Human resources image developed in Human Health Science Graduate School

The Graduate School of Human Health Sciences focuses on research related to the “health” of people living in large cities. In particular, research that contributes to the realization of a vibrant longevity society, which is the mission of Tokyo Metropolitan University, is one of the major issues of this major. Based on a well-established academic system based on theory and practical knowledge in a wide range of fields, in addition to deepening it, graduate education is conducted under an interdisciplinary and integrated research system. We aim to foster "highly practical experts" and "leading researchers" in various fields related to health.

Characteristics of the Physical Therapy Science Area

Today, in the area of health, medical care and welfare, the need for highly skilled professionals with advanced physical therapy expertise is increasing. In the Physical Therapy Science area of this Graduate School, we set up a wide research field from pediatric to the elderly, and aim to foster clinicians, educators and researchers who can respond to various physical therapy problems.

Therefore, we set up research areas of physical function recovery physical therapy, movement disorder analysis physical therapy, and community-based physical therapy, and set up a master’s program and a doctoral program respectively.

In addition, it is possible to advance research while adopting clinical day and night lecture system and accumulating clinical experience as a medical profession such as a physical therapist, and it is possible to plan an organic development of clinical and research.

Admission policy

Master's program

We teach the latest knowledge for the purpose of acquiring advanced knowledge of physiotherapists and technical improvement, advanced practice specialists, and education with self-directed behavioral skills based on creative and scientific thinking for professional development. Aims to train teachers and researchers.

Doctoral program

The purpose is to further develop learning and research in the field of master's program, and to train human resources who can research autonomously in universities, research institutes, companies, etc.

The pillar of education and research in the physical therapy science area

Common to all fields
(required courses)

Movement disorder analysis physical therapy field
Physical function recovery physical therapy field
Community-based physical therapy field
Manual Physical Therapy Course（Master）

