

2018 International Symposium

Evidence-Based Exercise Medicine for the Promotion of Lifelong Health

12:00~18:00, Friday, May 18th, 2018
Grand Ballroom, Baekyangnuri, Yonsei University, Seoul, Korea



FRICSS
Frontier Research Institute of
Convergence Sports Science



Department of Physical Education
Department of Sport Industry Studies



National Research
Foundation of Korea

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Convergence Sports Science

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Opening Remarks

Hae Dong Lee, PhD: Director of the FRICSS



As the Director of the Frontier Research Institute of Convergent Sports Science (FRICSS), I sincerely welcome all of you!

Since the foundation of the “Institute of Sports Sciences” in 1993, the institute has been made its best effort to be a leader in basic and applied researches and research promotion in the field of sports sciences. In 2014, with renaming the institute FRICSS, we have been pursuing the sports science-centered convergent researches by collaborating with related areas in order to resolve health-related social conundrums.

During the early era of sports science, researches mainly focused on the enhancement of athlete’s performance. With the dramatically increasing attention to the Quality of Life (QoL) with longevity, the research focus has been moved on how sports science contributes to the QoL.

In order to live up to it, the FRICSS has remodeled its organization. In 2015, the FRICSS was given a valuable opportunity from the National Research Foundation to perform multidisciplinary researches entitled “Evidence-based Exercise Medicine for the Promotion of Lifelong Health”. With this generous support for the last 3 years, our convergent research team, which consists of researchers from sports science, medical and health science and engineering, is boosting up researches on exercise medicine for representative metabolic and musculoskeletal disorders and cancer. Throughout this project, the institute is expected to contribute to expand “lifelong health”, the current social issue, and looks forward to open a new horizon for the role of convergent sports science.

Lastly but not least importantly, I would like to express sincere appreciation to Drs. Ewa M Roos, Kerry S. Courneya, Chang-Hyung Lee, and Dong Hoon Lee for their valuable time and contribution to this symposium.

May 18, 2018
Hae Dong Lee, PhD
Director of the Frontier Research Institute of Convergent Sports Science
Yonsei University

개회사

Hae Dong Lee, PhD: Director of the FRICSS

안녕하십니까?

융합체육과학선도연구소 소장 이해동입니다. 우선 저희 연구소에서 주최하는 국제심포지엄에 함께하셔서 자리를 빛내주신 모든 참여자 분들께 진심으로 감사 드립니다.

저희 연구소는 1993년 체육연구소로 개소하여 체육학 연구의 선도적 역할에 매진 해 왔습니다. 과학기술과 정보통신기술이 급속하게 발전으로 인한 현 시대의 새로운 사회적 요구에 부합하고자 2014년 현재 연구소명칭으로의 개칭과 함께 체육학을 중심으로 관련 학문 분야와의 유기적인 융복합 연구 선도를 통해 문제 해결형 글로벌 연구소로의 도약을 위해 최선의 노력을 기울이고 있습니다.

그 노력의 일환으로 지난 2015년부터 3년간 저희 연구소는 한국연구재단 대학중점연구소 지원사업에 선정되어 “건강증진을 위한 근거중심 운동의학적 융합연구”라는 주제를 가지고 최근 사회적 이슈인 건강수명 연장을 위한 연구 및 연구 활성화 활동을 할 수 있는 값진 기회를 부여 받았습니다. 체육학, 의보건학 및 공학 융합연구팀이 수행하는 본 사업을 통한 저희의 노력이 증가하는 기대수명에 부합하는 “건강수명” 연장을 위한 체육학 선도자의 역할에 대한 새로운 지평을 열기를 기대합니다.

마지막으로 본 심포지엄에 국제적 선도연구 소개 및 교류의 물꼬를 터주시기 위해서 이 자리에 참석해주신 Drs. Ewa M. Roos, Kerry S. Courneya, 이 창형, 그리고 이 동훈 박사님께 감사드리며, 이 심포지엄이 함께 해주신 모든 분들께 값진 시간이 되시기를 기원합니다.

2018년 5월 18일
연세대학교 융합체육과학선도연구소 소장
이해동

Welcome Address

Il Moon, PhD: Senior Vice President for Research Affairs



I welcome all of you here at the 2018 FRICSS International Symposium hosted by the Frontier Research Institute of Convergence Sports Science (FRICSS), Yonsei University.

Since the establishment of the Institute of Sports Science in 1993, the FRICSS has been academically developing so far. Now, it is ready to become a frontier in the field of sports science. Vision of a longer, healthier, and happier life through exercising has been widening the scope of sports science through problem-solving foundation and applied scholastics. Furthermore, we are working on exploring new areas of study by converging our discipline with others. As a result, the FRICSS was nominated as "the Priority Research Centers Program" by the National Research Foundation of Korea since 2015 and have carried on "evidence-based exercise medicine for the promotion of lifelong health" through combining medicine, science, and engineering in conjunction with sports science. The FRICSS have also presented over 40 research papers, hosted scholarly seminars on new topics, and spread active sports programs to the society in this short period of time.

I am proud to introduce FRICSS to everyone here today as a Yonsei's outstanding representative research institution. I believe that this (research) institution will play the role of a new global convergence research hub in the field of convergence sports science and help to solve the humanity's problem of a "healthy and happy life" through creative research and educational efforts.

I hope that 2018 FRICSS International Symposium with all the leading researchers from around the world will jump-start new gateways in the research of convergence sports science. Through this symposium, I believe that there will be new developments introduced in the field of convergence sports science and that we will make a greater global networking in convergence research.

I thank you all domestic and international scholars and guests for attending this 2018 FRICSS International Symposium. I would especially like to thank and welcome Drs. Kerry S. Courneya, Ewa M. Roos, Chang-Hyung Lee and Dong Hoon Lee.

I would also like to ask you to watch with affection, how the FRICSS grows to be the center of Korean Convergence Sports Science, and to a greater extent, a global leader in the world-wide convergence research.

Lastly, I want to thank Dr. Hae Dong Lee, the director of the FRICSS and everyone affiliated, for their effort to make this happen.

May 18, 2018
Il Moon, PhD
Senior Vice President for Research Affairs
Yonsei University

Congratulatory Speech

Shin-Wook Kang, PhD.: President of KAHPERD



Good afternoon! It is a beautiful day to enjoy outdoor physical activities with beloved family members and friends. On this fresh day of sunny spring, it is with my great pleasure to congratulate all the special guests and participants on opening this 2018 International Symposium hosted by the Frontier Research Institute of Convergence Sports Science (FRICSS)

I am particularly privileged with the opportunity at this year's international symposium for meeting renowned invited scholars in the field of sports medicine to address the roles of exercise to prevent and treat cancer, obesity, and musculoskeletal diseases. It is a well-established truth that everyone can benefit from doing exercise regularly to improve health and fitness, and exercise has now become an important public policy focus to enhance a nation's overall welfare. The idea of "Exercise Is Medicine" is now a global campaign slogan promoted by a range of interdisciplinary initiatives from the fields of sports science and medical science to improve a country's national health. As such, it is indeed timely to explore and analyze the roles of exercise to prevent and treat contemporary health problems. In particular, it is clearly anticipated that the individual and community health importance of exercise will continue to rise along with the speed and degree of scientific technology. At the same time, advanced scientific research will also contribute to expanding the medial benefits of exercise.

