# Sports Science & Fitness Congress

## September, 22nd - 24th

German Sport University Cologne, 2017

moderated by Karin Silbernagel & Christian Couppé

***Per Aagaard - Roland Becker - Tim Gabbett - Karin Silbernagel***
***Christian Couppé - Kevin Tipton - Christian Kopkow***
***Eric Hegedus - Evangelos Pappas - Michael Skovdal Rathleff***

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*Sports Science & Fitness Congress*
*September 22nd - 24th 2017*

*German Sport University Cologne*
*Cologne, Germany*

# Book of abstracts

*Editor: Sven Friese*

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*The SSF-Congress vision* is, that the cutting edge of science is attainable for the majority of people, comprehensible, suitable for daily use, and with long-lasting effects.

We keep the fee as low as possible to increase the opportunity to become a part of a yearly platform for sharing relevant new developments and building on accumulated knowledge.

The main theme of the SSF-Congress 2017 is *putting science into practice* to show congress participants how to further improve therapy and training.

Renowned presenters from international institutions are going to hold lectures to ensure that the quality of the presentations is as high as possible.

## Sponsors

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| Friday, 22nd September 2017 | | | |
|---|---|---|---|
| **Christian Couppé** | 09:30 - 09:35 | 5´ | Opening |
| **Tim Gabbett** | 09:35 - 10:25 | 50´ | A Best Practice Approach to Monitoring Training Load / Room: Lecture hall 5 |
| | 10:25 - 11:10 | 45´ | Coffee break / Room: Foyer |
| **Michael Skovdal Rathleff** | 11:10 - 12:00 | 50´ | Managing Patellofemoral Pain: Is it time for a rethink? / Room: Lecture hall 5 |
| **Nina Gras** | 12:00 - 13:30 | 90´ | Workshop: „Objectivity in Functional Screening – the TEMPLO® BASES solution (Body Assessment and Specific Efficiency Screening)". This workshop teaches the BASES concept and workflow of the TEMPLO® Functional Screening Software. / Room: Lecture hall 5 |
| | 13:30 - 14:50 | 80´ | Lunch / Room: Foyer |
| **Eric Hegedus** | 14:50 - 15:40 | 50´ | The complexity of recovery and return to sport / Room: Lecture hall 5 |
| | 15:40 - 15:55 | 15´ | Presentation of Gymwatch Room: Lecture hall 5 |
| **Christian Couppé** | 15:55 - 16:00 | 5´ | Transition |
| | 16:00 - 16:35 | 35´ | Coffee break / Room: Foyer |
| **Tim Gabbett** | 16:30 - 17:30 | 60´ | Training Smarter and Harder / Room: Lecture hall 1 |
| **Karin Silbernagel** | 17:30 - 17:35 | 5´ | Transition |
| | 17:35 - | 10´ | Mini-oral by Ahmet ŞİRİNKAN / Room: Lecture hall 1 |

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|---|---|---|---|
| | 17:45 | | |
| **Tim Gabbett** | 17:45 - 18:45 | 60´ | Building Robust Athletes / Room: Lecture hall 1 |

| Saturday, 23rd September 2017 | | | |
|---|---|---|---|
| **Roland Becker** | 08:30 - 09:20 | 50´ | Time for a paradigm change in meniscal repair: save the meniscus! / Room: Lecture hall 1 |
| | 09:20 - 09:35 | 15´ | Presentation of Strobel & Walter - Yogaboard / Room: Lecture hall 1 |
| **Per Aagaard** | 09:35 - 10:35 | 60´ | The influence of eccentric strength training on the enhancement of maximal muscle strength, explosive force and muscular power - Consequences for Athletic Performance / Room: Lecture hall 1 |
| | 10:35 - 11:05 | 30´ | Coffee break / Room: Foyer |
| **Eric Hegedus** | 11:05 - 11:55 | 50´ | Predicting injury with performance tests: A simple solution in a complex environment? / Room: Lecture hall 1 |
| | 11:55 - 12:55 | 60´ | Workshop by Redcord about Neurac: A treatment method that aims to restore functional and pain-free movement patterns through high levels of neuromuscular stimulation. / Room: Lecture hall 1 |
| **Karin Silbernagel** | 12:55 - 13:00 | 5´ | Transition |
| | 13:00 - 14:10 | 70´ | Lunch / Room: Foyer |
| **Kevin Tipton** | 14:10 - 15:00 | 50´ | Updates in nutrition research / Room: Lecture hall 1 |
| **Karin Silbernag** | 15:00 - 15:50 | 50´ | Return to sports in athletes with tendinopathy / Room: Lecture hall 1 |