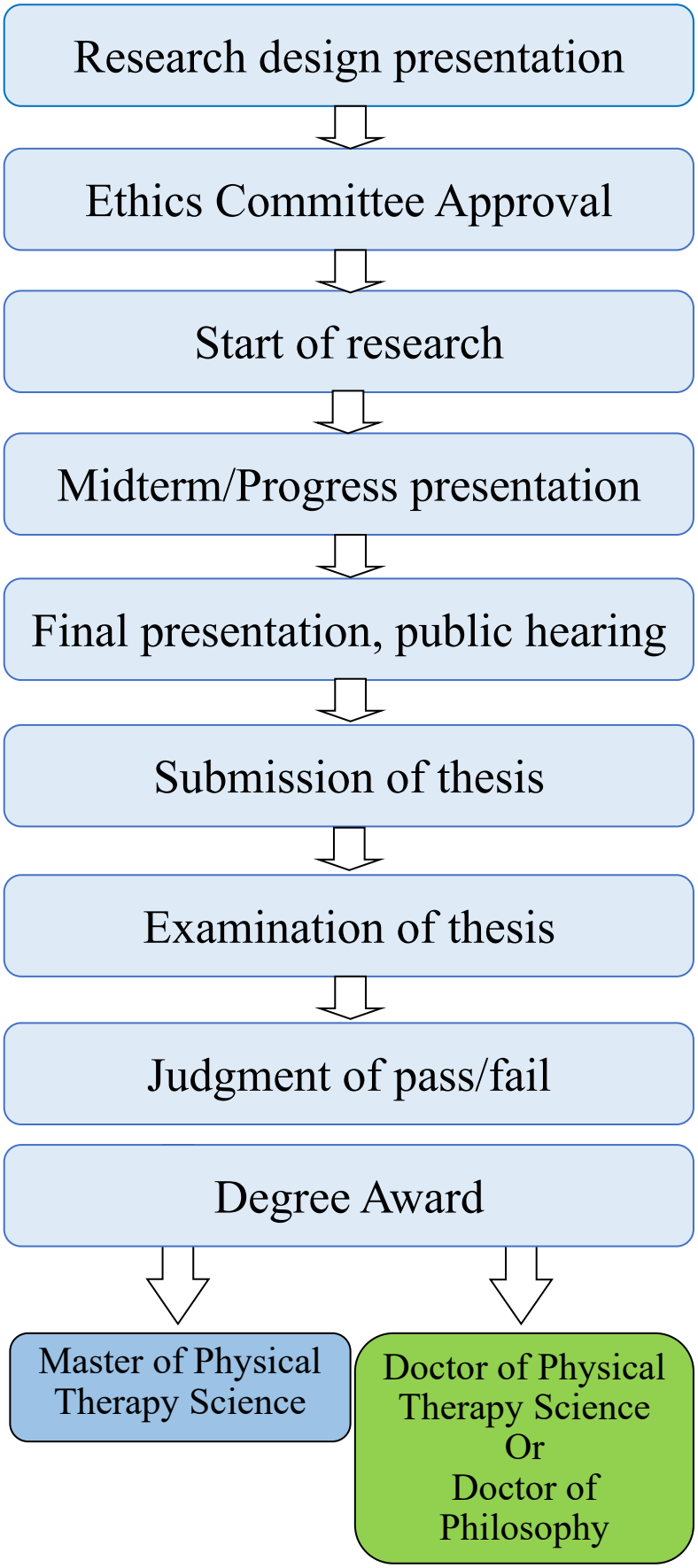
○Master's program

Thesis in Physical therapy
Physical Therapy Research Method

○Doctoral program

Thesis in Physical therapy

Thesis in Physical therapy (master's and doctoral thesis) teaching process



Pediatric Physical Therapy
Gima Lab.

This laboratory's research topics include fetal, neonatal, infant, and childhood developmental characteristics and all issues related to movement disorders and developmental disabilities. These topics will be examined with respect to the developmental mechanisms of sensorimotor experience, with the aim of gaining a deeper understanding of how the interaction between the brain, body, and environment affects human development, and identifying the implications for pediatric physical therapy.

In addition, the assessment of and early intervention of physical therapy for low birth weight infants, and methods of developmental care that promote development will be discussed.

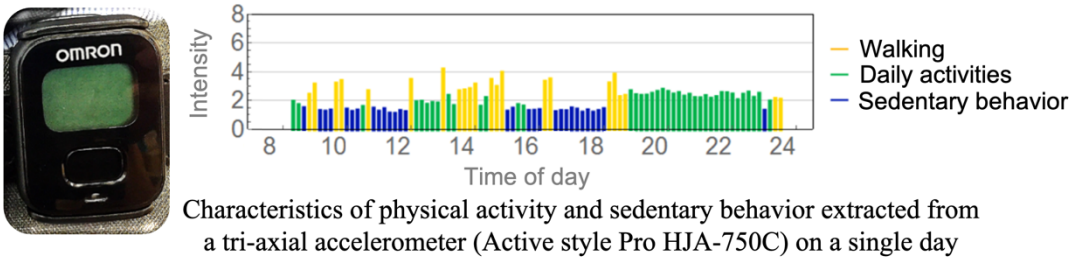
Our research uses various instruments for measuring movement (triaxial accelerometer, 3D motion analyzer system, body pressure sensor, etc.) and also seeks, proposes, and develops ideas for instruments and methods that can be applied in clinical practice.

Preventive Physical Therapy
Tajima Lab.