For this reason, I am very pleased today that the Frontier Research Institute of Convergence Sports Science (FRICSS) of Yonsei University is hosting this 2018 International Symposium to take a leading role in developing the field of exercise medicine. It is my strong belief that today's symposium will offer valuable opportunities to propose and discuss tangible and practical agendas and solutions for national health promotion.

It is also my pleasure to highlight that faculty members and alumni in physical education and sports science of Yonsei University have advanced its leadership role in the nation's sport and exercise development. Particularly, they have been leading sport science research, national sport policy, and practical sport development agendas. This is the reason why we could not help showing our best respect and appreciation for the Yonsei colleagues' contributions and efforts.

I would like to appreciate Dr. Hae Dong Lee, Director of the FRICSS, and faculty members at Yonsei University for their effort and devotion in preparing for this wonderful event. Besides, on behalf of the members of KAHPERD, I would specially welcome keynote speakers, Dr. Kerry Courneya of University of Alberta, Canada and Dr. Ewa Roos of University of Southern Denmark, Denmark, and the invited speakers for delivering valuable lectures making this symposium a great success. I am sure that your efforts will resonate a significant message to the field of sport science as well as health promotion for Korean people. I hope today's discussion turns out to be academically and professionally very meaningful. Lastly, I wish a continuous development and growth of the FRICSS.

Thank you.

May 18, 2018
Shin-Wook Kang, PhD.
President of KAHPERD

축사

Shin-Wook Kang, PhD.: President of KAHPERD

초록의 싱그러움 속에서 가족과 함께 스포츠를 즐기기 좋은 오늘, 연세대학교 융합체육과학선도연구소의 2018년 국제 심포지엄 개최를 진심으로 축하 드립니다.

올 국제 심포지엄도 예년과 마찬가지로 운동의학 분야의 저명한 학자들을 모시고 암과 비만, 근골격계 질환 등과 관련한 운동의 역할을 규명하는 자리로 알고 있습니다. 국민들의 건강과 체력에 이바지하는 운동의 역할이 널리 공유되면서 국가의 복지 정책의 하나로서 운동이 자리 잡고 있습니다. 또한 전 세계적으로 '운동은 약이다'라는 슬로건 아래 국민 건강을 위하여 체육학과 의학이 같은 길을 걷고 있습니다. 이러한 시점에 다양한 질환에 대한 운동의 치료 및 예방적 역할 탐구는 매우 시의 적절하다고 봅니다. 과학 기술의 발전 속도나 폭만큼 개인과 사회의 건강을 위한 운동에 대한 요구는 점차 증가할 것으로 예측되기 때문입니다. 또한 운동의 의학적 역할을 확장하는데 있어서 선진 연구들에 대한 의미 있는 경험도 매우 중요할 것으로 생각합니다. 오늘의 심포지엄에서는 최신 지견을 공유하고 과학적 근거를 바탕으로 국민 건강을 위해 구체적이고 실천적인 대안을 제시하는 소중한 자리가 될 것으로 보고 있습니다. 그러한 의미에서 연세대학교 융합체육과학선도연구소가 개최하는 2018 국제 심포지엄은 운동 의학 분야의 특별한 경험이 될 것으로 기대됩니다.

연세대학교 체육교수님들과 동문 체육인들은 스포츠과학 연구 분야와 국가 스포츠 정책, 그리고 스포츠 현장에서 명실공히 우리나라의 체육을 이끌고 있을 뿐만 아니라 국민 건강 향상을 위해서도 선도적인 역할을 수행하고 있습니다. 연세 체육인들의 이러한 공로와 노력에 대해 체육인들은 항상 존경과 감사의 마음을 갖고 있습니다.

끝으로 국제 심포지엄 준비에 만전을 기하신 이해동 연구소장님과 연세대 교수님들의 노력에 감사드립니다. 특히 요번 심포지엄에서 기조강연을 해주실 캐나다 앨버타 대학교의 Kerry Courneya 교수님과 덴마크 남부대학교의 Ewa Roos 교수님을 환영하고, 훌륭한 강연을 맡아주신 여러 교수님들께 한국체육학회 전 회원을 대신하여 감사의 뜻을 전합니다. 아무쪼록 오늘의 이 심포지엄이 학문적으로 매우 의미 있는 시간이 되기를 진심으로 기대합니다. 연세대학교 융합체육과학선도연구소의 무궁한 발전과 함께 이 자리에 함께 해주신 모든 분들의 건강과 행복이 함께하기를 기원합니다.

감사합니다.

2018년 5월 18일
한국체육학회장
강신욱

Congratulatory Speech

In-Sung Yeo, Ph.D: Dean, College of Sciences in Education



I would like to welcome all participants attending the 2018 FRICSS International Symposium, titled “Evidence-based Exercise Medicine for the Promotion of Lifelong Health”

I would like to appreciate and welcome especially the keynote speakers who come across the Pacific Ocean, Professor Kerry S. Courneys, University of Alberta, and Professor Ewa M. Ross, University of Southern Denmark. And also welcome the invited speakers, Dr. Dong Hoon Lee, the Harvard T.H. Chan School of Public Health and Professor Chang-Hyung Lee, Dept. Physical Medicine and Rehabilitation, Pusan National University. I look forward to more frequent and dynamic cooperation in various researchers after this symposium.

FRICSS, founded in 1993 as ‘The Research Institute of Physical Education’, an adjunct to College of Sciences in Education, has developed a lot in the past 25 years. In 2014, ‘The Research Institute of Physical Education’ was renamed into ‘The Frontier Research Institute of Convergence Sports Science(FRICSS)’. And in 2015 it has been chosen one of the Priority Research Centers by the National Research Foundation of Korea, and has started the blended and integrated research in Physical Education and Medicine.

Owing to the support of university headquarters, and the dedication of faculty members, and enthusiasm of the graduate students, the institute has developed as today. I would like to acknowledge faculty members and graduate students of Dept. of Physical Education, and Dept. of Sport Industry Studies, for this wonderful international symposium.

May 18, 2018
Dean, College of Sciences in Education
In-Sung Yeo, Ph.D

축사

In-Sung Yeo, Ph.D: Dean, College of Sciences in Education

안녕하세요?

2018 FRICSS 국제심포지엄(주제 : 건강 증진을 위한 근거기반 운동의학적 융합연구)에 참석해주신 여러분을 진심으로 환영합니다.

특히, 멀리 해외에서 오늘 심포지엄 기조연설을 위해 우리 학교를 방문해주신 알버타대학교 코네야 교수님과 덴마크 남부대학교의 루스 교수님께 감사드립니다. 또한 오늘 발표자로 참석해주신 하버드대학교 보건대학원 이동훈 박사님과 부산대학교 의과대학 이창형 교수님께도 감사드립니다. 이번 심포지엄을 계기로 하여 여러 다양한 전공의 연구자들간에 더욱 활발한 교류가 있기를 기대합니다.

융합체육과학선도연구소는 1993년 교육과학대학 부설 '체육연구소'로 설립되어 지난 25년간 많은 변화와 발전을 거쳐 왔습니다. 2014년 체육연구소가 '융합체육과학선도연구소'로 개칭되었고, 2015년 한국연구재단의 대학중점연구소사업에 선정되어 체육과학, 의학, 보건학 및 공학의 융합적 연구를 수행하고 있습니다.

