randomly invited to take part in the assessment. The physical activity of schoolboys was measured using actigraphs (Tri-axis ActiTrainer Activity Monitors). The level of the intensity of physical activity was determined by calculating energy consumption in METs; bouts of physical activity (PA) had to last for at least 10 minutes without interruptions. Light PA (LPA) equals up to 3 METs, moderate PA (MPA) - 3 - 6 METs, and vigorous PA (VPA) – 8 or more METs. Based on the frequency of vigorous (VPA) and moderate physical activity (MPA) per week, the participants of this study were divided into physical activity groups. Body composition was accessed using TANITA Body Analyser (TBF-300). The participants performed physical fitness tests to measure their flexibility (*Eurofit*, 1993), power (vertical jump was measured

using a jump parameter gauge (SBM-1), muscular strength and endurance (modified push-up test, Suni et al., 1994). Results: All of the schoolboys had experienced LPA on each of the assessed days. MPA on each day was experienced by 59.6 % of the boys. No participants had achieved VPA on a daily basis. The frequency of MPA and VPA experienced most often was 5 – 7 and 1 – 3 days per week, respectively. The total PA measured during the week was largely comprised by LPA, i.e. 79.8 %; MPA and VPA were 18.8 and 1.4 %, respectively. Results indicated, that boys experiencing VPA 3 or more days/week had significantly lower BMI than those who experienced VPA on 1 day/week, not experiencing VPA at all during the week, or than those who experience MPA 6 days/week ($p < 0.05$). Results of body composition indicated, that boys experiencing VPA had lower body fat mass in compare with those who experienced only VPA and LPA ($p < 0.05$). Analysis of physical fitness results indicated that boys experienced VPA were better in muscular strength and endurance test ($p < 0.05$), but results of high jump and sit and reach test were not significantly different. Conclusions: Boys, who achieve VPA, have a greater total physical activity during the week than those boys who do not experience VPA. If during the week boys achieve VPA on more than 2 days, even if it is just for 10 min, there is a significant increase in the total amount of weekly physical activity, which is related to lower BMI. Boys, who do not experience MPA at least for 6 days/week, the total amount of weekly physical activity decreases and they can perform better results in strength and endurance test ($p < 0.05$). The key words: frequency, intensity, volume, physical activity, boys.

RELATIONSHIPS BETWEEN ANTHROPOMETRY, BIOLOGICAL AGE, BODY COMPOSITION AND BONE PARAMETERS IN PREPUBERTAL RHYTHMIC GYMNASTS

**M. Saar¹, A. L. Parm¹, K. Pärna¹, J. Jürimäe¹, V. Tillmann²,
K. Maasalu², I. Neissaar¹, T. Jürimäe¹**

¹*University of Tartu, Faculty of Exercise and Sport Sciences, Tartu, Estonia*

²*University of Tartu, Faculty of Medicine, Tartu, Estonia*

Aim: Investigate the relationships between anthropometric, bone parameters, body composition and bone age in girls. **Subjects and methods:** In total 89 7 – 8-year-old girls were studied and divided into the rhythmic gymnasts' (n= 46) and control (n= 43) groups. Body height and mass were measured and body mass index calculated. Body composition was determined by DXA. To estimate bone maturity, a radiograph of the non-dominant hand was taken. **Results:** In rhythmic gymnasts body fat% and FM were lower, and BMD and

BMC values at lumbar spine and femoral neck were higher. All measured skin fold thicknesses were thicker in controls. In girths and widths there were only few significant differences between the groups. In conclusion: Relationships between anthropometry, body composition and bone parameters in gymnasts are weak. In controls all anthropometric parameters correlated with BMD and BMC in spine.

