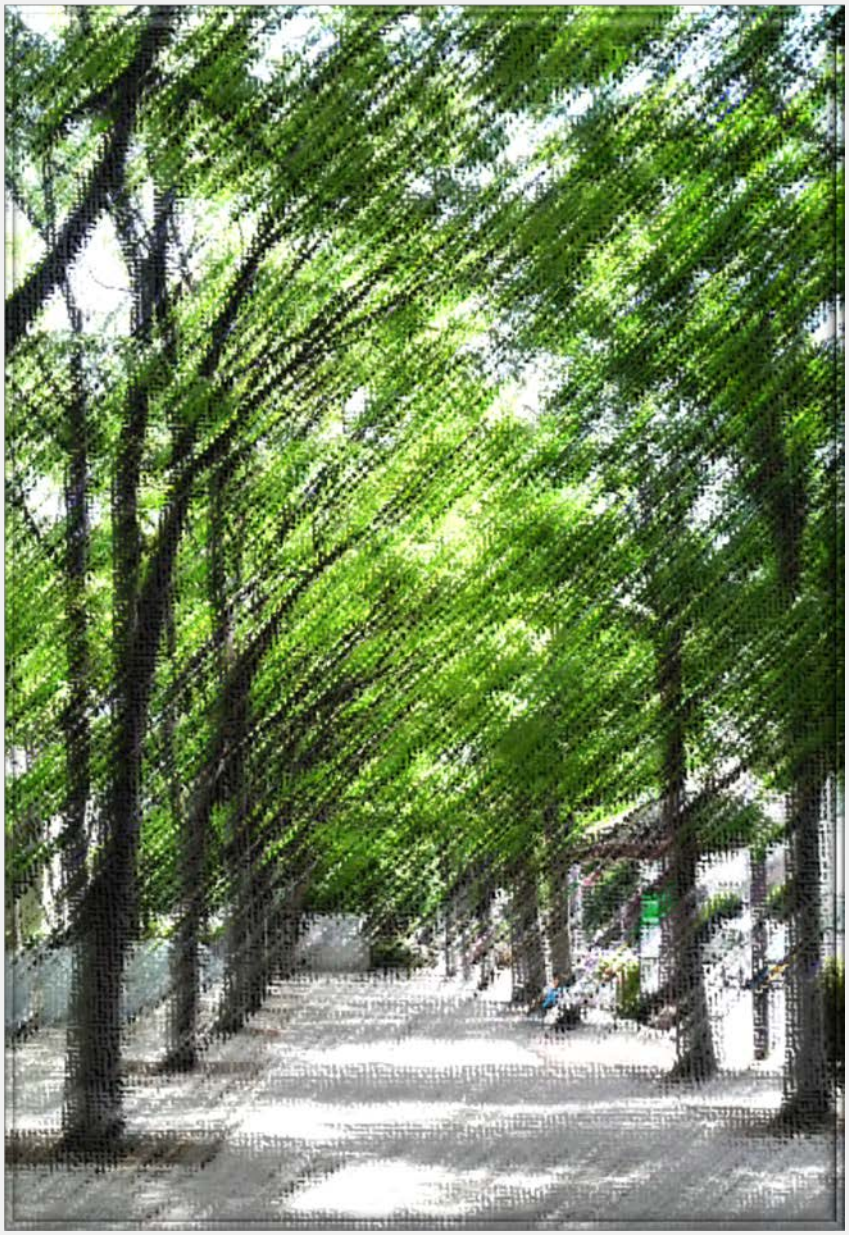
Tokyo Metropolitan University

Graduate School of Human Health Sciences

Department of Physical Therapy



Human resources image developed in Human Health Sciences Graduate School

The Graduate School of Human Health Sciences focuses on research related to the health of people living in large cities. Research that contributes to the creation of a vibrant long-living society, which is the mission of Tokyo Metropolitan University, is a focal point of this major. Backed by a well-established academic system based on theory and practical knowledge in a wide range of fields, postgraduate education is conducted under an interdisciplinary and integrated research system. In addition to enhancing this system, we strive to foster both skilled practitioners and leading researchers in various health-related fields.