우리 연구소는 암, 당뇨, 고혈압 예방 및 회복을 위한 한국형 운동 프로그램 개발 및 보급, 근거기반의 정형외과적 만성질환(퇴행성 관절염과 요통)의 예방 및 처치를 위한 표준화 및 특성화 운동 프로그램 개발 및 보급을 위해 노력해왔습니다.

현대의학의 발전과 생활수준의 향상에 힘입어, 평균수명 및 기대수명이 급격히 증가되었고, 이에 따라 삶의 질 향상을 위한 건강의 중요성이 더욱 크게 부각되고 있습니다. 운동을 통해 건강 수명이 연장되고, 행복한 삶을 추구하는데 우리의 연구가 도움이 된다는 자부심을 갖게 됩니다.

연구소가 이렇게 발전하게 된 데에는 학교 본부의 지원, 여러 교수님들의 노고, 많은 석박사 연구원들의 열정과 헌신이 있었기 때문입니다. 이 자리를 빌어 감사의 말씀을 드립니다. 오늘 이 국제 심포지엄 개최를 위하여 애쓰신 모든 분들께 감사드립니다.

2018년 5월 18일
연세대학교 교육과학대학장
여인성

FRICSS

Frontier Research Institute of
Convergence Sports Science

2018 FRICSS International Symposium

Evidence-Based Exercise Medicine for the Promotion of Lifelong Health

Friday, May 18th, 2018, 12:00~18:00
Grand Ballroom, Baekyangnuri, Yonsei University, Seoul, Korea

• Program, Registration, Submit Poster: www.fricss.weebly.com •

Keynote Speakers



"Exercise and Cancer Outcomes:
from Observational Studies to Randomized
Trials"

Kerry S. Courmeya, PhD

Professor and Canada Research Chair in Physical
Activity and Cancer/ Fact. of Kinesiology, Sports, and
Recreation, University of Alberta, CANADA



"Exercise is Medicine for Painful Joints:
The Evolution of Osteoarthritis Management:
from Late-Stage Surgery to a Comprehensive
Prevention and Treatment Strategy"

Ewa M. Roos, PhD

Professor and Head of Research Unit/ Dept. Sports
Science and Clinical Biomechanics, University of
Southern Denmark, DENMARK

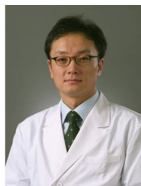
Invited Speakers



"New Insights on Obesity Paradox Using Body
Composition: Implication for Population
Health and Physical Activity"

Dong Hoon Lee, PhD

Dept. Nutrition, Harvard T.H. Chan School of Public
Health, USA



"The Clinical Effect of Crunch Factors on
Back Pain: Golf Swing Biomechanics"

Chang-Hyung Lee, MD/PhD

Dept. Physical Medicine and Rehabilitation,
Pusan National University, Korea



"Evidence-Based Exercise Medicine for Chronic
Disease: Is Our Evidence Good Enough?"

Justin Y. Jeon, PhD

Dept. Sport Industry Studies, Yonsei University, Korea



"Effects of Proprioception Training on
Outcomes of Patients with Knee Osteoarthritis"

Sae Yong Lee, PhD

Dept. Physical Education, Yonsei University, Korea

Frontier Research Institute of Convergence Sports Science, Tel: 82-2-2123-4759, E-mail: fricss@yonsei.ac.kr

Presented by



Department of Physical Education
Department of Sport Industry Studies

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Program Agenda

Time	Program	Speaker
12:00~13:00	Registration/ Poster Session	
13:00~13:20	Welcome Address	
13:20~14:20	Project Introduction	Hae Dong Lee, PhD Yonsei University
	Effects of Proprioception Training on Outcomes of Patients with Knee Osteoarthritis	Sae Yong Lee, PhD Yonsei University
	Evidence-Based Exercise Medicine for Chronic Disease: Is Our Evidence Good Enough?	Justin Y. Jeon, PhD Yonsei University
14:20~14:30	Coffee Break/ Poster Session	
Session I	Evidence-Based Exercise Medicine from the Perspective of Musculoskeletal Health	Moderators: Sae Yong Lee, PhD Doo Sup Kim, PhD Yonsei University
14:30~15:20	Exercise is Medicine for Painful Joints: The Evolution of Osteoarthritis Management: from Late-Stage Surgery to a Comprehensive Prevention and Treatment Strategy	Ewa M. Roos, PhD University of Southern Denmark
15:20~15:50	The Clinical Effect of Crunch Factors on Back Pain: Golf Swing Biomechanics	Chang-Hyung Lee, MD/PhD Pusan National University
15:50~16:10	Q & A	
16:10~16:20	Coffee Break/ Poster Session	
Session II	Evidence-Based Exercise Medicine from the Perspective of Metabolic Health	Moderators: Sang-Hoon Suh, PhD Yonsei University Yeon Soo Kim, MD/PhD Seoul National University
16:20~17:10	Exercise and Cancer Outcomes: from Observational Studies to Randomized Trials	Kerry S. Courneya, PhD University of Alberta
17:10~17:40	New Insights on Obesity Paradox Using Body Composition: Implication for Population Health and Physical Activity	Dong Hoon Lee, PhD Harvard University
17:40~18:00	Student Award Session	

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Convergence Sports Science

**Introduction to Evidence-Based Exercise Medicine for
Lifelong Health**

Hae Dong Lee, PhD
Yonsei University

**Effects of Proprioception Training on Outcomes of Patients
with Knee Osteoarthritis**

Sae Yong Lee, PhD
Yonsei University

**Evidence-Based Exercise Medicine for Chronic Disease:
Is Our Evidence Good Enough?**

Justin Y. Jeon, PhD
Yonsei University



Current Affiliation

Professor, Department of Physical Education, Yonsei University
Director, Frontier Research Institute of Convergent Sports Science, Yonsei University
Director, Sports-Care Techno-Design Research Center, ICONS, Yonsei University

Education

2002 Ph.D., Biomechanics, Faculty of Kinesiology, University of Calgary
1999 M.Sc., Biomechanics, Faculty of Kinesiology, University of Calgary
1995 M.Sc., Sports Biomechanics, Department of Physical Education, Yonsei University
1993 B.A., Physical Education, Department of Physical Education, Yonsei University

Career Highlights

2015-2018 Principle Investigator, "Evidence-based Exercise Medicine for Lifelong Health", funded by the National Research Foundation
2015-2017 Associate Editor, Korean Society of Sports Biomechanics
2011-2013 Member, Executive Council, International Society of Biomechanics
2006-2010 Research Professor, BK21 Mechatronics Research Group, Chungnam National University
2003-2005 Postdoctoral Research Fellow, Radiological Sciences, UCLA

Biography

Dr. Lee's research is focused on the biomechanics of the neuromuscular system. Expertise is in the area of adaptation of skeletal muscle-tendon complex to altered loading environment, aging, rehabilitation from injuries, exercise and training. Within this area, work is carried out experimentally and theoretically at in vivo levels. In addition, he has been collaborating with researchers from various areas, such as biomedical, electrical, and cloth & textile engineering, and orthopedics and rehabilitation medicine, for convergent sports science researches.