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| | 15:50 - 16:30 | 40´ | Coffee break / Poster presentation / Room: Foyer |
| **Christian Couppé** | 16:30 - 17:20 | 50´ | Latest updates in Tendinopathy treatments / Room: Lecture hall 1 |
| **Kevin Tipton** | 17:30 - 18:00 | 30´ | Meet the expert: Participants are allowed for asking questions about the specialized areas of Kevin Tipton. / Room: Lecture hall 1 |
| **Eric Hegedus** | 18:00 - 18:30 | 30´ | Meet the expert: Participants are allowed for asking questions about the specialized areas of Eric Hegedus. / Room: Lecture hall 1 |

| **Sunday, 24th September 2017** | | | |
|---|---|---|---|
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| **Christian Kopkow** | 09:30 - 10:00 | 30´ | Core Outcome Sets – why outcome research matters! / Room: Lecture hall 1 |
| | 10:00 - 10:30 | 30´ | Coffee break / Room: Foyer |
| **Per Aagaard** | 10:30 - 11:30 | 60´ | Effects of Resistance Training on Neuromuscular Function - Implications for athletes and non-athletes, elderly and patients / Room: Lecture hall 1 |
| **Christian Couppé** | 11:30 - 12:20 | 50´ | Training modalities for tendons: What matters? / Room: Lecture hall 1 |
| | 12:20 - 13:20 | 60´ | Lunch / Room: Foyer |
| **Evangelos Pappas** | 13:20 - 14:10 | 50´ | Etiology and prevention of ACL injuries / Room: Lecture hall 1 |
| | 14:10 | 30 | Mini-orals by Sertaç ERCİŞ, Nurcan DEMİREL, A.Uğur |

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|---|---|---|---|
| | -<br>14:40 | ´ | NALCIOĞLU |
| **Christian Kopkow** | 14:40<br>-<br>15:10 | 30<br>´ | Scapula dyskinesis – relevant or overrated in overhead athletes? / Room: Lecture hall 1 - Coffee break |
| | 15:10<br>-<br>15:40 | 30<br>´ | Oral presentation by Rita Mansour: How to apply sports nutrition theories into practice while working with elite athletes (individuals or teams). / Room: Lecture hall 1 |
| **Michael Skovdal Rathleff** | 16:20<br>-<br>17:10 | 50<br>´ | Plantar fasciitis: Key facts and intervention strategies in prevention and rehabilitation / Room: Lecture hall 1 |
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| **Evangelos Pappas** | 17:20<br>-<br>17:50 | 30<br>´ | Meet the expert: Participants are allowed for asking questions about the specialized areas of Evangelos Pappas. / Room: Lecture hall 1 |
| **Christian Kopkow** | 17:50<br>-<br>18:20 | 30<br>´ | Meet the expert: Participants are allowed for asking questions about the specialized areas of Christian Kopkow. / Room: Lecture hall 1 |
| **Evangelos Pappas** | 18:20<br>-<br>18:30 | 10<br>´ | Closing / Room: Lecture hall 1 |

**INVESTIGATION OF VOLUNTEERS' AND FAMILIES' EXPECTATION AND IDEAS WHO PARTICIPATED TO SPECIAL MOVEMENT EDUCATION AND GAME PROGRAM WHICH IS AIMED TO BRING TOGETHER AND APPLIED TO 3-5 AGED DISABLED CHILDREN**