Characteristics of the physical therapy science area

Today, the need for highly skilled professionals with advanced physical therapy expertise in the fields of health, medical care, and welfare is increasing. In the Physical Therapy Science area of this graduate school, we established a wide research field from pediatric to elderly patients, with the goal of training clinicians, educators, and researchers who can respond to various physical therapy problems.

We developed the following research areas of physical therapy: function recovery, movement disorder analysis, and community based; in addition, we established master's and doctoral programs. The research included adopting a clinical day and night lecture system and accumulating clinical experience in a medical profession, such as physical therapy. In addition, it was possible to plan an organic development of clinical practice and research.

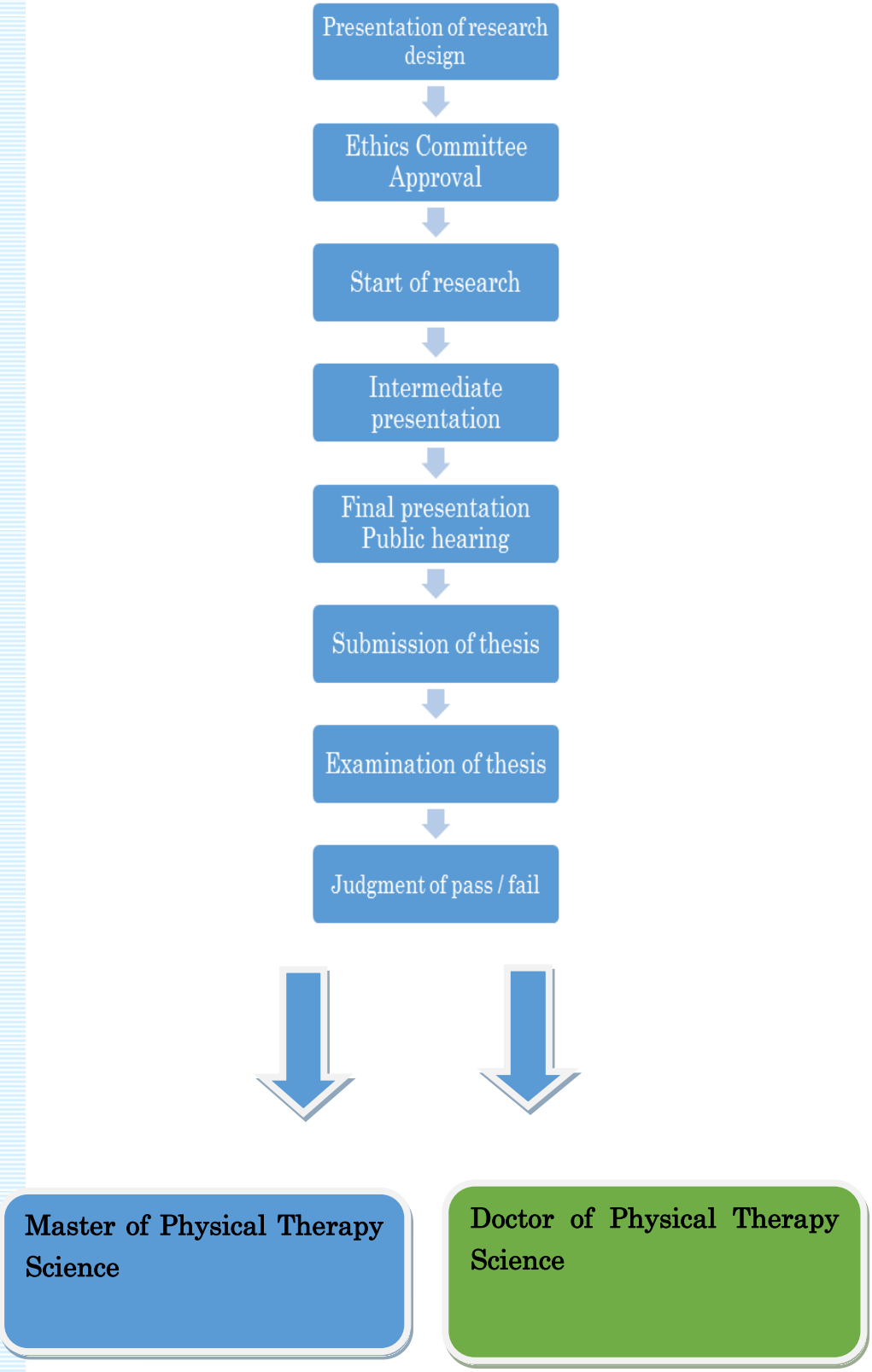
Admission policy

Master's program	For the master's program, with the goal of training researchers, we teach the latest information to provide advanced knowledge for physiotherapist and technical improvement, advanced practice specialists, and education with self-directed behavioral skills based on creative and scientific thinking for professional development.
Doctoral program	The purpose of the doctoral program is to further develop the learning and research acquired during the master's program and to train individuals who can research autonomously in universities, research institutes, and companies.

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	Physical therapy science special research Physical Therapy Management Physical Therapy Research Method
○Doctoral program	Physical therapy science special research

Special research (master's and doctoral thesis) teaching process

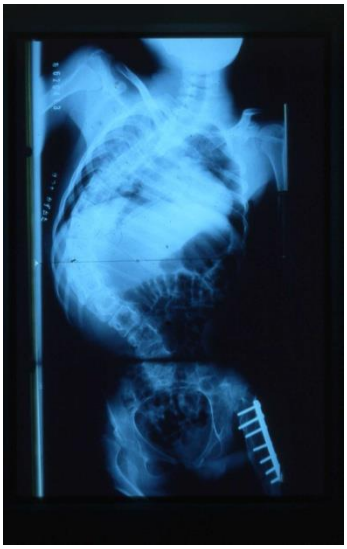


Pediatric Physical Therapy