DIDACTIC MODEL FOR MIDDLE-AGED AND ELDERLY PEOPLE TO PURPOSEFULLY MAINTAIN AND IMPROVE BALANCE

V. Ševcenko, V. Lāriņš

Latvian Academie of Sport Education, Riga, Latvia

It is considered that a human being has five main physical qualities: strength, endurance, speed, flexibility and agility. We usually do not pay enough attention to training balance, although the character of a man's movements to a great extent is determined by the ability to maintain balance. Middle-aged and elderly people have different health disturbances due to the decrease of physical activity: decrease of muscle strength, changes in posture and decrease of balance function. The aim of the research was to state middle-aged and elderly people's indicators of posture and balance, as well as to develop a therapeutic program to maintain and improve balance. Middle-aged and elderly people were the subjects of the research. Methods: To test static balance the Romberg Test and the Digital Balance Analyzer Platform were used. To state dynamic balance the test Stars, the Movement Ballistic Coordination Assessment Test and jumps were used. The Vienna Test System RT was applied to measure basic reaction time and movement time, as well as using the test program for determining muscle strength endurance was determined muscle strength endurance and balanced work of skeletal muscles. As a result of the research middle-aged and elderly (45 – 60 years old) people's posture indicators, strength indicators of the main muscle groups and the indicators of static and dynamic balance were stated. The mean indicator result on the balance platform of 45 – 50 years old people is 1,0 – 1,5, but of 60 years old people it is 1,8 – 2,5. There was interrelation between the posture and balance indicators. The conclusions: A therapeutic program was developed with the aim to maintain and improve balance of middle-aged and elderly people. Trainers additionally to their training aims will be able to evaluate static and dynamic balance, posture and strength of the main muscles, the ability to change the centre of gravity and affect socialization. After the application of the program a positive correlation has been stated between posture and balance ($P < 0.05$). Key words: static and dynamic balance, posture, therapeutic program.

OSTEOPATHIC MANIPULATIONS OF THE ANKLE IN THE CONTEXT OF YOUNG ORIENTEERS BALANCE IMPROVEMENT

B. Smila¹, A. Fernāte¹, V. Zaļaiskalna²

¹Latvian Academy of Sport Education, Riga, Latvia

²Medicine centre 8, Riga, Latvia

The aim of the study is to examine the effect of the use of osteopathic manipulations of the ankle, balance exercises, balance exercises and osteopathic manipulations of the ankle in the context of young orienteers balance improvement. Subjects and methods: 36 young orienteers` were randomized (3 groups) to an intervention, after being assessed at baseline and then reassessed one week later. Digital Balance Analyzer (DBA) was used for assesment of statistical balance. Significant improvement was identified for the intervention groups using t-test. Results have shown that significant improvement in the statistical balance test (right leg, closed eyes and ears) was identified for intervention group, whom intervention program was balance exercises ($t = 2.47, p = .03$). Significant improvement in the statistical balance test (left leg, closed eyes and ears) is identified for intervention group, whom intervention program was balance exercises and osteopathic manipulations of the ankle ($t = 2.61, p = .02$). There was not significant improvement in the statistical balance test for intervention group, whom intervention program was only osteopathic manipulations of the ankle. Conclusions: significant improvement in the statistical balance indicate that the balance exercises, balance exercises and osteopathic manipulations of the ankle program was effect positively and might therefore be acceptable to other young orienteer.

MAXIMAL RESPIRATORY PRESSURES AND THEIR ASSOCIATION WITH SPIROMETRIC PARAMETERS AND CHANGES DUE TO IMMERSION IN WATER

M. Rumaka², I. Uptis¹

²Riga Stradins University, Riga, Latvia

¹Latvian Academy of Sports Education, Riga, Latvia

The aim of this study was to determine associations between maximal static inspiratory (MIP) and expiratory (MEP) pressures and parameters of forced spirometry, and determine changes of MIP and MEP in water immersion up to the neck level. Subjects and methods: Investigation involved 62 female student of Latvian Academy of Sports Education with the mean age 22.13 ± 1.3 years, height 168.4 ± 6.6 cm, and weight 61.3 ± 7.0 kg, all were non-smokers. MIP and

MEP was measured at the mouth level outside the swimming pool and repeated in the swimming pool while subject was immersed up to the neck level. Forced spirometry was performed according ATS guidelines outside the water. Results: Average value for MIP outside the water was 104.7 ± 29.2 cmH₂O and for MEP 145.3 ± 31.6 cmH₂O. There was positive correlation between peak expiratory flow and MIP, MEP, and rate of increase of both pressures ($p < 0.05$). Vital capacity was not related to maximal pressures. Faster rate of inspiratory pressure increase was positively related with forced inspiratory volume in one second ($p < 0.05$). There was significant decrease of MIP and rate of increase of inspiratory pressure in the immersion state while no changes of expiratory parameters were observed. Conclusions: Stronger respiratory muscles are related with faster flow rates in inspiration and expiration. Immersion decreases MIP and rate of pressure decrease without changing expiratory parameters.