**Sertaç ERCİŞ, Univercity of Atatürk, Faculty of Sport Sciences, Department of Recreation, Erzurum/Turkey.**
**Ahmet ŞİRİNKAN, Univercity of Atatürk, Faculty of Sport Sciences, Department of Recreation, Erzurum/Turkey.**
**R. Nazım SARAÇOĞLU, Univercity of Atatürk, Faculty of Sport Sciences, Department of Recreation, Erzurum/Turkey.**

**Abstract**

**Aim of the Investigation:** Investigation of volunteers' and families' expectation and ideas who participated to special movement education and game program which is aimed to bring together and applied to 3-5 aged disabled children.

**Material and Method:** 25 children who are between 3-5aged participated to the Project. 15 children (9girl and 6boy) are kindergarten student, 10 of them (6boy and 4girl) formed from children who need special education.
30 volunteer trainers (12boy and 18girl) were determined from sport science faculty for practices. For practices Special Olympics, within the scope of tiny athletes 8 weeks '' special movement education and game program'' was prepared.
Practices were made two days (Saturday and Sunday) in a week for 45-60 minutes. During practices one volunteer trainer worked for each one student.

**Analysis:** Before starting to the practice, interview which is formed with 8question with 30 volunteer trainers and 40 families who participated to practice program was done for their expectation and view. Also volunteer students' observation reports were compared and saved as first and last observation.

**Results and Observation:** As a result of project practice, it is specified that in first meeting results families had less expectation (%78) and in last meeting results they observed more significant results than they expected (%88).
Volunteer trainers specified that in the first meetings they were desperate and had less self-confidence (%75), but after the practice these thoughts have completely changed and their self-confidence increased (%92) at the same time they observed significant developments (%97) in children.
As a result, it is said that families' of students who participated to the project expressed their positive satisfactions and also volunteer trainers expressed that participating to the project give them experience and provide benefits their self-confident.

**Key words:** *Special Education, Movement Education, Bringing Together, Families, Interview, Observation.*

**INVESTIGATION OF THE EFFECT OF GAME PRACTICE PROGRAM WHICH IS APPLIED TO CHILDREN WHO NEED SPECIAL EDUCATION and AIMED TO BRING TOGETHER TO PSYCHO-MOTOR SKILLS**

**Ahmet ŞİRİNKAN, Univercity of Atatürk, Faculty of Sport Sciences, Department of Recreation, Erzurum/Turkey.**

**Abstract**

**Aim of the investigation**: The aim of this research is to investigate the effect of game practice program which is applied to children who need special education and aimed to bring together to psycho-motor development.

**Material and Method**: 25 children who are between 3-5aged participated to the Project. 15 children (9girl and 6boy) are kindergarten student, 10 of them (6boy and 4girl) formed from children who need special education.
After meeting with a special education school administrator and a kindergarten manager for project, information has been given to families.
Volunteer trainer students who are from sport science faculty have been determined for practice. With giving information about project to volunteers, two seminars have been given to children about their skills of game, movement, behavior and communication.
8 weeks '' special game and movement program '' was prepared for practice. While preparation, the support of pre-school teaching, special education teaching and lecturers of recreation department of sport science faculty was got.
Practices were made two days in a week (Saturday and Sunday) for 45-60 minutes. One volunteer trainer worked for each one student during the practices.

**Analysis:** Before starting to the practices, students' skills which are included psycho-motor behavior ( tests of gross motor development (walk, run, jump, gallop jump, side slip, jump forward) and basic skill tests (catch the throwing tennis ball, hit the puff ball with stick, hit the puff ball with foot, dribbling the basketball ball, throwing tennis ball)) were tested and saved.
**Results and Evaluation**: The significant developments ($p>0,05$) have been achieved from the beginning and end of the project measurements of gross motor development tests ( walk, run, jump, and jump forward) and basic skill tests (catch the throwing tennis ball, hit the puff ball with foot, dribbling the basketball ball).
There wasn't significant development in the tests of gallop jump, side slip, hit the puff ball with stick, throwing the tennis ball ($p>0.05$)
As a result, it is said that there is positive developments in students' gross motor development characteristics and basic skill characteristics who is from partner kindergarten and need special education with practice of 8 weeks '' special game and movement program'' .