Nitta Lab.

In this laboratory, from the perspective of physical therapy, we are researching the following: methods of evaluating functionality in children and adults with developmental disorders, such as cerebral palsy; the development of rehabilitation programs; the burden of nursing care; and the establishment of environmental and assistive tools.

When developing medical, assistive, and health equipment, it is important to understand the needs of the people who will be using the devices and to develop equipment that can provide care in line with the strength and movement of the specific person.

As physical therapists, we interact clinically, on a daily basis, with individuals who require our support. Based on this experience and knowledge, we have collaborated with corporations and other researchers within the university to plan and design a wide variety of support equipment and health-related products. By taking the finished prototypes to the clinical field, we can monitor their use and make improvements, thus producing final products that match specific needs.

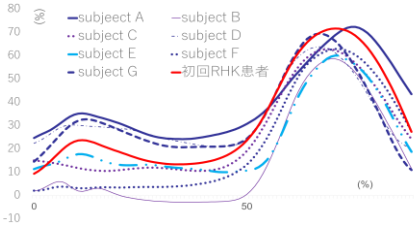


cerebral palsy

Disability prevention physical therapy
Yamada Lab.

In disability prevention physical therapy, we conduct research from the perspective of preventing the need for physical therapy for internal and exercise disorders. These methods include promoting health, preventing the need for long-term care, countering dementia in the elderly population, and averting lifestyle-related disease.

In this laboratory, in addition to clinical research on avoiding the need for long-term care, and preventing respiration and internal disorders, we developed, through biomechanics research using a three-dimensional motion analysis device, an ultrasonic diagnostic device and magnetic resonance image (MRI) equipment. We are verifying the effectiveness of the prevention program.