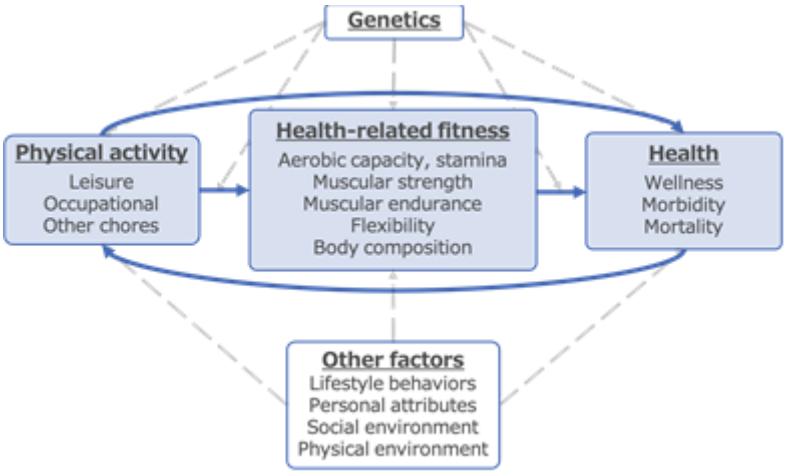
The main research topics of this laboratory will focus on issues related to physical activity and public health (population health promotion, disease prevention, and care prevention). In particular, we aim to acquire basic knowledge of epidemiology, health education, biostatistics, etc., which are the pillars of public health, to develop the ability to plan, practice, analyze, and discuss epidemiological research designs, and to return the knowledge obtained to society.

Regarding physical activity, students will learn to understand and analyze the characteristics of subjective evaluation using questionnaires and objective evaluation methods using accelerometers. Furthermore, students will deepen their understanding of the relationship between physical activity and health-related physical fitness and health outcomes, as well as the linkages to personal and environmental factors that modify these relationships, and acquire the ability to read and interpret evidence and conduct research.

The laboratory is also engaged in multifaceted efforts to promote physical activity, including research on the relationship between awareness of physical activity guidelines and physical activity and sedentary behavior, research on the recommended amount of physical activity for people with chronic diseases, and physical activity intervention research in the community.



Characteristics of physical activity and sedentary behavior extracted from a tri-axial accelerometer (Active style Pro HJA-750C) on a single day



Conceptual model of physical activity and health
(Created from Physical Activity and Health 2nd ed, Human Kinetics)

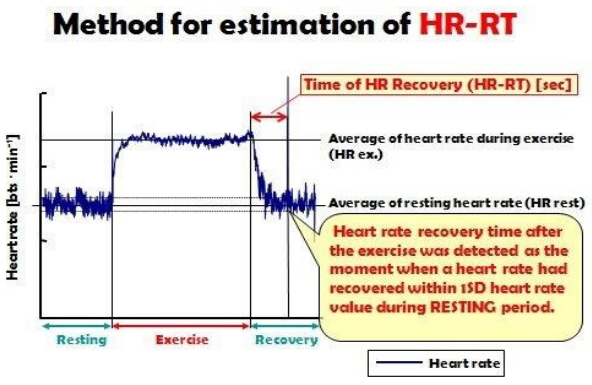
Cardiovascular, Pulmonary and Metabolic Physical Therapy Furukawa Lab.

In Cardiovascular, Pulmonary and Metabolic Physical Therapy, we conduct research and instruction on physical fitness and physical activities for people with internal impediment, and physical therapy evaluations and therapeutic techniques, and prevention methods for internal disorders: circulatory, respiratory, and metabolic disorders, and lifestyle-related diseases.

Our goal is to understand the physical activities of people with internal impediment, including motor system disorders, and prevention of internal disorders through intensive study of the literature and analysis of clinical data, and to examine exercise prescriptions and appropriate physical therapy approaches based on scientific evidence.

The main research theme in recent years in this field is as follows.

1. Evaluation of physical fitness an physical activity
2. Relationship between attitude change and respiratory muscle strength
3. Cardiorespiratory response during exercise testing
4. Development of a fall prediction assessment tool in hemodialysis patients
5. Perioperative rehabilitation effect after upper abdominal laparotomy
6. Combined effects of respiratory physical therapy and music therapy
7. Relationship between the waist and trunk fat percentage
8. Effect of electrical stimulation of skeletal muscle on energy metabolic rate
9. Relationship between the pre-sickness range of life and swallowing function in people with aspiration pneumonia
10. Difference between mask shape and reservoir effect



CPX and analysis of heart rate recovery time

Neurocognitive Therapy
Ikeda　Lab.