Summary of the Project

Hae Dong Lee, PhD: Yonsei University, Director of the FRICSS

Introduction to Evidence-Based Exercise Medicine for Lifelong Health

Vision

Promotion of Life Long Health through Evidence-based Exercise Medicine (EbEM)

Objectives

- Frontier research institute in EbEM
- Frontier educational institute for EbEM specialists
- Global research hub for EbEM
- Social contribution through EbEM research and education

Strategy

- Inter- & multi-disciplinary sports science researches
- International collaborative researches
- Comprehensive education for EbEM specialists
- Promotion of EbEM from laboratory to public

Summary of the Priority Research Centers Program by National Research Foundation of Korea

As many other countries, we, Koreans, faces serious social and economic burden, which results from altered lifestyle and an unprecedented increase in aging population in history. As one of ways to resolve this pending issue, the institution is provided a valuable opportunity by the National Research Foundation (NRF) to promote "Evidence-based Exercise Medicine" as a prevention and treatment option for fatal and chronic diseases.

In order to achieve this object, the institution organized a convergent research team from exercise medicine, and health sciences. After setting forth a vision that "healthier life for happier life", the institution will focus on collecting and accumulating the evidence for supporting the statement that "if exercise could be packed in a pill, it would be the single most widely prescribed and beneficial medicine" by Robert N. Butler (Director, the National Institute on Aging (NIA)).

Specifically, the institution has focused on providing "evidence-based exercise medicine" for the top three life-threatening fatal diseases (cancer, hypertension, and diabetes) and the two most common chronic musculoskeletal diseases (osteoarthritis and low back pain).

Expected Contributions

- Throughout the convergent researches, our efforts will raise the importance of multidisciplinary collaborative researches and create future research collaboration environment. Based on it, the institution is expecting to play important roles as a leading international research institution.
- The outcomes of this project are expected to contribute to create new paradigms in future physical education.
- This effort is expected to influence the formation of new policies and the creation of future sociocultural paradigm.



Current Affiliation

Professor, Department of Physical Education, Yonsei University
Director, Yonsei Institute of Sports Science and Exercise Medicine

Education

2009 Ph.D., Sports Medicine, Department of Kinesiology, University of Virginia
2005 M.S., Athletic Training, (CAAHEP Accredited Entry-Level Graduate Program), Department of Exercise and Sport Science, University of North Carolina
2002 Ph.D., Sports Biomechanics, Department of Kinesiology, Yonsei University
1998 M.S., Sports Biomechanics, Department of Kinesiology, Yonsei University
1996 B.A., Department of Physical Education, Yonsei University

Career Highlights

2014-2018 Department Chair, Department of Physical Education, Yonsei University
2012-2018 Assistant Professor, Department of Physical Education, Yonsei University
2009-2012 Assistant Professor, Department of Kinesiology and Sport Sciences, the University of Miami
2010-2018 Founding Lab Director, Sports Medicine and Motion Analysis Laboratory

Biography

Dr. Lee's research as an athletic trainer has been focusing on recovery from damage of sport players to exhibit their maximal performance, however, the subjects are not limited only within sport players but normal persons. Specifically, work is carried out for the effect of preceded knee damages (especially, anterior cruciate ligament injury) on knee osteoarthritis (OA) by analyzing big data from the National Health Insurance Service (NHIS) and develop prognostic technique utilizing epidemiological data extracted from the NHIS and biomechanical characteristics of OA patients. Another multidisciplinary way of analysis is also about to be done by comparison between the physiological characteristics of OA patients and that of normal persons to extract the risk factors affecting pathogenesis of OA.

Effects of Proprioception Training on Outcomes of Patients with Knee Osteoarthritis

Approximately 250 million people worldwide (3.6% of the population) have osteoarthritis (OA) of the knee. OA is a disease characterized by the degradation of joint cartilage and underlying bone, leading to joint pain, stiffness, and physical disability. In general, the recommended interventions for patients with knee OA include a combination of non-medication and medication treatments, with surgical interventions when needed. Non-medication treatments such as therapeutic exercise, changes in lifestyle, the pacing of activities, weight loss, and other management intended to unburden the damaged joint have been emphasized. Recent studies have indicated a potential association between impaired proprioception of the knee and the pathogenesis and pathological changes during early development of knee OA. Furthermore, proprioceptive impairments may be a predisposition to the cause of pain or disability in patients with knee OA. However, there is limited evidence to provide concrete idea regarding the effectiveness of proprioceptive training regarding pain, stiffness, function, and functional test in patients with knee OA. Therefore, the purpose of this presentation is to determine the efficacy of proprioception training regarding pain, stiffness, function and functional test in patients with knee OA.

Data Sources: A computerized search was performed using PubMed, MEDLINE, CINAHL, and SPORTDiscus from commencement to November 2015. Search terms were “proprioception or neuromuscular or balance exercise”, “Western Ontario and McMaster Universities (WOMAC) or Visual Analogue Scale (VAS) or Numerical Rating Scale (NRS) or Knee Injury and Osteoarthritis Outcome Score (KOOS) or International Knee Documentation Committee (IKDC) or Tegner Activity Scale (TAS) or Short Form-36 Health Survey (SF-36) or Berg Balance Scale (BBS) or Walking Speed Time Test (WST) or Timed Get Up and Go Test (TGUG) or Chair Stand Test (CST) or 6-Minute Walk Test (6MWT)” and “OA or osteoarthritis”. **Study Selection:** Studies were included if they met the following criteria: (1) Subjects with OA, (2) Subjects with proprioception training, (3) written in English, and (4) mean, standard deviation, and sample size of each group had to be reported. All sources were cross-referenced to identify additional relevant studies. **Data Extraction:** Methodological quality was assessed using the Physiotherapy Evidence Database (PEDro) scale and appraised the levels of evidence using the Oxford Centre for Evidence-based Medicine (OCEBM) guidelines. The effect size (Cohen’s D) and 95% confidence intervals (CIs) were calculated for the patient outcomes (pain, stiffness, function and functional test). **Data Synthesis:** In total, seven RCTs involving 558 patients with knee OA met the inclusion criteria. The range of selected studies PEDro scale was between 6 and 8. Levels of evidence were OCEBM level 2. Based upon the Meta-analysis results of WOMAC pain subscale (SMD: $-.53$, 95% CI: $-.80$ to $-.27$, $p < 0.001$), function subscale (SMD: $-.49$, 95% CI: $-.80$ to $-.17$, $p = 0.002$), and non-WOMAC walking speed test (SMD: -1.07 , 95% CI: -2.12 to $-.01$, $p = 0.048$), proprioception training had significant treatment effects. However, proprioception training was not associated with significant reductions in the WOMAC stiffness subscale, and non-WAMAC Timed Get Up and Go test scores. **Conclusions:** Proprioception training effectively promotes pain relief and functional improvements in the daily activities of patients with knee OA and could be included in rehabilitation programs. However, physical stiffness and functions did not change after proprioception training. For physical stiffness relief and functional improvement, modified proprioception training is recommended.