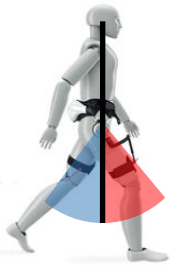
Gait analysis study differences by type CR, UK and RHK artificial knee joints

Development of Arakawa-Koroban exercise

fall prevention exercise program

Clinical study of Honda Walking Assist device

in hemiplegic stroke patients



ISPRM 2019 【Research paper and conference presentation 】

- Relationship between foot and ankle function and immediate effect of the Honda Walking Assist device in hemiplegic stroke patients
- Influence of Insoles on Healthy Young Women's Foot Motion and Knee Adduction Moment During Walking
- Association of difficulty in descending stairs with age and sex group in patients underwent total knee arthroplasty
- Biomechanical gait analysis for a hip disarticulation prosthetic - power source for the swing phase of a hip disarticulation prosthetic limb –

WCPT 2019

- Biomechanics of short leg brace (Ottobock Agilium Freestep) for osteoarthritis of knee and its relationship with flat feet
- Assessment of muscle density index with multi-frequency bioelectrical impedance analysis:

Relationship between aging and one leg standing time

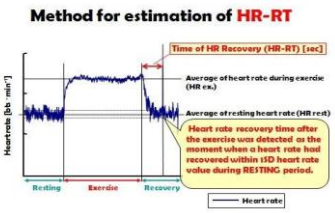
Physical therapy for internal disorders
Furukawa Lab.

In physical therapy for internal disorders, we conduct research and offer instruction on physical fitness and activities for people with internal disorders, such as ischemic heart disease, and provide physical therapy evaluations and therapeutic techniques.

Our goal is to understand the physical activities of people with organ damage, including lifestyle-related diseases and motor system disorders, through an 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 themes in recent years in this field are as follows:

1. Study on the evaluation of physical fitness and physical activity
2. Study on the relationship between attitude change and respiratory muscle strength
3. Study on the cardiorespiratory response during exercise testing
4. Study on the development of a fall prediction assessment tool in hemodialysis patients
5. Study on the perioperative rehabilitation effect after upper abdominal laparotomy
6. Study of the combined effects of respiratory physical therapy and music therapy
7. Study on the relationship between the waist and trunk fat percentage



CPX and analysis of heart rate recovery time

Neurocognitive Therapy
Ikeda　Lab.

The focus of our research includes the following: cognitive and motion science and physical therapy studies, neural mechanisms of voluntary movements, plasticity of the nervous system, motor images, and motor learning. We hope to elucidate the pathophysiology of movement disorders, to examine current evaluation methods, and to develop specific strategies for physical therapy.

【What do you learn?】

Each graduate student will select an area of interest from among the following themes, read a research paper on the theme, provide a summary, give a presentation, and discuss the contents.

Teaching Policy Themes:

Neural mechanisms of voluntary movements, Neural plasticity, Motor imagery, Motor learning and control, Subjective experience, Multisensory integration, Recovery of motor function, Recovery of ability of action, Neurocognitive rehabilitation

○Master's Course

Analysis of Neurocognitive Therapy

Analysis Practice of Neurocognitive Therapy

○Doctoral Course

Advanced Analysis of Neurocognitive Therapy

Advanced Analysis Practice of Neurocognitive Therapy

【Research paper and conference presentation】

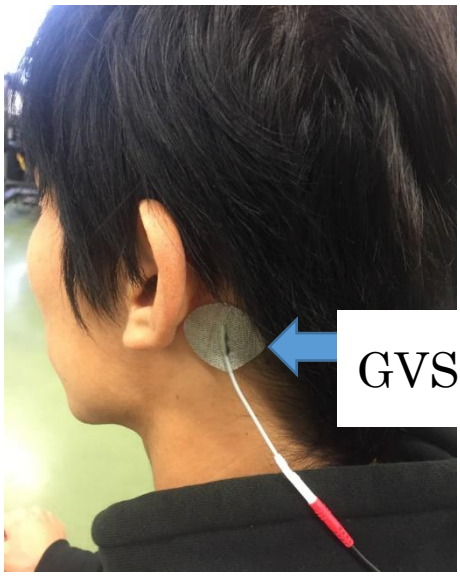
・K. Sakai, Y. Ikeda, and K. Amimoto: Effect of kinesthetic illusion induced by visual stimulation on ankle dorsiflexion dysfunction in a stroke patient: ABAB single-case design. Neurocase. 2019. Jan 18:1-5.