THE MYOGLOBIN GENE A79G POLYMORPHISM IN LITHUANIAN ATHLETES

V. Ginevičienė¹, A. Jakaitienė¹, A. Pranculis¹, K. Milašius², L. Tubelis²,
V. Kučinskas¹, A. Utkus¹

¹*Department of Human and Medical Genetics, Faculty of Medicine, Vilnius University*

²*Lithuanian Educological University, Vilnius, Lithuania*

Myoglobin plays a crucial role in energy metabolism by carrying molecular oxygen between the capillaries and the mitochondria to satisfy the requirement for sustained work. Although genetic variation (A79G) in myoglobin (*MB*) gene has long been recognized in humans, there is little information on the functional implications of such variation and no data from elite athletes. The aim of this study was to analyze the possible importance of the *MB* (A79G) polymorphism in Lithuanian athletes. Subjects and methods: A total of 165 Lithuanian elite athletes (78 endurance-oriented, 38 power-oriented, 49 “mixed group”) and 240 healthy unrelated individuals (controls) were genotyped (PCR-RFLP). Anthropometric measurements and muscle strength were evaluated. Results: *MB* genotypes in athletes group showed differences from controls (AA/AG/GG: 19.4/63.0/17.6% vs. 27.9/45.0/27.1%; $P = 0.002$). The frequency of *MB*-A allele was higher in endurance athletes than in controls (53.2% vs. 46.8%; $P = 0.001$). It was found that the values of phenotypic measures were significantly different with respect to gender and sports groups ($P < 0.05$). The power-oriented athletes with the GG genotype had significantly higher height, muscle mass, grip strength and short-term explosive muscle power (vertical jump test) than AA genotyped athletes ($P < 0.05$). The Roufier index reflecting the aerobic capacity was lower in AA genotyped athletes compared to athletes

with the AG and GG genotypes. Conclusions: The *MB* (A79G) polymorphism associated with the physical capacity in Lithuanian athletes: the GG and A/G genotypes are related to speed/power sports and AA genotype to endurance demanding sports. In summary, the *MB* gene is one of the genetic markers to be taken into the consideration in the identification of talented individuals in sports.

**ELITE TRAINING AND UPPER SECONDARY EDUCATION –
MODELS FOR SPORTIVE SUCCESS**

R. Carlson

School of Sport and Health Sciences (GIH), Stockholm, Sweden

Competitive sport is well established in most cultures and is one of the most common leisure activities among children and youth. Sportive performances and personal achievements are recognized in lower ages than ever before. Hence – the global value of sport is obvious and to the search for and development of talents are devoted great efforts. Over the years most countries have developed methods for talent recruitment and development as well as interacting with each other. However, few initiatives involve the traditional western and eastern world. Financed by the Swedish Government, this project is a comparative study engaging Russia, Belarus, Latvia, Poland and Sweden. A project group was established containing prof. Dmitryi Chernikov (Russian State University of Physical Education and Health, RSUPE, Moscow), prof. Dzmitry Smaliakou and prof. Alexej Gataulin (Belarusian State University of Physical Culture (BSUPHC, Minsk), prof. Juris Grants (Latvian Academy of Sport Education, LASE, Riga) and prof. Krzysztof Piech, (Academy of Physical Education, Warsaw - Biala Podlaska). The project leader is prof. Rolf Carlson (School of Sport and Health Sciences, GIH, Stockholm). The aim of the project is to analyze persisting models for combination structures of elite training and upper secondary education. Based on the results of the study, the purpose is in a further perspective to identify developmental models of common interest. Issues of focus: organization of schools/sport schools; recruitment standards of pupils; coach issues like education, competence, acting; pupils experiences and development (16-19 years of age). Method: Data will be collected through online questionnaires with pupils from a selection of sport schools in respective countries. Coaches at sport schools representing all participating countries will be interviewed. Planning sessions have been held in Riga and Moscow. The collecting of data will commence early 2013. Results: to be presented. Involved colleagues and universities are very eager to take part in the project. Due to political identities a lot of paper work has been required. It needs to be pointed out that politics is subordinated. However, The Swedish Government regards this project to be part of a reestablishing process between Sweden and Belarus concerning diplomatic relations. Both countries did close each other's embassies and expelled their ambassadors including diplomatic corps in 2012 due to diplomatic differences.