Current Affiliation

Professor and Chair, Department of Sport Industry Studies, Yonsei University
Professor, Cancer Prevention Center, Yonsei Cancer Center, Yonsei University College of Medicine
Head, Exercise Medicine Center for Diabetes and Cancer Patients (ICONS)

Education

2003 Ph.D., Department of Physical Education & Recreation, University of Alberta,
1998 M.S., Department of Physical Education & Recreation, University of Alberta
1995 B.A., Department of Physical Education, Yonsei University

Career Highlights

2005-2018 Professor, Department of Sport Industry Studies, Yonsei University
2011-2012 Visiting Professor, Dana Farber Cancer Institute, Harvard Medical School, Boston, USA
2003-2005 Research Fellow, Joslin Diabetes Center, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, USA

Biography

Justin has various research experiences on exercise and health from molecular biology, animal science, physiology, endocrinology, clinical and epidemiology studies in three different countries including South Korea, Canada and United States. Justin has either led or been integrally involved with 16 completed trials investigated the effects of exercise on various diseases among people with and without disabilities (Spinal cord injured, Children with Epilepsy, Obese children, Obese adolescents, Obese adults, Type 2 diabetic and Cancer patients) and currently the PI or co-investigator on 6 ongoing trials investigating the role of exercise in cancer population including colorectal, breast, prostate, blood cancer patients. Justin Jeon has also led several epidemiological studies which investigated the effects of fatness and fitness on metabolic diseases among adolescents and adults.

Justin has published more than 160 research articles (Over 85 journal articles in SCI or SCIE) His research publications have been cited more than 2800 times with h-index 27 and i10-index of 55 (scholar.google.com)

Evidence-Based Exercise Medicine for Chronic Disease: Is Our Evidence Good Enough?

The therapeutic effect of exercise on cancer survivors has been reported. The meaning of therapeutic is 'relating to the healing of disease or the branch of medicine concerned with the treatment of disease and the action of remedial agent'. Very few would argue that exercise can be one of the therapeutic tools for cancer survivor. However, what does it really mean that exercise can be therapeutic for cancer survivors? Is exercise beneficial in preventing cancer or beneficial in improving the prognosis of cancer? Does exercise improve cancer-related and non-cancer related symptom management and eventually improve the quality of life of cancer survivors? The meta-analysis studies consistently reported that the higher level of physical activity participation is associated with reduced risk of various cancers, including colorectal, breast, stomach, lung and prostate cancer. Furthermore, the higher level of physical activity participation is also associated with significant reduction in cancer recurrence and the risk of mortality in various cancer. The mechanism on how exercise participation would prevent cancer and improve cancer prognosis includes exercise-induced change in circulating insulin, growth factors, adipocytokines, immune function, and more recent epinephrine and interleukine-6 dependent NK cell mobilization. Now, there is enough evidence suggesting the benefit of exercise on cancer prevention and cancer prognosis.

On the other hand, most cancer survivors suffer from treatment-related side effects as well as non-treatment related musculoskeletal disorders. These conditions include urinary and bowel incontinence, peripheral neuropathy, low level of physical fitness, reduced range of motion due to surgery, and joint problems. Our surveys at the Cancer Prevention Center showed that up to 80 percent of our cancer survivors complain about joint problems, especially on the knee, lower back, shoulder, and neck. Therefore, we can speculate that cancer survivors would get benefit from strengthening exercises as well as the aerobic type of exercise. Furthermore, the providence of cancer-specific exercise program is necessary since cancer survivors are very different based on the type of cancer and cancer treatments.

In this presentation, I will first discuss about the process of evidence-based exercise development for cancer survivors. Then, I will report the result of recent exercise trial on survivor with prostate cancer, breast cancer, patients with hematopoietic cell transplantation. Lastly, I will present new and tested therapeutic exercise program for cancer survivors.

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**Evidence-Based Exercise Medicine from the
Perspective Musculoskeletal Health**

**Moderators: Sae Yong Lee, PhD
Doo Sup Kim, PhD**
Yonsei University

**Exercise is Medicine for Painful Joints:
The Evolution of Osteoarthritis Management:
from Late-Stage Surgery to a Comprehensive
Prevention and Treatment Strategy**

Ewa M. Roos, PhD
University of Southern Denmark

**The Clinical Effect of Crunch Factors on Back Pain:
Golf Swing Biomechanics**

Chang-Hyung Lee, MD/PhD
Pusan National University



Current Affiliation

Professor and Head of Research, Department of Sports and Clinical Biomechanics, Musculoskeletal Function and Physiotherapy and Center for Muscle and Joint Health, University of Southern Denmark

Education

2000 post-doctoral fellow, Harvard Medical School

1999 Ph.D., Lund University

1995 Pre-doctoral fellow, University of Vermont

1986 Research Assistant, University of Calgary

Career Highlights

Professor and Head of Research, Department of Sports and Clinical Biomechanics, Musculoskeletal Function and Physiotherapy and Center for Muscle and Joint Health, University of Southern Denmark

Biography

Professor Roos has a passion for advancing the frontiers of knowledge in muscle and joint health to improve the quality of life of those with musculoskeletal disease and to improve health care delivery for these conditions. Her focus is on patient involvement, non-surgical and surgical treatments and clinical care pathways.

Professor Roos is an internationally leading researcher and change agent in the field of musculoskeletal health. She has been able to both produce high-impact clinical research and translate that research into clinical tools that are easily and effectively implemented in hospitals, primary care clinics and even community settings in municipalities. She has also served as an expert on clinical guideline committees for osteoarthritis (Sweden and Norway 2003, Sweden 2012, 2017--), Osteoarthritis Research Society International 2014, China 2017), knee osteoarthritis (Denmark 2012) and meniscus pathology (Denmark 2015), thereby impacting the delivery of clinical care in the Nordic countries and worldwide.

Professor Roos is the author of 205 peer-reviewed publications. She has published in high impact journals such as the New England Journal of Medicine, the British Medical Journal and The Lancet. Her work has been cited in total 10952 times with 1 paper cited more than 1100 times and 23 additional papers cited more than 100 times. Her h-index is 54 (January 2018). She has supervised 21 PhD theses to completion with her students having professional backgrounds in medicine, physiotherapy, nursing and sports. Four of her PhD students have received awards and/or prestigious post-doctoral funding from the Swedish or Danish Medical Research Councils.

Summary of the Project

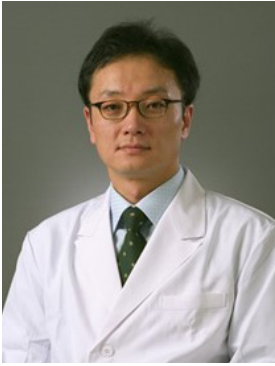
Ewa M. Roos, PhD: University of Southern Denmark

Exercise is Medicine for Painful Joints: The Evolution of Osteoarthritis Management: from Late-Stage Surgery to a Comprehensive Prevention and Treatment Strategy

Up to 30% of adults report frequent knee pain, a significant barrier for achieving levels of physical activity needed to promote good general health. Pain and functional limitations are the main symptoms associated with osteoarthritis, a disease that is increasing in prevalence. Eighty percent of the osteoarthritis burden is related to the knee. The increase in knee osteoarthritis is related to demographic changes in our societies, including physical inactivity. For people with knee osteoarthritis, exercise is a cornerstone treatment recommended in clinical guidelines across many countries and globally.

The pain relieving effect from 6-8 weeks of twice weekly exercise is 2-3 times greater than for pharmacological pain relievers, including opioids, and without the side effects. The pain relieving effect from knee arthroscopy is no greater than from non-surgical treatment options, including exercise, and importantly, much cheaper and without side effects. Finally, patients with moderate to severe osteoarthritis, eligible to have their knee replaced, and randomized to non-surgical treatment, including exercise, improve their pain with some 30% which is enough for 3 out of 4 to delay their surgery for at least one year.