Cognitive and motion science and physical therapy studies neural mechanisms of voluntary movements, plasticity of the nervous system, motor images, motor learning, etc. The purpose is to elucidate the pathophysiology of movement disorders, to examine the evaluation methods so far, and to develop specific strategies for physical therapy.

【What kind of thing do you learn】

Each gaduate student will select a theme of interest from among the following themes, and will read a research paper on the theme, summarize its contents, give a presentation, and discuss the contents.

Teaching Policy Theme

Neural mechanisms of voluntary movements, Neural plasticity, Motor imagery, Motor learning and control, Visual–motor illusion Subjective experience, Multi-sensory integration, Recovery of motor function, Recovery of ability of action, Neurocognitive rehabilitation

【Research paper and conference presentation】

- K. Sakai, K. Goto, R. Watanabe, J. Tanabe, K. Amimoto, K. Kumai, K. Shibata, K. Morikawa, Y. Ikeda: Immediate effects of visual–motor illusion on resting-state functional connectivity. Brain and Cognition 146(105632), 2020.12.
- K. Sakai, Y. Ikeda, K. Amimoto, K. Goto, K. Morikawa, K. Kumai: Brain regions activated during visual motor illusion of the ankle joint movement. J. Asi. Reha. Sci, 3(2): 17-22, 2020.07.
- K. Sakai, T. Kawasaki, Y. Ikeda, K. Tominaga, K. Kurihara: Relationship between motor estimation error and physical function in patients with Parkinson's disease. Medicines 7(43), 2020.07.
- Keiichiro Shibata, Yumi Ikeda : Effects of a mental rotation intervention on sensory discrimination functions and body perception.11th WORLD CONGRESS FOR NEUROREHABILITATION. 2020.10.

Measurement of cerebral blood flow during kinesthetic illusion induced by visual stimulation task using fNIRS

Neuro-Physiotherapy
Kaneko Lab.

The goal of our research is to attain a novel neuroscience founded rehabilitation treatment. To explore the scientific principles of the nervous system, we employ brain function imaging such as fMRI, electrophysiology such as non-invasive brain stimulation, EEG, evoked potentials, and motion analysis using surface EMG.

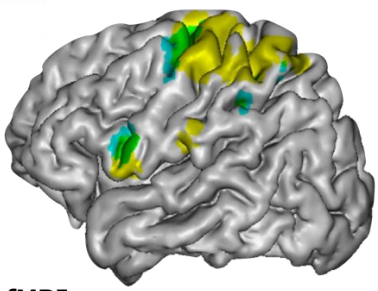
Clinically, in order to realize the brain functional reorganization and motor function repair in a survivor after stroke, we are developing the original product of xR system to represent visually induced kinesthetic illusion in the brain, and robotic devices. Those effects are examined in clinical trials.

Our laboratory collaborates with external hospitals and research organizations and carries out from experimental research to clinical trials.

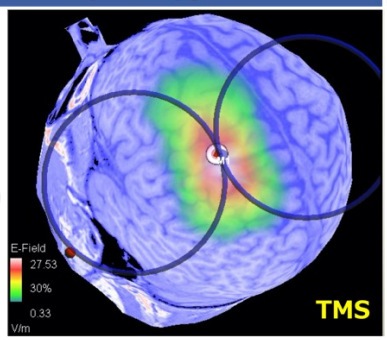
We hope you will complete creative original research, and we will transmit significant information to the world.