COMPARATIVE APPROACH TO SPORTS AND EDUCATION SYSTEMS IN LATVIA

J. Grants

Latvian Academy of Sport Education, Riga, Latvia

The aim of the study is to compare the sports and education systems in Latvia to analyze combination standards for high level training and education in upper secondary schools. The study is a part of the project "Elite Sport Training in Upper Secondary Education – Models for Sportive Success" including different participating institutions from different countries as Sweden, Russia, Belorussia and Poland. Subjects and methods: sport and education sector, theoretical analysis of literature. Results: many non-governmental sport organizations such as federations, societies and unions have been founded and have joined respective international federations. The umbrella non-governmental sports organization is the Latvian Sports Federation Council. The governmental sports organization, the Sports Department of the Ministry of Education and Science, LR, is responsible for promoting active participation in all forms of sport. The governmental sports institution, the Latvian Youth Sports Centre and the Latvian School Sports Federation take responsibilities for developing programs and materials, and organize competitions. General upper secondary education in Latvia normally lasts for three years (Grades 10-12). There are two types of secondary education programs: general secondary and vocational secondary education and training programs. The compulsory curriculum of 3-year general secondary schools is stated by the National Standard in the following profiles: (1) general comprehensive, (2) humanitarian/social, (3) mathematics/natural science/technical, (4) vocational/professional (arts, music, business, sports). Conclusions: the current situation about participation of young athletes in different sport trainings is that it takes place mainly in sport schools, as well as in child and youth centers – informal education and in sport clubs. In compulsory upper secondary school dual career is realized in the following ways: classical (during day – studies; during afternoon and evening – sport trainings); specialized (partly integrated education and sport training), e.g. basketball and ice-hockey schools; sport gymnasiums (complete integration of sport trainings and education: training-studies-training; teacher consultations even until 9.p.m.), e.g. Murjani Sport Gymnasium.

BSUPC IN FRAMEWORK OF THE BELARUSIAN SYSTEM OF SPORT EDUCATION

Dz. Smaliakou

Belarusian State University of Physical Culture, Minsk, Belarus

The aim of the research was to verify the best approach to sport education by the revision of the educational system in sports area. There were sociological methods used: survey, interview. In the framework of the international project “Top level sportsmen in high school – the models of sportive success” there were interviewed a test group of students during the period 10.03-15.03 of the track and field specialization at Belarusian State University of Physical Culture. Belarusian State University of Physical Culture is the oldest institution of higher education in Belarus. BSUPC is the top of the sport educational pyramid in Belarus that enroll the students from sports schools and clubs. It offers a set of opportunities for top-level sportsmen as well as for ordinary students to complete higher education and obtain profession in field of sports. It has 75 years long history and during this period the university has prepared more than 90 Olympic Champions, a large number of head coaches of national teams, as well as 3 Ministers of Sport and Tourism. It offers not only sportive opportunities, but also gives a possibility to obtain actual specialization in other fields of economic of Belarus. There are a lot of businessmen, officials, journalists, etc. among BSUPC alumni. Results: the most successful students of the 1st year of track and field specialization had obtained education at the sports schools before they were enrolled to the university. The most of them were involved in professional sports activities. The problem of education of this group of students is time management – successful combination of education and training. Conclusion: variety and flexibility of educational plans gives possibility to successfully combine sport and education, education and work.