To help clinicians put science into action we developed Good Life with osteoArthritis in Denmark (GLA:D®), a not-for-profit initiative hosted at University of Southern Denmark. In its first 5 years we have educated more than 1000 physical therapists to deliver evidence-based patient education and supervised, progressed, group-based neuromuscular exercise focusing on improving joint, core and lower extremity function. Together, these clinicians have treated more than 30000 patients. Results show decreased sick leave, less pain, less intake of pain killers and improved physical function. The GLA:D® program is now also available in Canada, Australia and China.



Current Affiliation

Professor, Physical Medicine & Rehabilitation, Pusan National University Yangsan Hospital

Education

- 2001 Specialist, Physical Medicine & Rehabilitation License
- 2007 Ph.D., Degree of Rehabilitation, Korea University
- 2001 M.Phil., Degree of Rehabilitation, Korea University
- 1995 B.A., Medical School, Korea University

Career Highlights

- 2008-2010 Assistant professor in Samsung Medical Center,
- 2010-2018 Seoul and Professor in Pusan National University Yangsan Hospital

Biography

As a specialist for physical medicine and rehabilitation, Dr. Lee has been interested in various topics related to musculoskeletal diseases. In addition to these clinical topics, his major concern is also focused to sports medicine about elite athletes. He worked as a Korean team physician in Beijing Olympics, Doha Asian Games, Jangchun Asian Games, and Bangkok Universiade Games so far. Recently, he worked as a Venue Medical Officer for Speed skating games in Pyeongchang Winter Olympic Games.

However, his interests are not only limited to clinical field. As a basic researcher, he has been studying the development and genetic analysis of Brown Adipose Tissue(BAT) using controlled animal study. Also, lordotic curve controlled traction devices on cervical and lumbar spines have been studied since 3 years ago.

His current topic for this year is about Biomechanical analysis of Golf swing which is coincide with today's topic. He hopes to have a chance to discuss and co-work with other researchers from overseas.

Summary of the Project

Chang-Hyung Lee, MD/PhD: Pusan National University, Korea

The Clinical Effect of Crunch Factors on Back Pain: Golf Swing Biomechanics

I. The Basic Golf swing biomechanics consists of Swing Arc, Weight shift, head control (up/down, rotation), shoulder rotation, impact speed, rhythm, agility components. The common evaluating factors for golf swings are followed below.

- 1) Swing arc: in~out, out~ in in front view
- 2) Weight shifting: at address, back swing, impact, follow throw
- 3) Head control: head height at address, back swing, impact, follow throw
- 4) The time of head rotation at each stage
- 5) Shoulder rotation: acromion link at each stage
- 6) Impact speed: club speed at impact stage
- 7) Rhythm: the time during address to back swing and back swing to follow throw

II. Specific Measurement factors for Golf Swing Biomechanics are as follows.

- 1) How close hit the ball to target point with each club? Consider head up, swing arc, weight shifting, coordination, core muscle power factors.
- 2) How far can you hit the ball with a driver? As long distance is combination of swing speed and sweet spot hit. Then, how can you increase swing speed by anyhow? Consider smash factor (hit distance/ impact speed) and crunch factors (shoulder angle, pelvic angles, and shoulder to pelvic angle difference), grip power, agility, core muscle power, trunk rotator muscle strength and more?

III. Clinical importance of Golf Swing on back injury: Crunch Factors vs Core muscle

As golf is a potentially dangerous recreational activity due to the demand for the better score, several factors should be considered for decreasing golf induced back injury.

- 1) Clinical importance of Golf swing on Back Injury: Asymmetric nature of golf swing, female golfers are susceptible to back injury.
- 2) Crunch Factors in Golf swing: To make a better swing, hitting a long and accurate drive, the difference between the shoulder rotation and pelvic rotation is considered to be bigger. There are many overuse injuries as opposed to an acute onset: especially in pro players
- 3) 'Core muscle' strengthening: treatment for golf induced injuries and hit farther
Increasing crunch factor is supposed to be strongly related with hit distance and accuracy without causing back pain for golfers.
- 4) Considerations for golf induced back injuries
Therefore, simply shortening of the backswing may not be suggested as a best strategy to increase golf swing performance and reducing total amount of musculoskeletal injuries of back and shoulder.
- 5) The Characteristics of female golfers
It appears that although the angular shearing force of the spine is greater in female golfers, the total burden on the spine might not be greater than male golfers.
- 6) How can we prevent back injury but still hit a long distance and accurate?

To prevent the back injury and still hit a long and accurate hit, it is crucial that the clinical practitioner has a fundamental knowledge of normal swing mechanics and a working knowledge of the musculoskeletal requirements needed to protect back injuries. In particular, a dynamic exercise program which incorporates golf functional rehabilitation in addition to basic training program such as core strength and stability, flexibility, balance, and peripheral muscle strength.

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**Evidence-Based Exercise Medicine from
the Perspective Metabolic Health**

Moderators: **Sang-Hoon Suh, PhD**
Yonsei University
Yeon Soo Kim, MD/PhD
Seoul National University

**Exercise and Cancer Outcomes:
From Observational Studies to randomized Trials**

Kerry S. Courneya, PhD
University of Alberta

**New Insights on Obesity Paradox Using Body
Composition: Implication for Population Health
and Physical Activity**

Dong Hoon Lee, PhD
Harvard University



Current Affiliations

Professor and Canada Research Chair, Faculty of Kinesiology, Sport, and Recreation, University of Alberta
Adjunct Professor, Department of Oncology, Faculty of Medicine and Dentistry, University of Alberta
Director, Behavioral Medicine Laboratory and Fitness Center, University of Alberta
Scientific Staff Member, Cross Cancer Institute, Edmonton, Alberta

Education

1992 Ph.D., Kinesiology; University of Illinois, Urbana-Champaign, Illinois, U.S.A.

1989 M.A., Physical Education; University of Western Ontario, London, Ontario, Canada

1987 B.A., Physical Education; University of Western Ontario, London, Ontario, Canada

Career Highlights

: Visiting Professor (2017). School of Medicine, Technical University of Munich, Bavarian State Ministry of Education, Science, and the Arts, Munich, Germany.

: Debra Sivesind Career Award (2016). Department of Palliative, Rehabilitation, and Integrative Medicine, The University of Texas MD Anderson Cancer Center, Houston, TX, USA.

: Visiting International Research Fellowship (2014). Faculty of Education and Arts, University of Newcastle, Newcastle, NSW, Australia.

: Visiting Fellow (2014). Health and Wellness Institute, Edith Cowan University, Western Australia, Australia.

: Award of Research Excellence (2012). Canadian Association of Psychosocial Oncology.

: Partnership with Internationally Renowned Scholars Program (2009). School of Medicine and Public Health, University of Newcastle, Newcastle, NSW, Australia.

: Canada Research Chair (2004-present). Canada Research Chairs Program, Government of Canada.

: Raine Visiting Professorship (2004). Raine Medical Research Foundation, University of Western Australia, Perth, WA, Australia.

: Investigator Award (2000-2005). Canadian Institutes of Health Research, Ottawa, ON, Canada.

: Young Investigator Award (1999). Society of Behavioral Medicine.