Neuroscience Founded Physiotherapy

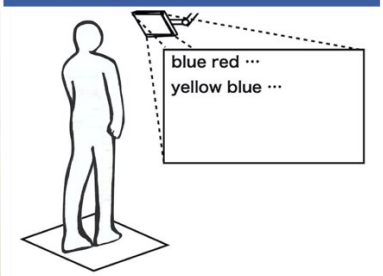
Brain imaging & Physiology



(Kaneko F, et al, PLOSONE, 2015)



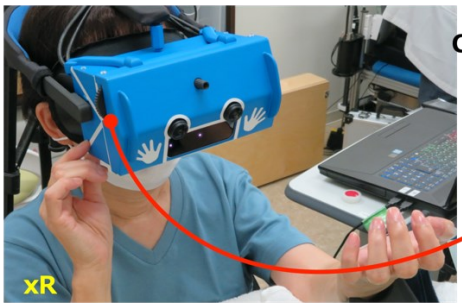
Cognitive health



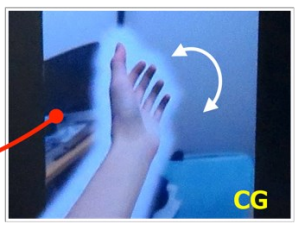
Word-tandem dual-task

(Kimura T, et al, Frontiers Hum Neurosci, 2021)

Embodied-brain system science



Cognitive body augmentation

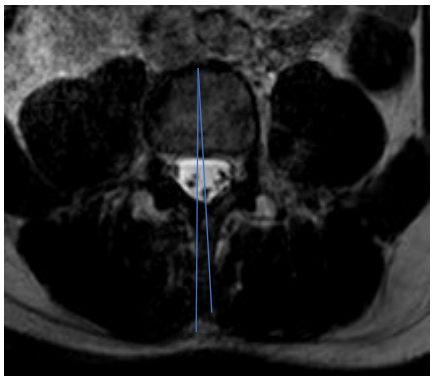


Robotic devices

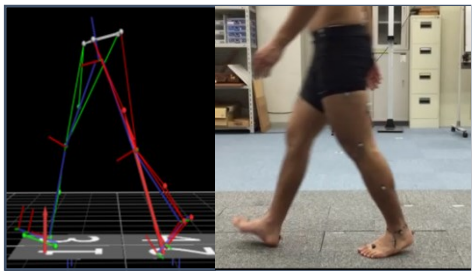
Physical Therapy for the Musculoskeletal System　Kuruma Lab.

Our laboratory conducts fundamental and clinical research about the physical therapy for the musculoskeletal system. We study motion analysis and the intervention effect of the physical therapy for healthy subjects and movement disorders. The research methods are an electromyogram and dynamometer, three-dimensional movement analysis, MRI and the ultrasound etc.

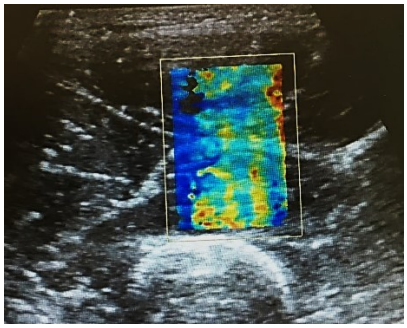
Trunk harness



Analysis of lumbar rotation angle



Gait analysis

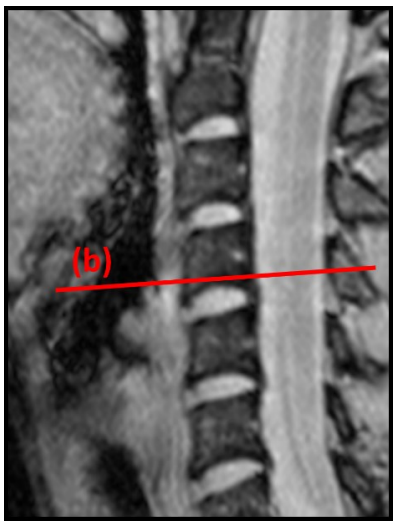


Muscle stiffness using shear wave elastography of ultrasound.