**Key words**: Special Education, Partner, Motor skills, Movement practice.

**INVESTIGATION OF THE EFFECT OF GYMNASTIC EDUCATION WHICH IS APPLLIED TO 2-7 AGED CHILDREN WHO NEED SPECIAL EDUCATION AND PARTNER CHILDREN TO SOME MOTORIC FEATURES DEVELOPMENT**

**Nurcan DEMİREL, Univercity of Atatürk, Faculty of Sport Sciences, Department of Sport Trainer, Erzurum/Turkey.**
**Ahmet ŞİRİNKAN, Univercity of Atatürk, Faculty of Sport Sciences, Department of Recreation, Erzurum/Turkey.**

**Abstract**

**Aim of This Research**: The aim of this research is to investigate the gymnastic education effects which is applied to 2-7aged children who need special education and partner children to some motoric features ( balance, flexibility and coordination) development.

**Material and Method**: 22 children who are between 2-7age participated to the project. 12 of children (6girl and 6boy) are partner tiny athlete (who don't need special education), 10 of them (6boy and 4girl) are tiny athlete (who need special education).
For implementation of the project, 8 weeks example plan which is in '' Tiny Athletes Project, Application Guide'' within Special Olympics Tiny Athletes Project has been developed and restructured as gym content. Educational games have also been added to the configured implementation plans.

**Analysis**: At the beginning of the project, the tests of flexibility( sit reach test), balance (flamingo balance , double foot one foot stand on empty , walk on a balance) and coordination (rhythmic walk, jump forward, two leg jump from gymnastic exercises) were done to children and saved. After 8 weeks working process, same tests were done again and the comparisons were done. The results of research were evaluated with SSPS.20 statistic program, arithmetic averages , maximum and minimum values were saved with the analysis techniques of Mann-Whitney U test in comparisons.

**Result and Evaluation:** Between the first tests and the tests which are done at the end of the project, significant developments were saved in partner students ($p>0,01$ and $p>0,05$) .
In children who need special education $p>0,05$ ratio of development was recorded in flexibility. While developments were saved in tests of double foot one foot stand on empty from balance test, there wasn't significant development ($p>0.05$) in the other balance tests (flamingo balance test and walk on a balance test). In coordination tests (rhythmic walk, jump forward, two leg jump) $p>0.05$ ratio of development was saved.
As a result in project implementation it is said that gymnastic practices which are provided with participation of children who need special education and partner children and about flexibility, balance and coordination contributes development to all two groups of children.

**Key Words:** Special Education, Gymnastic, Partner, Flexibility, Balance, Coordination.

THE STUDY OF FOREIGN LANGUAGE LEVELS AND EXPECTATIONS OF THE STUDENTS IN FACULTY OF SPORTS SCIENCES

A.Uğur NALCIOĞLU

**Abstract**

**Purpose:** The purpose of this study is to study foreign language levels and expectations in learning process of students in faculty of sports sciences.
Material and Method: 180 students studying in departments of Physical Education and sports teacher education, Sports Coaching, Sports Management and Recreation in Faculty of Sports Sciences participated in the study. The participants consisted of 45 female and 135 male students. 25 participants of the study are students in Physical Education and sports teacher education department, 45 in Sports Coaching department, 65 in Recreation department.
"Job Expectation Questionnaire" was employed in the study. The questionnaire consisted of 6 questions related to demographic features and also 21 questions related to expectations about foreign language learning.

**Analysis:** Data was obtained by analyzing survey results via SSPS.20 program. Descriptive statistics of data were obtained by calculating section variables, frequency and percentage distribution. The difference between sections was compared through T test ($p>0.05$).