: Early Career Distinguished Scholar Award (1998). North American Society for the Psychology of Sport.

: Young Scientist Award (1992). Canadian Society for Psychomotor Learning and Sport Psychology.

Biography

Prof. Courneya's research program focuses on the role of physical activity after a cancer diagnosis including how it might help cancer patients prepare for treatments (prehabilitation), cope with treatments (symptom management), recover after treatments (rehabilitation), and improve long-term survival. His main research interests include studying: (a) the effects of physical activity on health-related fitness outcomes, patient-reported outcomes, and cancer outcomes, (b) the determinants of physical activity in cancer survivors, and (c) behavior change interventions to increase physical activity in cancer survivors. Prof. Courneya is Study Co-Chair for the multinational Colon Health and Life-Long Exercise Change (CHALLENGE) Trial, which is the first phase III trial designed to determine the effects of exercise on disease-free survival in 962 colon cancer survivors. He is also a member of the steering committee for the Intense Exercise for Survival (INTERVAL) Trial, which is a multinational phase III trial examining the effects of exercise on overall survival in 866 men with metastatic prostate cancer. Moreover, he is Team Co-Leader for the Alberta Moving Beyond Breast Cancer (AMBER) Study, which is the first prospectively designed cohort study examining the associations between objectively-measured physical activity, health-related fitness, and cancer outcomes in 1,500 newly diagnosed Alberta breast cancer survivors. Prof. Courneya has co-authored the American College of Sports Medicine's exercise guidelines for cancer survivors (2010), the American Cancer Society's physical activity and nutrition guidelines for cancer survivors (2012), and the American Society of Clinical Oncology's position statement on obesity and cancer (2014).

Summary of the Project

Exercise and Cancer Outcomes: From Observational Studies to Randomized Trials

My presentation will provide an overview of the effects of exercise on cancer outcomes such as treatment response, disease recurrence and progression, and cancer-specific and overall survival. I will begin with an overview of some potential clinical and mechanistic pathways through which exercise might influence such cancer outcomes. I will then summarize recent systematic reviews and meta-analyses of observational studies examining the associations between physical activity and cancer outcomes including some interesting data examining how genetic and molecular markers may influence these associations (i.e., a precision medicine approach to exercise oncology). Data will then be presented from several recently completed and ongoing exercise studies focused on cancer outcomes. First, results will be presented from the Supervised Trial of Aerobic versus Resistance Training (START). The START Trial was a Canadian multicenter trial that randomized 242 breast cancer patients between 2003-2005 to usual care (n=82), supervised aerobic (n=78) or resistance (n=82) exercise during chemotherapy. Patients were then followed-up 8 years later for disease-free survival (DFS). It was found that 8-year DFS was 82.7% for the exercise groups compared with 75.6% for the control group (Hazard ratio [HR]=0.68, 95% CI=0.37-1.24; log-rank p=0.21). Slightly stronger effects were observed for overall survival (HR=0.60, 95% CI=0.27 to 1.33; log-

Summary of the Project

Kerry S. Courneya, PhD: University of Alberta, CANADA

rank $p=0.21$). The START Trial provided the first randomized data to suggest that adding exercise to standard chemotherapy may improve breast cancer outcomes, a finding that has since been replicated in an independent Australian trial. Second, an overview and update will be provided on the ongoing Alberta Moving Beyond Breast Cancer (AMBER) Study. The AMBER Study is the first and only prospective cohort study designed specifically to determine the associations between physical activity, health-related fitness, and breast cancer outcomes in 1,500 newly diagnosed Alberta breast cancer survivors. AMBER includes many features designed to overcome previous methodological limitations of observational studies including objective measures of physical activity and sedentary behavior, a comprehensive assessment of fitness parameters, and blood collection at multiple standardized time points across the breast cancer trajectory. An overview and update will also be provided on the Colon Health and Life-Long Exercise Change (CHALLENGE) Trial, which is the first phase III multinational trial examining the effects of exercise on disease-free survival in 962 stage II/III colon cancer survivors who have recently completed chemotherapy. Finally, an overview and update will be provided of the recently launched Intense Exercise for Survival (INTERVAL) trial supported by the Movember Foundation. The INTERVAL trial is the first phase III trial examining the effects of high intensity aerobic and resistance training on overall survival in 866 men with metastatic castrate-resistant prostate cancer. I will end with discussing some of the challenges and future directions in this exciting area of research.



Current Affiliation

Postdoctoral Research Fellow, Department of Nutrition, T.H. Chan School of Public Health, Harvard University

Education

2017 Sc.D., Epidemiology and Nutrition, T.H. Chan School of Public Health, Harvard University

2013 M.S., Epidemiology, T.H. Chan School of Public Health, Harvard University

2012 M.S., Sport and Leisure Studies, College of Sciences in Education, Yonsei University

2010 B.S., Sport and Leisure Studies, College of Sciences in Education, Yonsei University

Career Highlights

2017-2018 Postdoctoral Research Fellow, Department of Nutrition, T.H. Chan School of Public Health, Harvard University

Biography

Dr. Lee is a Postdoctoral Research Fellow at Harvard T.H. Chan School of Public Health. With his background in exercise physiology, nutrition, and epidemiology, Dr. Lee applies rigorous methodologies and multidisciplinary approaches to expand current understanding of the role of energy balance in preventing chronic diseases and promoting population health. Dr. Lee's main research interests include (1) studying the role of physical activity over the life-course on chronic diseases, with specialty in cancer prevention and prognosis, and understanding the underlying mechanisms; (2) identifying nutrition and lifestyle factors that contribute to obesity-related cancers, including rare diseases such as multiple myeloma; and (3) applying his recently developed methods on estimating body composition to re-examine issues in obesity research that are yet to be fully understood (i.e., obesity paradox). Dr. Lee seeks to strengthen causal inference in his work with his expertise in diverse study designs, including randomized controlled trials and observational studies, and analytical skills (i.e., survival analysis, longitudinal analysis, prediction model). He has extensive experiences with clinical trials and big data, including national and hospital-based data and Harvard cohorts of Nurses' Health Study and Health Professionals Follow-up Study. He also conducted numerous meta-analyses and reviews to synthesize the existing evidence to inform public health policies and guidelines related to physical activity, diet and obesity. His work has been recently recognized by World Innovative Contribution Awards in 2017.

New Insights on Obesity Paradox Using Body Composition: Implication for Population Health and Physical Activity

Obesity is a major public health challenge in the US and around the world. Obesity, assessed by body mass index (BMI), is a significant risk factor for increased risk of many chronic diseases as well as mortality. However, the shape of the association between BMI and mortality has been a topic of considerable discussion as epidemiologic studies have found unexpected J-or U-shaped relationship between BMI and mortality. For instance, in some studies overweight was associated with increased mortality, but in others the lowest mortality was observed among overweight individuals and mortality tended to increase with lower BMI, even after accounting for smoking (residual confounding) and preexisting disease (reverse causation). This pattern has come to be known as the "obesity paradox". Given the existing and rising number of overweight and obese adults in the US, these divergent findings cause a great deal of confusion among researchers, policy makers, and the general public.