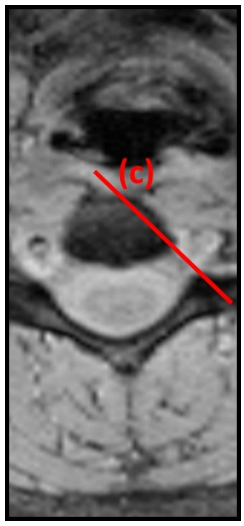
Orthopaedic Physical Therapy
Usa Lab.

We focus on the dysfunction of nerves, muscles and joints, and conduct studies on the function of these tissues, mechanism of dysfunction, and the effectiveness of the therapeutic exercises and manual therapy for dysfunction in musculoskeletal system.

To accomplish those studies, we apply the image analyses using MR image (Magnetic Resonance image) and ultrasound image, the analyses using electromyography, and the muscle function analyses using dynamometers and tissue hardness meters.



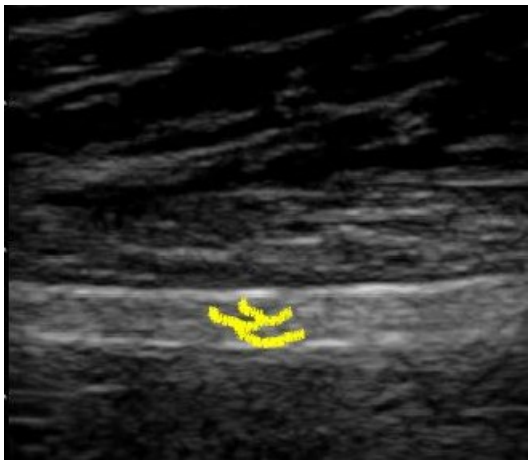
(a)Midsagital plane of cervical vertebrae



(b)Oblique horizontal plane parallel to the base of C4

(c)Oblique coronal plane perpendicular to C5 nerve root

MR image to measure the area of foramen in cervical vertebrae.

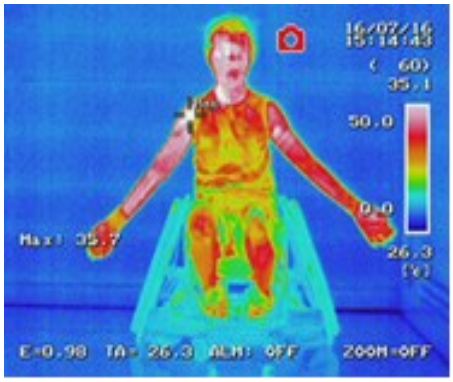


Ultrasound image to measure Sciatic Nerve Displacement

Adapted Sports Physical Therapy
Shida Lab.

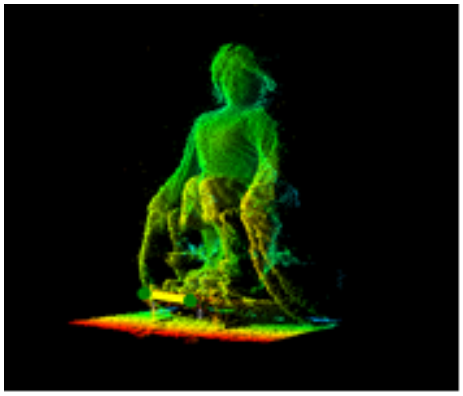
In this field, we research living support for persons with disability, focusing on improvement the ability of athletes with disability and prevention of dysfunction. We are conducting research on activities that consider the health of people with disabilities and the elderly, as well as wheelchairs and welfare equipment.

Regarding sports activities for persons with disability, there are many divergent perspectives concerning not only physical and psychological effects, but also the effects of sports equipment and development and dissemination systems. We conduct multifaceted examination of activities and sports activities for persons with disability to live better, not only with respect to the persons themselves, but also surrounding persons, the environment, etc. Research methods include observational research and practical intervention research using kinematic methods such as motion analysis, in addition to survey research.