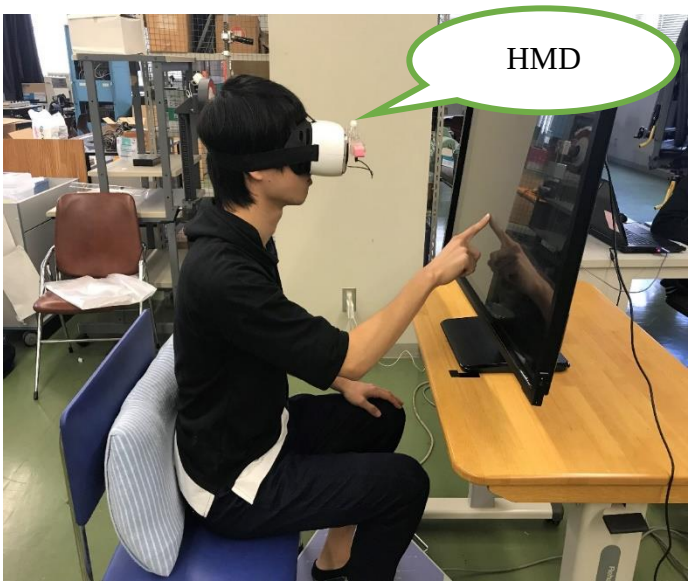
・K. Goto, Y. Ikeda, T. Matsuda, H. Kuruma, and A. Senoo: Analysis of cerebral neural activity during dual-task performance of cognitive motor tasks. 23th Meeting of the European Neurological Society. 2013. vol. 260　(supplement1): S101, 2013.06.

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

Neurological Physical Therapy
Amimoto Lab.

In our work on neurological physical therapy, we explore the characterization of physical and cognitive dysfunctions due to brain damage, a literature review of therapeutic approaches, and empirical clinical research. Specifically, research will be conducted on the application and development of evaluation and treatment methods, with special consideration of the pathological conditions of acute and chronic phases, in patients with hemiplegia and higher cortical dysfunction. In recent years, we have investigated the effects of vestibular stimulation, the influence of vibration stimulation on postural control, the generation of a unilateral spatial neglect model using virtual reality, and research on the effect of delayed feedback for balance improvement.

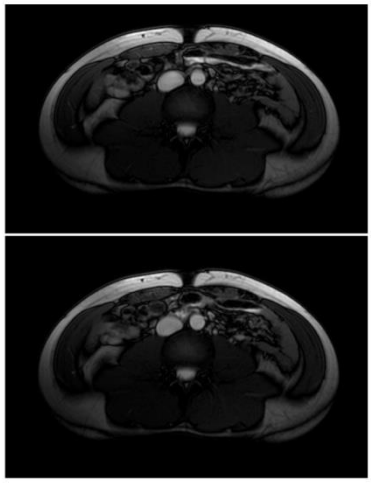




Physical therapy for the musculoskeletal system
Kuruma Lab.

Our laboratory conducts fundamental and clinical research on physical therapy for the musculoskeletal system. We study motion analysis and the intervention effect of physical therapy on healthy subjects and those with movement disorders. For research, we used an electromyogram, a dynamometer, three-dimensional movement analysis, MRI, and ultrasound. In addition, we use functional MRI for brain activity.