One important but underexplored methodological limitation in the current obesity research is that BMI is an imperfect measure of adiposity. While BMI indicates overweight relative to height, it does not discriminate between fat mass and lean body mass. However, direct measurement of body composition is particularly difficult in large epidemiological studies because it requires expensive and sophisticated technologies. To address this limitation, we recently developed and validated anthropometric prediction equations to estimate lean body mass and fat mass from the National Health and Nutrition Examination Survey. Then, we applied this novel approach to examine the association of predicted lean body mass and fat mass with all-cause and cause-specific mortality in 38,021 men from the Health Professionals Follow-up Study (1987-2012).

This presentation will give an overview of the highly controversial issue of the 'obesity paradox' and its potential explanations, with a focus on the role of body composition. Further, the implications of the findings to population health and physical activity will be discussed.

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Poster Exhibition

No.	Title
1	<p>Association Between Physical Fitness and Cancer Mortality: A Meta-analysis of Prospective Cohort Studies.</p> <p>Jihee Min, Hyuna Park, Seo Hyeon Hwang, Justin Y. Jeon 2017 ISBNPA Annual Meeting, 2016, June 7~10, Victoria, BC, Canada</p>
2	<p>Korean Prostate Cancer Survivors' Physical Activity Participation, Exercise Participation, Exercise Barriers, and Preferences</p> <p>Jihee Min, Samuel Yoo, Min-Jae Kim, Youngdeuk Choi, Justin Y. Jeon 2018 ISBNPA Annual Meeting, 2018, June 3~6, Hong Kong, China</p>
3	<p>Physical Activity Level, Participation in Physical Education Classes and Exercise Barriers in Childhood Cancer Survivors</p> <p>Ji Young Kim, Ji Hee Min, Su Jin Yeon, Samuel Yoo, Chuhl Joo Lyu, Jung Woo Han, Justin Y. Jeon 2018 ISBNPA Annual Meeting, 2018, June 3~6, Hong Kong, China</p>
4	<p>Meeting 24-Hour Movement Guidelines for the Early Years and Individual, Parental, and Environmental Characteristics Among Early Years Children in Canada and South Korea: Cross-cultural Comparisons</p> <p>Yoon Kyung Song, Eun-Young Lee, Justin Y. Jeon, Valerie Carson 2018 ISBNPA Annual Meeting, 2018, June 3~6, Hong Kong, China</p>
5	<p>FGF21 Expression After a 3-day Ketogenic Diet and During Graded Exercise in Healthy Adults</p> <p>Wonhee Cho, Hyuk In Yang, Dong-hyuk Park, Justin Y. Jeon 2018 ISBNPA Annual Meeting, 2018, June 3~6, Hong Kong, China</p>
6	<p>Exercise During Active Surveillance for Prostate Cancer (ERASE) Trial- A Study Protocol of Phase II RCT</p> <p>Dong-Woo Kang, Normand G. Boulé, Adrian S. Fairey, Catherine J. Field, Kerry S. Courneya 2018 FRICSS International Symposium, 2018, May 18, Seoul, Korea</p>
7	<p>Factors Related to Return to Work of Industrially Injured Patients Participated Work Hardening Program</p> <p>Yun Bong Kim, Sang Hee Kim, Young-Hyeon Bae 2018 FRICSS International Symposium, 2018, May 18, Seoul, Korea</p>

Poster Exhibition

No.	Title
8	<p>Effects of Changes in Muscle Mechanical Properties on Neuromuscular Control of Gait in Human: a Simulation Study</p> <p>Hae Dong Lee, Adrian K. M. Lai, James M. Wakeling 2018 The Korean Society of Mechanical Engineers (Biotechnology sector), 2018, April 25~27, Daegu, Korea</p>
9	<p>Effects of Exergame on Overweight Adolescents' Friendship Network and Body Fatness</p> <p>So-Young Park, Han-Joo Lee, Na-Rae Sohn, Su-Ryeon Ryu, Saes-Byeol Moon SHAPE America 2018, 2018, March 20~24, Nashville, TN, USA</p>
10	<p>Research Products of Exercise Medicine Center for Diabetes and Cancer Patients</p> <p>Justin Y. Jeon 2018 I-CONference, 2018, March 27, Seoul, Korea</p>
11	<p>Breast Cancer Survivors Experience of a Social Capital-Based Exercise Adherence Program - A Qualitative Approach</p> <p>Kang Min Jae, Song Yoonkyung, , Ko Yun Hee, Han Jeehee, Kim Sung Hae, Lee Hyo-Jin, Jeon Justin Y, Kim Sue. 2018 Global Breast Cancer Conference, 2018, April 5~ 7, Songdo Convensia, Incheon 2017, July 15~17, Chapel hill, NC, USA</p>
12	<p>Association of Smoking and Sedentary Behavior in Korean Population</p> <p>Christina Jeon, Heejin Kimm, Sun Ha Jee 2018 KSRNT (in press)</p>
13	<p>A Comparison of Attentional Focus with Balance Training between External and Internal Focus in Chronic Ankle Instability of Postural Control: Double Blinded Randomized Control Trial</p> <p>Tae Kyu Kang, Hyun Sick Chang, Sae Yong Lee 2017 The 7th International Ankle Symposium, 2017, July 15~17, Chapel hill, NC, USA</p>
14	<p>The Epidemiological Study of Post-traumatic Ankle Osteoarthritis after Ankle Sprain Over Middle Aged People Using National Health Insurance Sharing Service 450,000 Cohort Data</p> <p>So Young Lee, Kyeongtak Song, Sae Yong Lee 2017 The 68th NATA Clinical Symposia & AT Expo, 2017, Jun 26~29, Houston, Tx, USA</p>

Poster Exhibition

No.	Title
15	Validity and Reliability of a Novel Subtalar Joint Axis of Rotation Locator Measurement Device Byong-Hun Kim, Sae Yong Lee 2018 ASB Annual Meeting, 2018, Aug 8-11, Rochester, MN, USA
16	Ethnic Differences in Lower Extremity Static and Dynamic Postural Measures as a Potential Risk Factor for Anterior Cruciate Ligament (ACL) Injury Changyoung Kim, Saeyong Lee 2018 ASB Annual Meeting, 2018, Aug 8-11, Rochester, MN, USA
17	The Effect of Explicit Analogy and Sequential Method in Learning the Golf Putting Skill Sollina Kim, Dongwon Yook 2018 Korea society of sports psychology, 2018, Feb 1-2, Jeju, Korea
18	Development and Validation of the Psychic Energy Management Inventory of Psychological Skill Training Sungwon Woo, Dongwon Yook, Jaewook Hawng, Sunghoon Kim 2018 Korea society of sports psychology, 2018, Feb 1-2, Jeju, Korea
19	The Relationship among Leisure Satisfaction, Stress-related growth and Happiness for Female Active Senior Sa, Hye Ji, Min Seok Lee 2017 The Korean Association of Gerontology and Geriatrics, 2017.11.3, Seoul, Korea
20	Predicting Behavioral Intentions for 2018 PyeongChang Winter Olympic Stadium Facilities by Using Extended Model of Goal-directed Behavior Sa, Hye Ji 2018 International Conference on Hospitality, Leisure, Sports, and Tourism, 2018. 01.30, Sapporo, Japan
21	A Study on Leisure App, Acceptance and Purchase Intention by Applying Technology Acceptance Model(TAM) for University Student Min Seok Lee 2018 International Conference on Hospitality, Leisure, Sports, and Tourism, 2018. 01.30, Sapporo, Japan

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