Body temperature research by thermograph

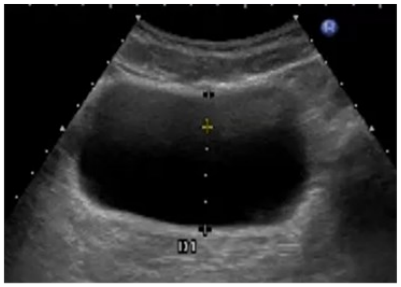

Breath gas analysis using upper body ergometer.


Analysis of wheelchair propulsion in sports using Mobile Motion Visualizer

Women's Health and Men's Health Physical Therapy
Kamio Lab.

In this field, we study physiotherapy for various conditions at different stages of life, based on the physiological and biological sex differences between women and men. For women, musculoskeletal disorders related to pregnancy and childbirth, pelvic floor problems and urinary incontinence, which are some of the conditions that are more likely to develop with age, such as pelvic organ prolapse and osteoporosis. Women also experience conditions specific to their sex, such as dysmenorrhea and pelvic girdle pain. In contrast, men commonly experience urinary problems caused by an enlarged prostate or prostate cancer. We will conduct basic and clinical research on physiotherapy according to the physical characteristics of women and men.

Physical therapy
Pelvi floor Muscle Contraction



Good contraction

Bad Contraction

Women's Health

- Problems before and after childbirth
- Treatment and prevention of pelvic floor dysfunction
- Osteoporosis
- Treatment of lymphedema after surgery for uterine cancer, breast cancer, etc.

Men's Health

- Postoperative management of urologic diseases
- Prevention and treatment of chronic pelvic pain and other conditions
- osteoporosis

Community-Based Physical Therapy
Asakawa Lab.

Physical therapists have a long history of working in the community. Follow-up of discharged patients and support of patient associations have been carried out for about 50 years. However, it is only recently that these activities have been organized as an academic discipline and field of practice in Japan. In this sense, community physical therapy today is a new field that has emerged against the backdrop of a long history of practice.

The Japanese Society for Community Comprehensive Physical Therapy (JSCCPT) organizes the main fields of practice into four areas that are directly related to the "individual-group" and "direct-indirect" axes. For example, home visit rehabilitation and day care rehabilitation are practices in which physical therapists approach individuals directly. Caregiver prevention classes and lifestyle-related disease prevention classes are also direct approaches, but are considered group-targeted practices. Individual community care meetings are an approach to individuals, and collaboration with the government is an approach to groups, both of which are considered indirect practices.

In order to expand these areas of practice, we have established the following main academic areas: 1. the area of gerontology, 2. the area of health activities, and 3. the area of home support.

Our laboratory is involved in these studies.

JSCCPT

https://www.jsccpt.jp/

Manual Physical Therapy Course (Master's course).

The Manual Physical Therapy Course offers lectures including practical skill training based on the educational standards of the International Federation of Orthopedic and Physical Therapists (IFOMPT). This is a sub-group of the World Physiotherapy (WPT).

This course enables the acquisition of comprehensive knowledge and the development of clinical reasoning skills, and its application for advanced clinical practice. In the second year, clinical practice is set as an opportunity to receive clinical experience. In the future, successful completion of this courses qualifies you for membership of IFOMPT as an Orthopaedic Manual Physical Therapist (OMPT).
The students are required to attend classes for an average of three days per week. This course provides opportunities for a discussion in order to cultivate the ability to attain knowledge and critical skills.

The University accepts international students from other Asian countries; therefore, you need to be able to express your opinions in English.

The ideal student profile for this course are students who keep challenging themselves, but not merely acquiring a skill. We also hope for students, who understand the limits of these skills and can think about how we can contribute toward promoting further growth of these skills.