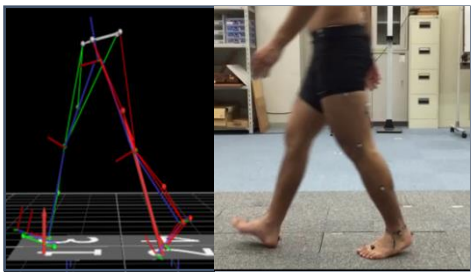
Imaging of a person with a history of low back pain



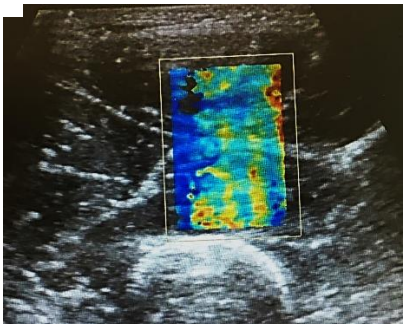
Before movement execution

After movement execution

MRI scans of the trunk of a person with a history of lower back pain before and after movement



Gait analysis

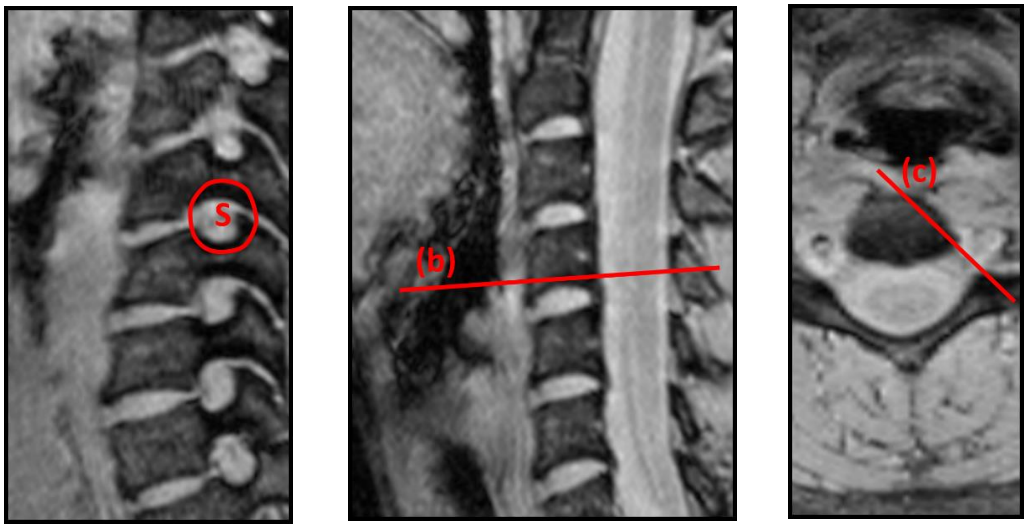


Muscle stiffness using shear wave elastography of ultrasound

Musculoskeletal physical therapy
Usa　Lab.

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

In our research, we use MRI and ultrasound imaging, electromyography, and muscle function analyses using dynamometers and tissue hardness meters.



MR image to measure the area of foramen in cervical vertebrae

(a) Midsagittal plane of cervical vertebrae

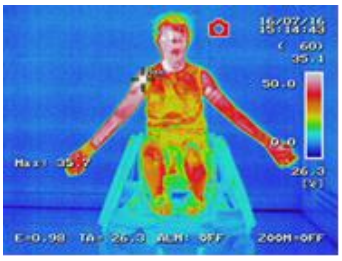
(b) Axial plane parallel to the base of C4

(c) Oblique coronal plane perpendicular to C5 nerve root

Ultrasound image to measure Sciatic Nerve Displacement

Physical therapy for adaptive sports
Shida Lab.

In this field, we research living support for persons with disabilities, focusing on improvement of the ability of athletes with disabilities and the prevention of obstacles to their progress. Regarding sports activities for persons with disabilities, there are divergent perspectives concerning not only physical and psychological effects, but also the effects of sports equipment and development and dissemination systems. We conducted a multifaceted examination of daily and sports activities that might benefit persons with disabilities, not only with respect to improving their lives but also the lives of other persons and their surroundings. Research methods include observational and practical intervention using kinematic methods, such as motion analysis, in addition to survey research.