**Results and Evaluation:** The study results indicated that 76 % of the students in education department and 51 % in Management Department of Faculty of Sports Sciences expressed that they are hopeless about their expectations regarding foreign language learning and level.
Only 27 % of the students in Recreation Department and 38 % in Coaching Department are hopeless about this issue and the majority of them expressed that they are hopeful about foreign language learning and levels.
Consequently, students in Coaching and Recreation Departments believe that foreign language is necessary and they need education in this issue.

**Key Words:** Sports, Foreign Language, Expectation, job.

# ANTHROPOMETRIC CHARACTERISTICS OF WORLD-CLASS RACEWALKERS

***Gomez-Ezeiza J, Torres-Unda J, Irazusta J, Granados C, Santos-Concejero J***

University of the Basque Country UPV/EHU (Spain)

**INTRODUCTION:** To excel in racewalking events, typical training programmes involve very high training volumes at low and moderate intensities (1), which have been shown to induce functional and structural adaptations at an anthropometric level. Since anthropometrical variables are closely related to movement efficiency and performance in endurance events, the aim of this study was to describe the anthropometric profile of world-class racewalkers.

**METHODS:** Twenty-nine world-class racewalkers (21 men & 8 women), all possessing the Olympic qualifying standard, participated in this study. Anthropometric characteristics, including height, body mass, eight skinfolds, five girths and four bone breadths were measured. Body composition, somatotype, somatotype dispersion mean, somatotype attitudinal mean and height to weight ration, as well as skinfolds extremity to trunk ratio were also calculated.

**RESULTS:** Mean height, body mass and BMI were 177.1 ± 7.1 cm, 66.4 ± 5.8 kg, and 21.2 ± 1.3 $kg \cdot m^{-2}$ for men and 165.6 ± 4.5 cm, 53.6 ± 3.7 kg, and 19.6 ± 1.6 $kg \cdot m^{-2}$ for women, respectively. Women presented greater body fat content (6.7 ± 0.6 ***vs***. 12.2 ± 0.8%; very large effect), less muscle mass (65.6 ± 4.6 ***vs***. 61.6 ± 2.6 kg; large effect), and were more endomorphic (large effect) than men. Men specialists in 20-km showed greater muscle mass (66.7 ± 4.9 ***vs***. 64.4 ± 4.3 kg; moderate effect), and slightly higher skinfolds, girths, body fat content and were more mesomorphic than 50-km specialists (moderate effect).

**DISCUSSION:** World-class racewalkers are characterised by greater muscle mass than runners of similar level. Similarly, racewalkers competing in 50-km, present lower body mass, body fat and muscle mass than specialists in 20-km, probably as a consequence of higher training volumes. The anthropometric data of this study may assist coaches and federations to establish reference values for athlete selection and talent identification in racewalking.

**ACKNOWLEDGEMENTS:** This study has been supported by a grant from the University of the Basque Country UPV/EHU (EHU A16/12).

**REFERENCES**

Gomez-Ezeiza J, Granados C, Santos-Concejero J. Different competition approaches in a world-class 50-km racewalker during an Olympic year. ***J Sports Med Phys Fitness*** 56(11):1423-7, 2016.

**Injury Rate Among Freeletics Athletes**

Maurice Kanstein1, Tobias S. Kaeding[1]
[1]: Institute of Sports Science Carl von Ossietzky University of Oldenburg

**Abstract**

**Introduction**
The commercially training concept Freeletics was evolved in 2013 and enjoys great popularity. The official website currently has over 13 million members from 160 countries. The concept is based on functional training and high intensity training. People ought to train solely with their own bodyweight and in most cases without any accessories1.
To date there is no data considering the injury rate within the training concept of Freeletics available, this study should investigate the injury rate, identify determinants and areas, were most of the injuries occur.