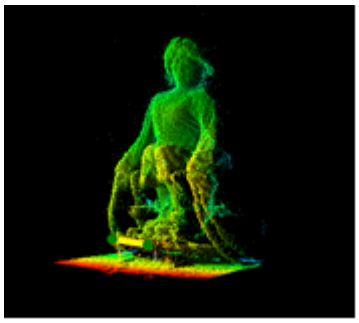


Body temperature research

by thermography

Breath gas analysis

using upper body ergometer



Analysis of wheelchair propulsion in sports using Mobile Motion Visualizer

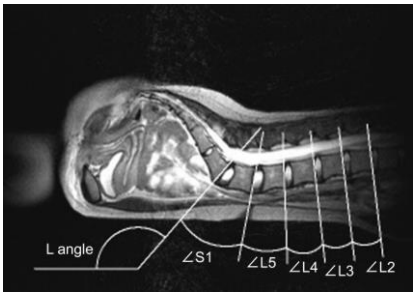
Manual Physical Therapy
Takei Lab.

In our laboratory, we study the theory, techniques, and effects of manual therapy, using the following methods:

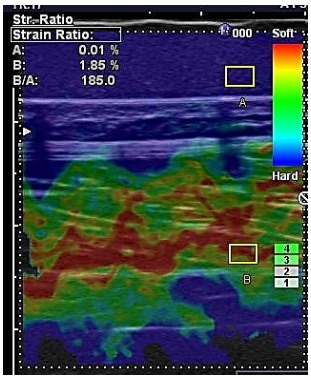
joint kinematics research, such as MRI of the sacroiliac and lumbar intervertebral joints, and dynamic basic research on muscles, fascia, tendons, and ligaments using ultrasonic diagnostic equipment.

We have examined the effects of manual physical therapy and iatrophysics; performed research on standing posture classification using alignment, range of motion, muscle strength, and body sway; and investigated the effects of physical therapy on osteoarthritis.

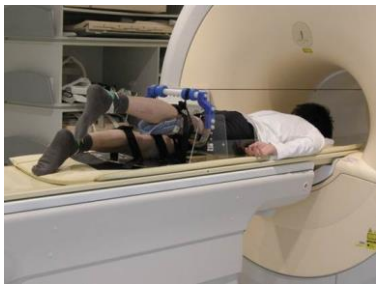
Our aim was to pursue the scientific basis of manual physical therapy by conducting both basic and clinical research.



MRI image of sacroiliac joint
and lumbar intervertebral joint



Using an ultrasonic diagnostic device
Real- time elastography



Hip extension Motion analysis
using MRI system

Community-Based Physical Therapy
Asakawa Lab.

Research on community-based physical therapy focuses on community-dwelling people and community living in the following four categories: 1. policy making for community-based rehabilitation and physical therapy, 2. therapeutic exercise for independent daily living among older adults with disabilities, 3. environmental arrangement/improvement for comfortable and safe care, and 4. preventive and supportive physical therapy to facilitate social participation among older adults.

The master's program provides advanced knowledge about community-based physical therapy through discussion about theory as well as actual practice in the field. The doctoral program provides an understanding of the method of evaluation and intervention in community-based physical therapy.

Manual Physical Therapy Course（Master）

This course provides comprehensive basic theory instruction about manual physical therapy, lectures, exercises, clinical training, and research methods and results in the ability of students to practice advanced clinical skills. The course offers educational content shown by IFOMPT and develops a wide range of classes on exercise physical therapy.

The course consists of the following four pillars:

1. Lectures on basic medicine and research methods
2. Lectures and practice on manual physical therapy
3. Clinical training
4. Research

With regard to pillar 1, students will take classes with peers in other fields and receive lectures from teachers outside the course. For pillars 2 and 3, students will be taught via lectures, practice, and clinical training of manual physical therapy, specifically by teachers who have acquired OMPT. With regard to pillar 4, an instructor who is specially trained in a specific area of physical therapy will provide research instruction.

At the end of the course, we hope to produce physical therapy practitioners with advanced knowledge and excellent research ability.