**Methods**
It was developed an online survey distributed via the social media platform Facebook. The survey was made available via a posting in selected Freeletics groups from Bremen and Oldenburg (Germany, Lower Saxony). 62 subjects (53.2% male, mean age 26.4 ± 16.6 yrs.) completed the survey. The data was analyzed with univariate and bivariate analysis and a chi-square test.

**Results**
An overall injury rate of 14.5% was found. Male subjects (21.21%; 7/33) were more often injured than female subjects (6.10%; 2/29). We did not find any significant correlations between an occurrence of a sports injury and the parameters age, sex, intensity of training, warm-up and cool-down exercises performed and the combination with other performed sports. However, we found a trend ($p = 0.0508$) regarding a raised risk for suffering a sports injury the longer the athletes performed the Freeletics training. Furthermore, most of the injuries occurred in ligaments, tendons, and cartilages (5/14).

**Conclusion**
Because we only surveyed 62 subjects as a random sample, the results cannot be generalized. Compared to the injury rate in CrossFit with approximately 20%, the injury rate in Freeletics is about 5% lower2. The higher intensity in CrossFit mitght be one reason for this difference in the injury rates. The injury rate in Freeletics is relatively high even though it is a training method only using own bodyweight. Also, the only available coaching by different electronic media can be a reason for a raised injury rate. For a deeper insight, further studies with more subjects and the integration of the aspect of coaching would be necessary.

**Keywords**: injury rate, functional training, high intensity training

**References**

1 Freeletics GmbH, 2016. About Freeletics. Available at: https://www.freeletics.com/en/press/
2 Weisenthal, B.M. et al., 2014. Injury Rate and Patterns Among CrossFit Athletes. Orthopaedic Journal of Sports Medicine, 2(4), p.2325967114531177. Available at: http://ojs.sagepub.com/content/2/4/2325967114531177%5Cnhttp://ojs.sagepub.com/content/2/4/2325967114531177.full%5Cnhttp://ojs.sagepub.com/content/2/4/2325967114531177.full.pdf.

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**Deviations in frequency and mode of vibration in whole-body vibration training devices**

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2: Institute of Communications Technology Leibniz Universität Hannover
3: Institute of Sports Medicine Hannover Medical School

**Abstract**

**Introduction**

Whole body vibration (WBV) training becomes more and more subject of scientific research and is used frequently in practice in the fields of mass sport and competitive sports as well as in therapy and prevention1. The most important problem in scientific research regarding the use of WBV training is to identify the ideal composition of the exercise parameters frequency, amplitude, body position, respectively exercises performed on the device, and the appropriate mode of vibration for each intention. All these parameters and their interaction are resulting in a specific exercise stimulus which in turn has influence on the safety and effectiveness of the exercise. The research regarding this problem might be hindered by the fact that WBV training devices sometimes generate and transmit frequencies and/or modes of vibration which are different to the preset adjustments2.

On the basis of findings of former research projects it must be assumed that regarding the preset frequency on WBV training devices a divergence of 10% or more might appear regularly2. This implicates that identified potentially ideal frequency ranges for specific intentions could not, or only very inaccurately, be applied and in addition, if the frequency is smaller than the preset frequency, a desired intensity could not be reached. The knowledge of potential divergences of the preset frequency and the mode of vibration between the manufacturer information and the actually applied signals is therefore of outmost importance for the application of methods of WBV training in practice and future research.

**Methods**

We conducted two research projects, one cross-sectional study in nine devices and one long term measurement in three devices used in a 13 months lasting research project regarding possible deviations in frequency and mode of vibration in WBV training devices and their possible causes3,4. The accelerations of different devices in different conditions and settings were recorded with a tri-axial accelerometer.

**Results**

We found divergences up to -25% regarding the preset frequency, but no relevant divergences regarding the mode of vibration.

Devices with a significant larger machine run time than other devices showed the most pronounced signs of impaired function concerning frequency, mode of vibration and random variability after prolonged use3,4.

**Conclusion**

Although our results cannot be generalized as we only analysed a small number of devices in terms of a random sample, they confirm that WBV training devices could show relevant divergences between the preset frequency and the actual applied frequency. Besides, we found out that such divergences might be, beside others, due to prolonged use. We strongly recommend that user in practice and research should analyse their WBV training devices regarding the applied frequency and mode of vibration on a regular basis.

**Keywords**: whole body vibration training, frequency, mode of vibration, acceleration, accuracy

**Effective exercises for patients with tetraplegia – a systematic review**

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**Abstract**

**Introduction** The patients with spinal cord injury (SCI) have a reduced physical performance and quality of life. Costs of therapy for patients with SCI are increasing annually.1 Therefore the efficiency of therapeutic measures plays an increasingly important role. To get an insight on the actual scientific evidence a systematic review was applied which investigates the effectiveness of exercises for patients with tetraplegia.

**Methods** We searched for the keywords “tetraplegia” and “exercise”, the synonyms and combinations of these in various databases (*Medicine Pubmed,* sports science BISp-databases *Spolit*, *Spofor* and *Spomedia, PEDro, Medscape* und *Cochrane Library).* 13 publications were involved for further analysis.

**Results** Safe endurance training and inspiratory strength training programs provide significant effects on respiratory functions, cardiac functions, biomechanical functions, metabolic functions and bone adaptions. In addition an intensive endurance training (at least 70% of the maximum heart rate) leads to significant effects, especially on the metabolic parameter TC/HDL-C. Besides interventions supported by functional electrical stimulation (FES) are recommended. In addition to the physical performance it seems also possible to improve the quality of life by exercise interventions.

**Conclusion** Inspiratory strength training and endurance training programs for people with tetraplegia have an influence on the physical condition and therefore on the psychological well–being of patients. It should be mentioned that studies were excluded, if the used intervention does not include a movement-related part. Hence studies using interventions such as FES or vibration training were excluded if they were not combined with a clearly movement-related intervention. Because interventions combined with FES can be recommended, it would be interesting to find out which role FES plays in future studies.

**Keywoords:** tetraplegia, exercise, intervention

**References** 1 Statistisches Bundesamt (2017). *Zahlen & Fakten. Gesundheitsausgaben nach Leistungsarten.* Zugriff am 08.03.2017 unter https://www.destatis.de/DE/ZahlenFakten/GesellschaftStaat/Gesundheit/Gesundheitsausgaben/Tabellen/Leistungsarten.html

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**USE OF THE KNEE INJURY AND OSTEOARTHRITIS OUTCOME SCORE IN A RECREATIONALLY ATHLETE POPULATION: KNEE INJURY IS ASSOCIATED WITH LOWER SCORES**

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**Abstract**

**Introduction:** The use of patient-reported outcome measures is to measure symptoms, pain, function, and sports activity for people with a variety of knee disorders. However, normative data for these measures are limited and often include a wide range of ages and activity levels. The purpose of the study is to provide normative data for the Knee Injury and Osteoarthritis Outcome Score (KOOS) in a recreationally athlete population and to compare scores between participants with a knee injury and those with no history of lower limb injury.

**Methods:** We administered the KOOS to 413 people in each of 8 age/gender categories. 303 participants were healthy with no history of knee problems and 110 with knee injury. We calculated means, standard deviations, percentiles and ranges by sex and age group.
Results: Among the 413 participants, 279 were male and the remaining 134 were female.

Normative mean scores for 5 sub-scales of the KOOS (Pain, Symptoms, Functional ADL, Sports and Recreation Function and Knee-Related QOL) were measured in each of 8 age/gender categories. However, mean scores among healthy men and women were (90.71) and (89.13) respectively. While, mean scores among injured men and women were (70.14) and (69.37) respectively.

**Conclusion:** *Scores on the KOOS vary by age and gender. Normative values for all KOOS scales suggest a high level of functioning among participants with no history lower limb injury. The normative data collected in this survey will allow clinicians to interpret how patients with knee injuries are functioning relative to their age- and gender-matched peers and will enable researchers to determine the clinical outcomes of treatment.*